

R16

Code No: 131AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

PROFESSIONAL COMMUNICATION IN ENGLISH

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B:

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) Give the meaning of the suffix 'ous' and use it in a sentence. [2]
- b) Complete the sentences with correct prepositions: [3]
- i) _____ the picture, there are four people.
- ii) A couple is sitting _____ the table.
- iii) The old people are sitting _____ the chairs.
- c) Last week in my email to you I **synthesized** our strategic direction as a productivity and platform company. What is the synonym of the word 'synthesized' in the mail given by Satya Nadella? Also make a contextual sentence using the synonym chosen by you. [2]
- d) Explain the phrase "In leaves no step had trodden black" taken from Robert Frost's 'Road not taken'. [3]
- e) Use the confusable 'there' as an adverb and as a subject. Give example for each. [2]
- f) Differentiate between present continuous tense and past perfect tense with an example for each tense forms. [3]
- g) Explain briefly why does J.C.Hill state that 'Men are fragile things come to live in this dangerous world'. [2]
- h) Choose the correct one word substitutes for the following sentences: [3]
- i) 'A man who hates women'
- A) Misogynist B) Misanthropist C) Pyromaniac D) Hypochondriac
- ii) 'A person who speaks less'
- A) Reticent B) Metropolitan C) Sinecure D) Fastidious
- i) What is Rahul's perception of literacy in the letter written to his father? [2]
- j) What do you understand by SQ3R technique in reading? [3]

PART -B

(50 Marks)

- 2.a) Why do you think Dr. A.P.J. Abdul Kalam was really a true inspiration for the youngsters of the country.
- b) Punctuate the following paragraph with full stops, commas, capital letters, etc.
- This is, without a doubt Kipling's most beloved poem, and, along with The White Man's Burden, his most famous. Although t.S. Eliot would deem it only great verse and others "jingoistic nonsense," it is consistently ranked among the highest, if not the highest itself, of britons' favorite poems. It was first published in the "Brother Square-Toes" chapter of *Rewards and Fairies*, a 1910 collection of verse and short stories.
- c) Write a paragraph on 'the greatest success in my life'. [3+3+4]

OR

- 3.a) Read the text below and summarize it in about 100 words.

If I had the power to impose my will, I would get people to walk more. We walk only when we have to, hurrying between places where vehicles can't take us. I know people who take their cars when they are going to the shops just up the road. There are cities in America where you can't get anywhere if you don't have a car. Once, in Los Angeles, I was considered eccentric when I wanted to walk around in Beverly Hills. We know places differently when we walk in them. To travel with someone in their car, to be given a lift, is to be at the mercy of their ego; it is to be inside their ego. But to walk with someone, to converse with them while walking, is like breaking bread together. Walking conversations are somehow more profound than driving conversations. It is something about putting one foot in front of the other together, moving through space, linked in the rhythms of the body. It is mutual body-song, the unique way each person walks their soul's signature on the earth. I would have people walk to the next bus stop rather than stand there waiting. I would have people get lost walking just for the special pleasures of discovery. I would have people walk when they are depressed, walk when they are overwhelmed with problems, when they are anxious, when they are sad. I'd have them walk when they are happy, just so they can infect the world with their precious mood.

- b) What are the features of writing a good paragraph?
c) Write which parts of speech are the underlined words in the sentences given below:

i) You have to believe in yourself if you ever expect to be successful at something.

ii) We left for the mountain just before six in the morning. [4+4+2]

- 4.a) Interpret the lines spoken by Satya Nadella 'First, we will simplify the way we work to drive greater accountability, become more agile and move faster'.

b) In the poem 'Road not Taken' the poet explains 'I shall be telling this with a sigh' why does he sigh at others? Explain.

- c) For each of the following word, choose the option that gives its meaning. [4+3+3]

i) Progress

1) fearful 2) advancement 3) bold 4) reverent

ii) Beneficial

1) promptness 2) keenness 3) valuable 4) liveliness

iii) Adverse

1) unpleasant 2) sinful 3) immoral 4) indifferent

OR

- 5.a) What are different styles of letter writing. Explain briefly with examples.

b) Write a letter of inquiry with reply.

c) What is the difference between extensive reading and intensive reading? Explain. [3+3+4]

- 6.a) Write an e-mail to the CEO of IBM highlighting your credentials to seek a job in his company? (Assume relevant data).

b) i) They will send him away to school.(change into passive voice)

ii) What is the superlative form of the adjective 'Mighty'?

- c) Read the following passage and answer the questions that follow.

The Galapagos Islands are in the Pacific Ocean, off the western coast of South America. They are a rocky, lonely spot, but they are also one of the most unusual places in the world. One reason is that they are the home of some of the last giant tortoises left on earth. Weighing hundreds of pounds, these tortoises, or land turtles, wander slowly around the rocks and sand of the islands. Strangely, each of these islands has its own particular kinds of tortoises. There are seven different kinds of tortoises on the eight islands, each kind being slightly different from the other. Hundreds of years ago,

thousands of tortoises wandered around these islands. However, all that changed when people started landing there. When people first arrived in 1535, their ships had no refrigerators. This meant that fresh food was always a problem for the sailors on board. The giant tortoises provided an easy solution to this problem.

Ships would anchor off the islands, and crews would row ashore and seize as many tortoises as they could. Once the animals were aboard the ship, the sailors would roll the tortoises onto their backs. The tortoises were completely helpless once on their backs, so they could only lie there until used for soups and stews. Almost 100,000 tortoises were carried off in this way. The tortoises faced other problems, too. Soon after the first ships, settlers arrived, bringing pigs, goats, donkeys, dogs and cats. All of these animals ruined life for the tortoises. Donkeys and goats ate all the plants that the tortoises usually fed on, while the pigs, dogs and cats consumed thousands of baby tortoises each year. Within a few years, it was hard to find any tortoise eggs-or even any baby tortoises. By the early 1900s, people began to worry that the last of the tortoises would soon die out. No one, however, seemed to care enough to do anything about the problem. More and more tortoises disappeared, even though sailors no longer needed them for food. For another 50 years, this situation continued. Finally, in the 1950s, scientists decided that something must be done. The first part of their plan was to remove as many cats, dogs and other animals as they could from the islands. Next, they tried to make sure that more baby tortoises would be born. To do this, they started looking for wild tortoise eggs. They gathered the eggs and put them in safe containers. When the eggs hatched, the scientists raised the tortoises in special pens. Both the eggs and tortoises were numbered so that the scientists knew exactly which kinds of tortoises they had and which island they came from. Once the tortoises were old enough and big enough to take care of themselves, the scientists took them back to their islands and set them loose. This slow, hard work continues today, and, thanks to it, the number of tortoises is now increasing every year. Perhaps these wonderful animals will not disappear after all.

i) What happened first?

- A) Sailors took tortoises aboard ships
- B) The tortoise meat was used for soups and stews
- C) Tortoises were put onto their backs
- D) Settlers brought other animals to the islands
- E) Pigs had been all the sailors had to eat

ii) What happened soon after people brought animals to the islands?

- A) Tortoise eggs were kept in safe containers
- B) Scientists took away as many animals as they could
- C) The animals ate the tortoises' food and eggs
- D) The tortoises fought with the other animals
- E) The tortoises continued to wander freely

iii) When did people start to do something to save the tortoises?

- A) In the 1500s
- B) In the 1950s
- C) In the early 1900s
- D) In the 1960s
- E) In the 1400s

iv) What happens right after the tortoise eggs hatch?

- A) The scientists take the tortoises back to their islands
- B) The scientists get rid of cats, dogs, and other animals
- C) The sailors use the tortoises for food
- D) The scientists raise the tortoises in special pens
- E) The scientists encourage the villagers to help

- v) What happened last?
 A) The tortoises began to disappear
 B) The number of tortoises began to grow
 C) Scientists took away other animals
 D) Tortoises were taken back to their home islands
 E) The number of tortoises began to decrease. [3+2+5]

OR

7. Polazza Limited, a software company, is looking for B.Tech Graduates with good academic record to work in its branches at Mumbai, Chennai and Bhuvaneshwar. Students pursuing/passed engineering in any branch can apply for the job. Short listing is done on the basis of curriculum vitae.
- a) Write a cover letter based on the above situation.
 b) Prepare the curriculum vitae assuming relevant data.
 c) Write a letter to the Bank Manager of HDFC Bank, 29 Juhu Beach, Mumbai 400 039, informing him of the change of address and requesting that your new address and telephone number be noted and that the records be modified accordingly. [3+3+4]

- 8.a) Write review of the recent book that you have read in about 500-600 words. You can interpret the i) *Title and lay out of the book* ii) *Characterization* iii) *Theme* iv) *Author's background* v) *Style of writing*
- b) Give the meaning of the idiom 'Cut corners' and use it in a meaningful sentence.
 c) Give the meaning of the idiom 'Devil's advocate' and use it in a meaningful sentence. [6+2+2]

OR

- 9.a) Good manners come from sympathy with others and from understanding our own limitations. Explain with reference to the attitude of the boy in "Good Manners".
- b) i) Little thing has been done (correct the sentence)
 ii) Choose the correct one word substitute for the phrase 'a person who speaks more'
 A) Garrulous B) Metropolitan C) Sinecure D) Fastidious
 iii) Three months _____ too long a time to wait (write appropriate verb that agrees with the subject). [7+3]

- 10.a) Fill in the blanks with a suitable tag for the sentences given

- i) But you don't really like sweets, _____?
 ii) He plays football on Sundays, _____?
 iii) Simran asked Mary where she was going. (Change into indirect speech)

- b) Write a report on road traffic congestion in your city.
 Include i) abstract ii) tools for data collection iii) conclusion and recommendations
- c) Explain the kind of anguish undergone by the boy in the words spoken 'Are we actually living, Papa? Or is life just by-passing us as we bury ourselves in books?' [3+4+3]

OR

- 11.a) Fill in the blanks with a suitable tag for the sentences given:

- i) I completed the work, _____?
 ii) She hates men, _____?
 iii) They didn't go to a movie, _____?

- b) What are the characteristics of writing a technical report? Explain.
 c) Explain the concern expressed by Rahul towards plants highlighted in the words 'we learn about pesticides but we do not know how to use them!' [3+3+4]

R16

Code No: 131AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

COMPUTER PROGRAMMING IN C

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) What is the size of the double data type? Which conversion specifier is used? [2]
- b) Write program in C to interchange the two values without using third variable. [3]
- c) Distinguish between built – in and user – defined functions. [2]
- d) How one dimensional arrays are initialized? Give example. [3]
- e) List the dynamic memory handling functions used in 'C'. [2]
- f) List the advantages and disadvantages of using pointers. [3]
- g) Write the syntax for enumerated data type. Give example. [2]
- h) Give brief information about self referential structures. [3]
- i) Write the syntax for opening a file. Give example. [2]
- j) List the advantages of using files. [3]

PART-B

(50 Marks)

- 2.a) Write and explain the steps in writing a 'C' program.
 - b) Discuss about the various bitwise operators supported by Language 'C'. [5+5]
- OR**
- 3.a) Write 'C' program to print the Fibonacci sequence.
 - b) In what way a do – while loop differs from while loop. Explain. [5+5]
- 4.a) What is a function? What are its advantages? Explain various parameter passing techniques.
 - b) Write a 'C' program to search for an element by using Linear Search. [5+5]
- OR**
5. Why we need storage classes? List and explain the various storage classes present in language 'C'. [10]
 6. With the help of syntax and example program explain the various string handling functions. [10]
- OR**
- 7.a) Write in detail about the various dynamic memory allocation functions.
 - b) Write a program to accept a set of names and display them by using array of pointers. [5+5]

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8.a) Write a 'C' program using functions to return the sum of two complex numbers passed as parameters.

b) Write short notes on typedef.

[5+5]

OR

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9.a) Create a structure called **student** and the members of the structure are **Stu_Name**, **Stu_Rno**, **M1**, **M2**, **M3**. Create a **pointer variable** for the structure, store the values and fetch the values present in the structure student.

b) In what way a Union differs from structures.

[5+5]

10.a) Discuss in detail about the file positions functions.

b) Write a 'C' program to count the number of words, white spaces and tab spaces present in a file.

[5+5]

OR

26 26 26 26 26 26 26 2

11.a) Explain the file input and output functions with example programs.

b) Distinguish between r, r+ and w, w+ modes of files.

[5+5]

R15

Code No: 121AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

COMPUTER PROGRAMMING

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, AME, MIE,
PTM, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10-marks and may have a, b, c as sub-questions.

Part- A (25 Marks)

- 1.a) Distinguish between variables and constants with example. [2]
- b) Explain the difference between break, goto and continue statements with an example. [3]
- c) What is a function? Why do we use functions in 'C' language? Give an example. [2]
- d) What is the difference between array and a pointer? Give examples for declaring single, two dimensional and multi dimensional arrays. [3]
- e) Define a pointer. What is a function pointer with an example? [2]
- f) Explain various string manipulation functions in 'C' programming. [3]
- g) Distinguish between structures and functions. [2]
- h) Explain enumerated type, Structure and Union types with examples. [3]
- i) Explain about dequeue. [2]
- j) Write a simple program for bubble sorting technique. [3]

Part-B (50 Marks)

- 2.a) Describe the for loop statement in 'C'.
 - b) Explain the difference between while and do-while statements with suitable examples.
 - c) Write a C program to print digits in reverse order for a given number. [3+4+3]
- OR**
- 3.a) Describe type casting with an example.
 - b) Explain the logical operators with suitable examples.
 - c) Write C program to print prime numbers in a given series of numbers. [3+3+4]
For example: numbers from 1 to 100.
- 4.a) Distinguish between Library functions and user defined functions in 'C' and with relevant examples.
 - b) Explain the various Parameter Passing Mechanisms in 'C'-Language with examples.
 - c) Write a program to check whether given elements in an array are distinct or not? [4+3+3]
- OR**
- 5.a) Explain the various categories of user defined functions in 'C' with examples.
 - b) Differentiate actual parameters and formal parameters.
 - c) Write a program to calculate sum and multiplication of all elements in a two dimensional array. [3+3+4]

- 6.a) Explain about pointers to pointers with an example.
b) How pointers can be used for declaring multi dimensional arrays?
c) Write a program to find whether the given number is Armstrong number or not by using command line arguments. [3+3+4]

OR

- 7.a) What is character pointer? How to initialize pointer variables?
b) Write a program to find whether the given number is palindrome or not by using command line arguments.
c) What is dynamic memory allocation? Discuss with examples. [3+4+3]

- 8.a) Write a short notes on unions within structures.
b) Discuss about self referential structures with examples.
c) Write a program to print 60 student's total marks and grades. [3+3+4]

OR

- 9.a) What are the advantages of structures and unions? Discuss.
b) How to access structure elements? Discuss.
c) Write a program to print the binary number equivalent for the whole digit number. [3+3+4]

- 10.a) Explain Linear and binary search methods.
b) Write a program using arrays to demonstrate the push and pop operations of a STACK.
c) Explain Selection sort technique with a simple program. [3+4+3]

OR

- 11.a) Explain briefly about enqueue operations.
b) Write a program to create a single linked list.
c) Explain insertion and deletion operations on linear list. [3+3+4]

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R13

Code No: 111AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

COMPUTER PROGRAMMING

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, AE, AME, MIE, PTM, CEE, AGE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) Distinguish between variables and constants with example. [2]
- b) Explain the difference between break, goto and continue statements with an example. [3]
- c) What is a function? Why do we use functions in 'C' language? Give an example. [2]
- d) What is the difference between array and a pointer? Give examples for declaring single, two dimensional and multi dimensional arrays. [3]
- e) Define a pointer. What is a function pointer with an example? [2]
- f) Explain various string manipulation functions in 'C' programming. [3]
- g) Distinguish between structures and functions. [2]
- h) Explain enumerated type, Structure and Union types with examples. [3]
- i) Explain about dequeue. [2]
- j) Write a simple program for bubble sorting technique. [3]

Part-B (50 Marks)

- 2.a) Describe the for loop statement in 'C'.
 - b) Explain the difference between while and do-while statements with suitable examples.
 - c) Write a C program to print digits in reverse order for a given number. [3+4+3]
- OR**
- 3.a) Describe type casting with an example.
 - b) Explain the logical operators with suitable examples.
 - c) Write C program to print prime numbers in a given series of numbers. [3+3+4]
For example: numbers from 1 to 100.
- 4.a) Distinguish between Library functions and user defined functions in 'C' and with relevant examples.
 - b) Explain the various Parameter Passing Mechanisms in 'C'-Language with examples.
 - c) Write a program to check whether given elements in an array are distinct or not? [4+3+3]
- OR**
- 5.a) Explain the various categories of user defined functions in 'C' with examples.
 - b) Differentiate actual parameters and formal parameters.
 - c) Write a program to calculate sum and multiplication of all elements in a two dimensional array. [3+3+4]

- 26 26 26 26 26 26 26
- 6.a) Explain about pointers to pointers with an example.
 - b) How pointers can be used for declaring multi dimensional arrays?
 - c) Write a program to find whether the given number is Armstrong number or not by using command line arguments. [3+3+4]

OR

- 26 26 26 26 26 26 26
- 7.a) What is character pointer? How to initialize pointer variables?
 - b) Write a program to find whether the given number is palindrome or not by using command line arguments.
 - c) What is dynamic memory allocation? Discuss with examples. [3+4+3]

- 8.a) Write a short notes on unions within structures.
- b) Discuss about self referential structures with examples.
- c) Write a program to print 60 student's total marks and grades. [3+3+4]

OR

- 26 26 26 26 26 26 26
- 9.a) What are the advantages of structures and unions? Discuss.
 - b) How to access structure elements? Discuss.
 - c) Write a program to print the binary number equivalent for the whole digit number. [3+3+4]

- 10.a) Explain Linear and binary search methods.
- b) Write a program using arrays to demonstrate the push and pop operations of a STACK.
- c) Explain Selection sort technique with a simple program. [3+4+3]

OR

- 26 26 26 26 26 26 26
- 11.a) Explain briefly about enqueue operations.
 - b) Write a program to create a single linked list.
 - c) Explain insertion and deletion operations on linear list. [3+3+4]

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R09

Code No: 51004

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING PHYSICS

(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, MCT, AE, BT, AME, MIE, PTM, AGE)

Time: 3 hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Derive an expression for the calculation of cohesive Energy of a solid.
- b) Calculate the packing factor for a BCC lattice.
- c) Explain the structure of Diamond. [7+3+5]
- 2.a) Describe the Laue method to determine the structure of a material and also mention drawbacks of laue method.
- b) What are point defects? Explain the formation of Edge and Screw dislocations. [7+8]
- 3.a) Distinguish between Bose – Einstein (B-E) and Fermi – Dirac (F-D) statistics Qualitatively.
- b) What are matter waves? Describe Davisson and Germer experiment to establish de-Broglie hypothesis. [7+8]
- 4.a) Explain the motion of an electron in a periodic potential. State and explain Bloch theorem.
- b) Based on the band theory of solids distinguish between conductors, semiconductors and Insulators. [7+8]
- 5.a) Derive an expression for carrier concentration in an intrinsic semiconductor.
- b) Explain the function of p-n diode in forward bias. Describe the construction and working of a Photo Diode. [7+8]
- 6.a) Define electric dipole, dipole moment and dielectric constant. Derive the expression for electronic Polarizability.
- b) Explain the properties of Dia, Para and Ferromagnetic materials. What are the applications of superconductors? [7+8]
- 7.a) What are the characteristics of lasers?
- b) Describe the construction and working of Ruby Laser.
- c) What are the applications of optical fibers? [5+5+5]
- 8.a) Define the term reverberation. Explain Sabine's formula of reverberation qualitatively.
- b) How do you measure the absorption coefficient of a material? What is acoustic Quieting? [7+8]

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R07

Code No: Z0521

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

BASIC ELECTRICAL ENGINEERING

(Common to CSE, IT)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) State and explain Ohm's law. What are its limitations?
b) Explain in detail how a magnetic field is produced due to the electric current.
c) State and explain Faraday's law of electromagnetic induction. [5+5+6]
- 2.a) What do you mean by ideal voltage and ideal current sources and draw their V-I characteristics?
b) State and explain maximum power transfer theorem.
c) Apply Thevenin's theorem to the given circuit shown in figure 1 and calculate the load current flowing through it. [4+4+8]

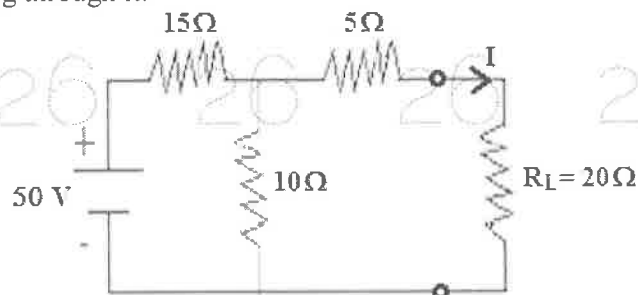


Figure: 1

- 3.a) What is meant by inductance? Compare self and mutual inductance.
b) A magnetic circuit has a uniform cross sectional area of 6 sq.cm and a length of 30 cm. A coil of 150 turns is wound uniformly around the magnetic circuit. When the current in the coil is 3A, the flux is 0.3 Wb. Calculate:
i) Magnetizing force
ii) Relative permeability
iii) Magnetic flux density. [8+8]
- 4.a) Find the R.M.S value for the following waveform (Figure 2).

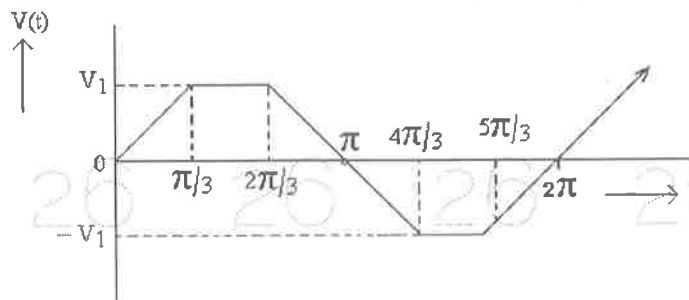


Figure: 2

- b) Explain the behaviour of AC through
i) Pure R ii) Pure L
For each case; derive the instantaneous value of V and I, Impedance, Average power, Power factor, Instantaneous power and the relevant phasors. [8+8]

- 26 26 26 26 26 26 26 2
- 5.a) Explain principle of operation a transformer.
b) An ideal 25 kVA transformer has 400 turns on the primary winding and 50 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz supply. Calculate:
i) Primary and secondary currents on full load
ii) Secondary emf
iii) The maximum core flux. 26 26 26 26 26 2
c) Define voltage regulation and efficiency of a transformer. [5+6+5]
- 6.a) Derive EMF equation of a D.C generator.
b) Derive the torque equation of a D.C motor.
c) A 6 – pole, Lap wound armature has 840 conductors and flux per pole of 0.018 Wb. Calculate the emf generated when the machine is running at 600 rpm. [5+5+6]
- 7.a) Explain the principle of operation of a 3 phase induction motor. 26 26 26 26 26 2
b) Explain the working of a synchronous motor. [8+8]
8. Explain the construction and operation of Moving iron attraction type instruments with a neat diagram. [16]

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R07

Code No: Z0222

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ELECTRICAL CIRCUIT ANALYSIS
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Explain the differences between dependent and independent sources.
- b) A voltage $v(t) = 200 \sin 100\pi t$ volts is applied across a capacitor of value $C = 0.05 \text{ F}$. Find the expression for the current $i(t)$ and the energy stored in the capacitor.
- c) State and explain Kirchoff's laws. [5+6+5]

- 2.a) Obtain an expression for effective inductance between two mutually coupled coils connected in i) series aiding ii) parallel aiding.
- b) Explain dot convention used for magnetically coupled coils.
- c) Explain what do you understand by coefficient of coupling and derive an expression for coefficient of coupling in terms of parameters of coupled coils. [6+4+6]

- 3.a) Obtain an expression for frequency of series resonance of RLC series circuit. Explain different characteristics of the above circuit.
- b) A 100Ω resistor, $20\mu\text{F}$ capacitor and a 2H inductor are connected in series. At what frequency the phase angle 45° between voltage and Current is 45° .
- c) Obtain the form factor and crest factor of sinusoidal voltage. [6+6+4]

- 4.a) Obtain the voltage and current relationship in a balanced 3-phase delta connected load with the help of phasor diagram.
- b) Find the reading of the wattmeter when the network shown in figure 1 is connected to symmetrical 440V , 3-phase supply. Phase sequence is RYB. Take E_{RY} as reference. [8+8]

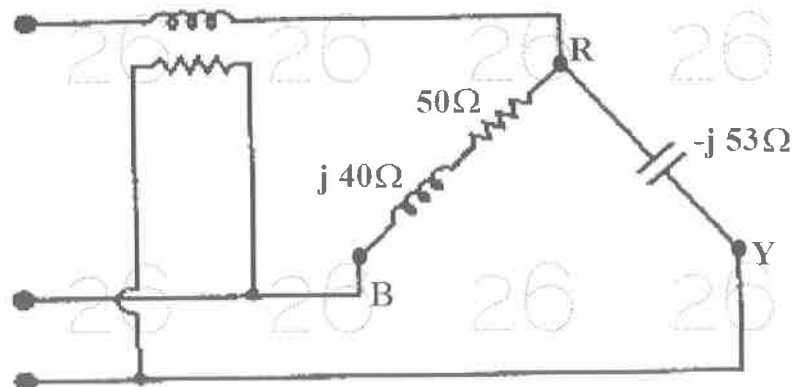


Figure: 1

5. For the network shown in figure 2, write the tie-set matrix and determine the loop current and the branch currents. [16]

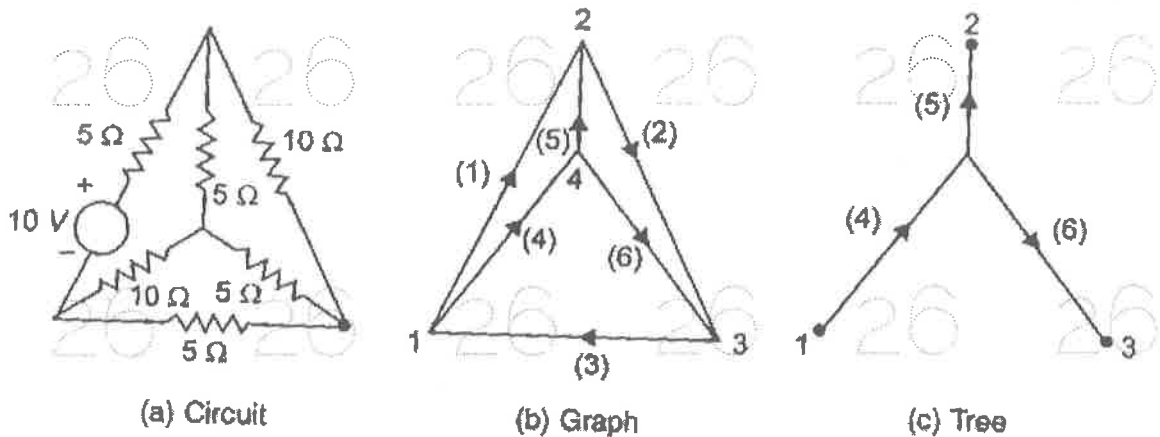


Figure: 2

- 6.a) Explain maximum power transfer theorem for d.c as well as a.c sources with suitable example.
 b) Determine the current in the 4Ω resistor in the circuit shown in figure 3 using superposition theorem. [8+8]

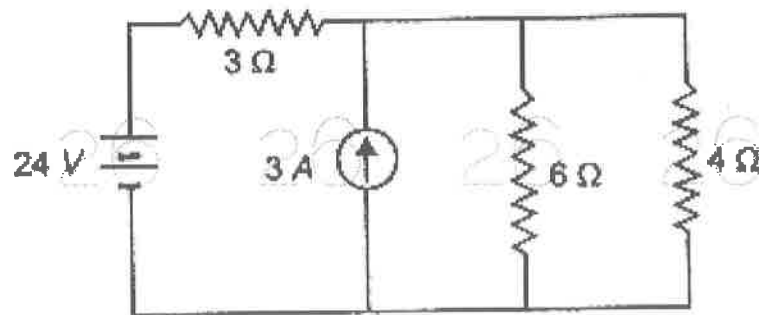


Figure: 3

- 7.a) In the circuit shown in figure 4 the capacitor is initially charged to a voltage of V_0 . Determine the current $i(t)$ after the switch is closed at $t=0$. Use Laplace transform.

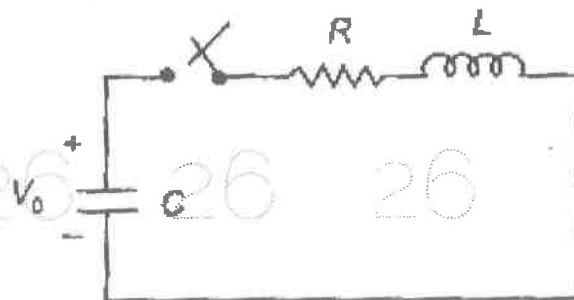


Figure: 4

- b) Obtain an expression for the transient current flowing through the RLC series circuit suddenly excited by d.c source. Assume zero initial conditions. [8+8]

8. Find the ABCD parameters for the network shown in figure 5.

[16]

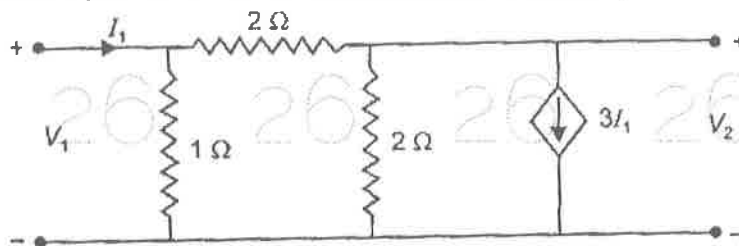


Figure: 5

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R16

Code No: 132AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

ENGINEERING PHYSICS - II

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub-questions.

PART- A

(25 Marks)

- 1.a) Calculate de-Broglie wavelength of 5 KeV neutron. Given mass of the neutron is 1.675×10^{-27} kg. [2]
- b) Explain the significance of a wave function. [3]
- c) Distinguish between intrinsic and extrinsic semiconductors. [2]
- d) Explain the energy diagram of a p-n junction diode. [3]
- e) Define the terms electric displacement vector and susceptibility. [2]
- f) Explain the structure of BiTiO_3 . [3]
- g) A paramagnetic material has magnetic field intensity 2×10^4 A/m. If the Susceptibility of the material is 3.0×10^{-4} , calculate the flux density. [2]
- h) What are the applications of superconductors? [3]
- i) What is surface to volume ratio? [2]
- j) Explain the working principle of TEM. [3]

PART-B

(50 Marks)

- 2.a) Derive an expression for Schrodinger's time independent wave equation. [5+5]
 - b) Explain the origin of bands formation in solids. [5+5]
- OR**
- 3.a) Explain Kronig – penny model qualitatively.
 - b) Describe the theory of one dimensional particle in a box. [5+5]
- 4.a) Calculate the carrier concentration in an n-type of semiconductor.
 - b) Describe the I-V characteristics of a solar cell. [5+5]
- OR**
- 5.a) Describe the Fermi level in the context of intrinsic semiconductor and derive an expression for it.
 - b) Explain the formation of p-n junction. [5+5]

- 6.a) Derive the expressions for electronic polarizability in a dielectric.
b) Explain Piezo and Pyroelectricity in dielectrics. [5+5]

OR

- 7.a) Derive Clausius – Mosotti relation in dielectrics.
b) Write a note on Ferroelectricity. [5+5]

- 8.a) Distinguish between para, ferro and Ferri magnetic materials.
b) Distinguish between soft and hard magnetic materials. [5+5]

OR

- 9.a) Describe Hysteresis curve on the basis of Domain theory.
b) What is superconductivity? Explain Meissner effect. [5+5]

- 10.a) Describe sol-gel method to synthesis nano materials.
b) How do you characterize nanomaterials by XRD? [5+5]

OR

- 11.a) Describe the Ball mill method to synthesise nano material.
b) What is nanoscale? Explain the quantum confinement at nanoscale. [5+5]

---ooOoo---

R16

Code No: 132AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

ENGINEERING CHEMISTRY

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Describe Calgon conditioning method shortly. [2]
- b) How the water is desalinated by reverse osmosis? Explain. [3]
- c) Construct the dry cell. Write the working principle and applications of dry cell. [2]
- d) Explain the functioning of Hydrogen gas electrode. [3]
- e) Write the synthesis of Nylon-6, 6. [2]
- f) What are biodegradable polymers? Explain by taking poly lactic acid as an example. [3]
- g) Write the composition, calorific value and applications of LPG. [2]
- h) Define Octane number of Gasoline. What is the significance of finding Octane number? [3]
- i) Give the definition and classification of Composite materials. [2]
- j) Write the applications of refractory materials. [3]

PART-B

(50 Marks)

- 2.a) What are boiler troubles? How water is softened by Ion-Exchange process? Write the advantages and disadvantages of Ion-Exchange method.
- b) Calculate the temporary, permanent and total hardness of a water sample containing the following impurities in mg/lit
 $\text{Ca}(\text{HCO}_3)_2 = 1.62$, $\text{MgCl}_2 = 0.76$, $\text{MgSO}_4 = 1.80$, $\text{CaSO}_4 = 0.68$, $\text{CaCO}_3 = 1.77$,
 $\text{NaCl} = 3.55$, $\text{Ca}(\text{NO}_3)_2 = 1.64$. [5+5]

OR

- 3.a) Illustrate the process of disinfection of potable water by Ozone treatment and De-fluoridation process.
- b) Describe the steps involved in the sewage treatment. What is significance of the treatment? [5+5]
- 4.a) Define battery. Write the composition, discharging, recharging cell reactions of Lead-Acid battery.
- b) What are ion selective electrodes? Write the working principle and applications of glass electrode. [5+5]

OR

- 5.a) What is electrochemical series? Discuss its important applications.
b) What is Fuel cell? Construct Hydrogen- Oxygen fuel cell. What are the advantages and applications of this cell? [5+5]
- 6.a) Explain classification, mechanism and applications of conducting polymers.
b) Write the structure of natural rubber. What are its disadvantages? Explain how these can be overcome by vulcanization. What are the advantages of vulcanization of rubber? [5+5]

OR

- 7.a) What are the various methods for the synthesis of fiber-reinforced plastics? Write their applications.
b) Differentiate addition polymerization from condensation polymerization. Give the suitable examples for both the polymerization methods. [5+5]
- 8.a) Write the steps involved in the transformation of wood into coal. Discuss the Process and significance of ultimate analysis of coal.
b) What is the composition of Petrol? Describe the process of fractional distillation with neat diagram. [5+5]
- 9.a) Describe the ultimate analysis of coal. Write the significance of each constituent.
b) Write the definition of cracking. Discuss the method and advantages of moving bed catalytic cracking. [5+5]

OR

- 10.a) Indicate the important characteristics of good lubricant. Explain about the mechanism of lubrication with special reference to thick film and thin film lubrication.
b) What is the chemical composition of Portland cement? Write the chemical reactions involved in the setting and hardening of Portland cement. [5+5]
- 11.a) Define refractory. Write a short note on following properties of refractory.
i) Refractoriness under load
ii) Porosity.
b) Write short notes on the following:
i) Water proof cement ii) High alumina cement
iii) Acid resistant cement iv) White cement [5+5]

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Code No: 131AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

MATHEMATICS-I

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) Verify $y(2x^2 - xy + 1)dx + (x - y)dy = 0$ is an exact differential equation or not? [2]
- b) Solve $y'' + 6y' + 9y = 0, y(0) = 2, y'(0) = -3$ [3]
- c) Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$ [2]
- d) Find a non trivial solution of homogeneous system $3x + 2y + z = 0, 2x + 3z = 0, y + 5z = 0$, if it exist. [3]
- e) Find all the Eigen values of $A^2 + 3A - 2I$, if $A = \begin{bmatrix} 1 & 2 \\ 1 & 0 \end{bmatrix}$. [2]
- f) Find the nature, index and signature of the quadratic form $3x^2 + 5y^2 + 3z^2$. [3]
- g) State Euler's theorem for function of two variables. [2]
- h) Examine the function $f(x, y) = x^3 y^2$ for extrema. [3]
- i) Solve $(p - q)(z - px - qy) = 1$ [2]
- j) Solve $xp + yq = 3z$ [3]

Part-B (50 Marks)

- 2.a) Solve $(x^2 y - 2xy^2)dx - (x^3 - 3x^2 y)dy = 0$
- b) Find the orthogonal trajectories of the family of Cardioids $r = a(1 - \cos\theta)$, where a is the parameter. [5+5]

OR

- 3.a) Solve $y'' - 2y' + y = xe^x \sin x$
- b) The number N of bacteria in a culture grew at a rate proportional to N . The value of N was initially 100 and increased to 332 in one hour. What would be the value of N after $1\frac{1}{2}$ hours? [5+5]

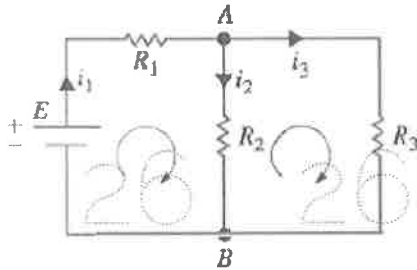
- 4.a) Determine the value of b such that the rank of $A = \begin{bmatrix} 1 & 1 & -1 & 0 \\ 4 & 4 & -3 & 1 \\ b & 2 & 2 & 2 \\ 9 & 9 & b & 3 \end{bmatrix}$ is 3.

- b) Discuss for what values of λ and μ , the simultaneous equations $x + y + z = 6, x + 2y + 3z = 10, x + 2y + \lambda z = \mu$ have i) no solution ii) a unique solution iii) an infinite number of solutions. [5+5]

OR

5.a) Find the rank of the matrix $A = \begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$.

- b) Use Gauss Jordan elimination method to solve the following network system, when $R_1=10$ ohms, $R_2=20$ ohms, $R_3=10$ ohms and $E=12$ volts. [5+5]



- 6.a) Find the Eigen values and the corresponding Eigen vectors of the matrix

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$$

- b) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$. Express

$B = A^8 - 11A^7 - 4A^6 + A^5 + A^4 - 11A^3 - 3A^2 + 2A + I$ as a quadratic polynomial in A . Find B . [5+5]

OR

- 7.a) Diagonalize the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ -4 & 4 & 3 \end{bmatrix}$, hence find A^4 .

- b) Reduce the quadratic form $x^2 + y^2 + 2z^2 - 2xy + 4xz + 4yz$ to the canonical form. Hence find its nature. [5+5]

- 8.a) If $u = \log\left(\frac{x^2 + y^2}{x + y}\right)$, prove that $xu_x + yu_y = 1$

- b) If $u = x^2 - y^2$, $v = 2xy$ when $x = r \cos \theta$, $y = r \sin \theta$. Show that $\frac{\partial(u, v)}{\partial(r, \theta)} = 4r^3$. [5+5]

OR

- 9.a) Expand $f(x, y) = e^y \ln(1+x)$ in powers of x and y and verify the result by direct expansion.

- b) Find the extreme values of $\sqrt{x^2 + y^2}$ when $13x^2 + 13y^2 - 10xy = 72$. [5+5]

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10.a) Form the partial differential equation from $z = x^n f\left(\frac{y}{x}\right)$.

26 26 26 26 OR 26 26 [5+5]

11.a) Solve $(y^2 + z^2)p - xyq + zx = 0$.

b) Solve $z^2(p^2x^2 + q^2) = 1$. [5+5]

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Code No: 121AC

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING MECHANICS

(Common to CE, ME, MCT, MMT, AE, AME, MIE, PTM, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

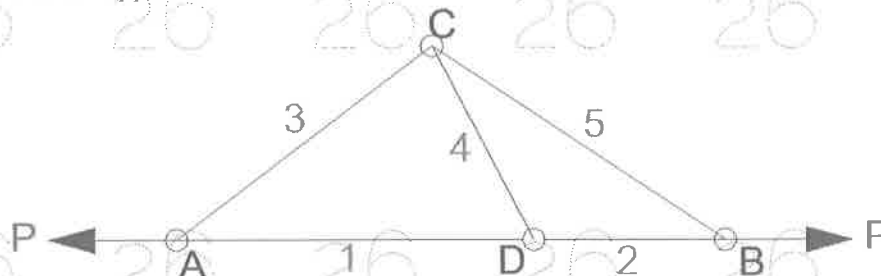
Illustrate your answer with NEAT sketches wherever necessary

Part- A (25 Marks)

- 1.a) Write the equations of equilibrium for a system of Coplanar Concurrent Forces in terms of moments. [2]
- b) What is a Free Body diagram? Explain with the help of figures. [3]
- c) What is 'Slip' of the belt in a belt drive? What is its effect on the velocity ratio of the drive? [2]
- d) What is a Wedge? Deduce an expression for its efficiency. [3]
- e) What is Radius of gyration? Explain. [2]
- f) Explain the terms 'Product of Inertia' and 'Principal axes. [3]
- g) Write the differential equation of motion of Rectilinear motion, and explain it. [2]
- h) Explain briefly about the Kinematics of Rotational Motion around a Fixed Axis. [3]
- i) State the Principle of Conservation of Momentum. [2]
- j) Distinguish between Simple and Compound Pendulums. [3]

Part-B (50 Marks)

- 2.a) Determine the axial force induced in each bar of the system shown in figure 1 due to the action of the applied forces P .



- b) State and prove the Theorem of Varignon. [5+5]

OR

- 3.a) A prismatic bar AB of weight $Q = 17.8 \text{ kN}$ is hinged to a vertical wall at A and supported at B by a cable BC, as shown in figure 2. Determine the magnitude and direction of the reaction R_a at the hinge A and the tensile force F in the cable BC.

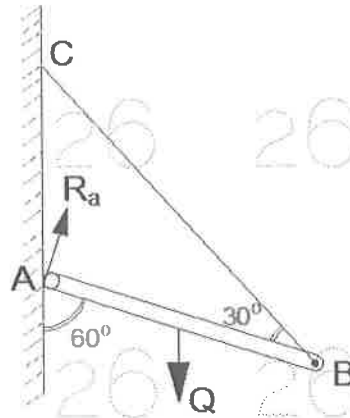


Figure: 2

- b) Differentiate between the moment of a force and couple. [5+5]
4. In a screw – jack, where the helix angle of thread is α and the angle of friction is ϕ , W is the load to be moved up / down, and P is the effort applied horizontally to a lever at a distance L from the axis of the screw, discuss the effects of moving the load (a) up and (b) down, if (i) $\phi < \alpha$, and (ii) $\phi > \alpha$ in each case. [10]
- OR
- 5.a) What is 'Initial tension' in a belt drive? If T_0 is the initial tension, derive the expression $\frac{T_1 - T_0}{T_2 - T_0} = e^{\mu\theta}$, with usual notation of the terms in the expression.
- b) Prove that the angle of friction is equal to the angle of the inclined plane, when a solid body of weight W placed on the inclined plane, is about to slide down. [5+5]
6. Determine the moments of inertia and the radius of gyration of the area, shown in figure 3, with respect to the x and y axes. (All dimensions are in mm). [10]

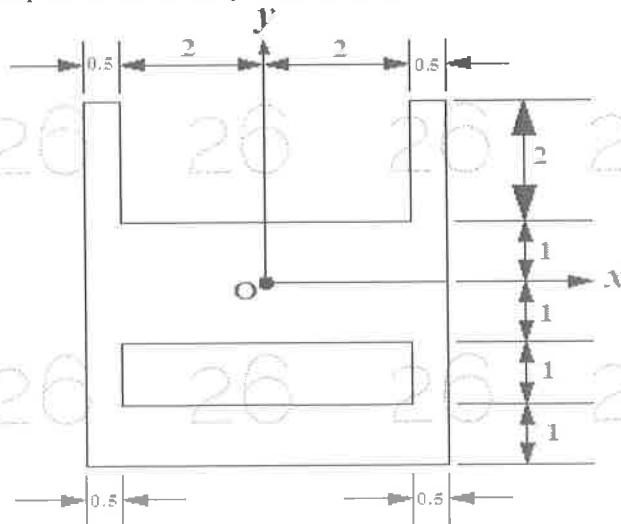


Figure: 3

OR

7. Determine the centroid of a hemisphere of radius R . [10]

8.a) A particle starts from rest and moves along a straight line with constant acceleration a . If it acquires a velocity $v = 3$ m/s after having travelled a distance of $s = 7.5$ m, find the magnitude of the acceleration.

b) Write the equations of plane motion of a rigid body. [5+5]

OR

9.a) A solid circular cylinder and a sphere are started from rest from the top of an inclined plane at the same time, and both roll without sliding down the plane. When the sphere reaches the bottom of the incline, if the cylinder is 3.6 m behind it, what is the total length of the inclined plane?

b) What are the different types of rigid body motion? Explain. [5+5]

10.a) The driver of an automobile moving with a constant speed $v_0 = 64$ kmph along a straight level road steps on the accelerator so as to increase the power by 20 percent. How far will the car travel before attaining a speed of 80 kmph? Assume that the resistance to motion remains constant and equal to 5% of the weight of the car.

b) What do you mean by period of vibration, cycle, frequency and resonance as applied to vibratory motions? Explain. [5+5]

OR

11.a) Define Impulse and Momentum, and derive their expressions from the differential equation of rectilinear motion of a particle.

b) In a spring – mass vibrating system, the natural frequency of vibration is 3.56 Hz. When the amount of suspended mass is increased by 5 kg, the natural frequency is lowered to 2.9 Hz. Determine the original unknown mass and the spring constant. [5+5]

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Code No: 121AL

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

MATHEMATICAL METHODS

(Common to EEE, ECE, CSE, EIE, IT, ETM)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A (25 Marks)

- 1.a) Define any 4 difference operators. [2]
- b) Prove that $\frac{\Delta}{\nabla} - \frac{\nabla}{\Delta} = \Delta + \nabla$ [3]
- c) Write the iterative formula for finding the approximate solution of the initial value problem $\frac{dy}{dx} = f(x, y); y(x_0) = y_0$. [2]
- d) Find the positive square root of 12 up to 4 decimal places. [3]
- e) If $x = \sum_{n=1}^{\infty} \frac{2b_n}{\pi} \sin nx$, $0 \leq x \leq \pi$, find b_n . [2]
- f) Does the Fourier series expansion of $f(x) = 1, 0 < x < 4, f(x+4) = f(x)$ exist? If so, find the constant term, coefficients of $\cos \pi x$ and $\sin \pi x$. [3]
- g) Solve $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 1$ [2]
- h) Write all possible solutions of the equation $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ [3]
- i) State Gauss divergence theorem. [2]
- j) If $\nabla \times \vec{A} = \vec{0}, \nabla \times \vec{B} = \vec{0}$ then find the value of $Div(\vec{A} \times \vec{B})$. [3]

PART-B (50 Marks)

2.a) Using Gauss's backward interpolation formula find the population for the year 1936 given that,

Year	x	1901	1911	1921	1931	1941	1951
Population	y	12	15	20	27	39	52

b) Prove that $(E^2 + E^{-2})(1 + \Delta)^2 = 2 + \Delta$ [5+5]

OR

3.a) Using the following table, find $f(2.75)$ using Forward difference formula.

x	2.5	3	3.5	4	4.5	5
Y=f(x)	21.145	22.043	20.225	18.644	17.262	16.047

b) Using the following table fit a curve of the form $y = ax^b$ using method of least squares. [5+5]

X	1	2	3	4	5	6
y	1200	900	600	200	110	50

- 4.a) Find a root of the equation $x^3 - 9x + 1 = 0$ correct to 4 decimal places by bisection method.
 b) Solve the following system of equations by using Gauss-Seidal iterative method (give the solution correct to 3 decimal places) $8x - 3y + 2z = 20$; $4x + 11y - z = 33$; $6x + 3y + 12z = 35$.

[5+5]

OR

- 5.a) By applying 4th order Runge-Kutta method obtain the values of y at $x=0.1$ and at 0.2 for the differential equation $\frac{dy}{dx} = -y$, given that $y(0) = 1$.

- b) Apply Simpson's rule to find the value of $\int_0^2 \frac{1}{1+x^3} dx$ by taking 10 points in $[0, 2]$. [5+5]

- 6.a) Obtain the Fourier series of $f(x) = f(x + 2\pi)$ and $f(x) = \frac{\pi - x^2}{4}, 0 < x < 2\pi$.

- b) Find the half range cosine series of $f(x) = x(2-x)$ in $0 \leq x \leq 2$.

[5+5]

OR

- 7.a) Find the half range cosine series for the function $f(x) = \begin{cases} x^2, & 0 \leq x < 1 \\ 1, & 1 \leq x \leq 2 \end{cases}$

- b) Is the function defined as $f(x) = \begin{cases} x + \pi, & 0 \leq x \leq \pi \\ x - \pi, & -\pi \leq x \leq 0 \end{cases}$ even or odd? If $f(x + 2\pi) = f(x)$,

find its Fourier series expansion.

[5+5]

- 8.a) Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$, where $u(x, 0) = 6e^{-3x}$.

- b) Solve $z = p^2x + q^2y$, using Charpit's method.

[5+5]

OR

- 9.a) An insulated rod of length l has its ends A and B maintained at 0°C and 100°C respectively until steady state conditions prevail. If B is suddenly reduced to 0°C and maintained at 0°C , find the temperature at a distance x from A at time t .

- b) Solve $(x^2 - yz)p + (y^2 - xz)q = (z^2 - yx)$

[5+5]

- 10.a) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the vector $2\vec{i} - \vec{j} - 2\vec{k}$

- b) Prove that $\nabla \times \nabla \times \vec{F} = \nabla(\nabla \cdot \vec{F}) - \nabla^2 \vec{F}$

[5+5]

OR

11. Verify Stoke's Theorem for $\vec{A} = (2x - y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over upper half of the surface of the sphere of unit radius.

[10]

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Code No: 111AL

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

MATHEMATICAL METHODS

(Common to EEE, ECE, CSE, EIE, IT, ETM)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A (25 Marks)

- 1.a) Define any 4 difference operators. [2]
- b) Prove that $\frac{\Delta}{\nabla} - \frac{\nabla}{\Delta} = \Delta + \nabla$ [3]
- c) Write the iterative formula for finding the approximate solution of the initial value problem $\frac{dy}{dx} = f(x, y); y(x_0) = y_0$. [2]
- d) Find the positive square root of 12 up to 4 decimal places. [3]
- e) If $x = \sum_{n=1}^{\infty} \frac{2b_n}{\pi} \sin nx$, $0 \leq x \leq \pi$, find b_n . [2]
- f) Does the Fourier series expansion of $f(x) = 1$, $0 < x < 4$, $f(x+4) = f(x)$ exist? If so, find the constant term, coefficients of $\cos \pi x$ and $\sin \pi x$. [3]
- g) Solve $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 1$ [2]
- h) Write all possible solutions of the equation $\frac{\partial u}{\partial t} = e^2 \frac{\partial^2 u}{\partial x^2}$ [3]
- i) State Gauss divergence theorem. [2]
- j) If $\nabla \times \vec{A} = \vec{0}$, $\nabla \times \vec{B} = \vec{0}$ then find the value of $\text{Div}(\vec{A} \times \vec{B})$. [3]

PART-B (50 Marks)

- 2.a) Using Gauss's backward interpolation formula find the population for the year 1936 given that,

Year	x	1901	1911	1921	1931	1941	1951
Population	y	12	15	20	27	39	52

- b) Prove that $(E^2 + E^{-2})(I + \Delta)^2 = 2 + \Delta$ [5+5]

OR

- 3.a) Using the following table, find $f(2.75)$ using Forward difference formula.

x	2.5	3	3.5	4	4.5	5
Y=f(x)	21.145	22.043	20.225	18.644	17.262	16.047

- b) Using the following table fit a curve of the form $y = ax^b$ using method of least squares.

[5+5]

X	1	2	3	4	5	6
y	1200	900	600	200	110	50

- 4.a) Find a root of the equation $x^3 - 9x + 1 = 0$ correct to 4 decimal places by bisection method.
 b) Solve the following system of equations by using Gauss-Seidal iterative method (give the solution correct to 3 decimal places) $8x - 3y + 2z = 20$; $4x + 11y - z = 33$; $6x + 3y + 12z = 35$. [5+5]

OR

- 5.a) By applying 4th order Runge-Kutta method obtain the values of y at $x=0.1$ and at 0.2 for the differential equation $\frac{dy}{dx} = -y$, given that $y(0) = 1$.

- b) Apply Simpson's rule to find the value of $\int_0^2 \frac{1}{1+x^3} dx$ by taking 10 points in $[0, 2]$. [5+5]

- 6.a) Obtain the Fourier series of $f(x) = f(x + 2\pi)$ and $f(x) = \frac{\pi - x^2}{4}$, $0 < x < 2\pi$.

- b) Find the half range cosine series of $f(x) = x(2-x)$ in $0 \leq x \leq 2$. [5+5]

OR

- 7.a) Find the half range cosine series for the function $f(x) = \begin{cases} x^2, & 0 \leq x < 1 \\ 1, & 1 \leq x \leq 2 \end{cases}$

- b) Is the function defined as $f(x) = \begin{cases} x + \pi, & 0 \leq x \leq \pi \\ x - \pi, & -\pi \leq x \leq 0 \end{cases}$ even or odd? If $f(x + 2\pi) = f(x)$, find its Fourier series expansion. [5+5]

- 8.a) Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$, where $u(x, 0) = 6e^{-3x}$.

- b) Solve $z = p^2x + q^2y$, using Charpit's method. [5+5]

OR

- 9.a) An insulated rod of length l has its ends A and B maintained at 0°C and 100°C respectively until steady state conditions prevail. If B is suddenly reduced to 0°C and maintained at 0°C , find the temperature at a distance x from A at time t .

- b) Solve $(x^2 - yz)p + (y^2 - xz)q = (z^2 - yx)$ [5+5]

- 10.a) Find the directional derivative of $\phi = x^2yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the vector $2\vec{i} - \vec{j} - 2\vec{k}$

- b) Prove that $\nabla \times \nabla \times \vec{F} = \nabla(\nabla \cdot \vec{F}) - \nabla^2 \vec{F}$ [5+5]

OR

11. Verify Stoke's Theorem for $\vec{A} = (2x - y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over upper half of the surface of the sphere of unit radius. [10]

---ooOoo---

R13

Code No: 111AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING MECHANICS

(Common to CE, ME, MCT, MMT, AE, AME, MIE, PTM, AGE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each

question carries 10 marks and may have a, b, c as sub questions.

Illustrate your answer with NEAT sketches wherever necessary

Part- A (25 Marks)

- 1.a) Write the equations of equilibrium for a system of Coplanar Concurrent Forces in terms of moments. [2]
- b) What is a Free Body diagram? Explain with the help of figures. [3]
- c) What is 'Slip' of the belt in a belt drive? What is its effect on the velocity ratio of the drive? [2]
- d) What is a Wedge? Deduce an expression for its efficiency. [3]
- e) What is Radius of gyration? Explain. [2]
- f) Explain the terms 'Product of Inertia' and 'Principal axes'. [3]
- g) Write the differential equation of motion of Rectilinear motion, and explain it. [2]
- h) Explain briefly about the Kinematics of Rotational Motion around a Fixed Axis. [3]
- i) State the Principle of Conservation of Momentum. [2]
- j) Distinguish between Simple and Compound Pendulums. [3]

Part-B (50 Marks)

- 2.a) Determine the axial force induced in each bar of the system shown in figure 1 due to the action of the applied forces P .

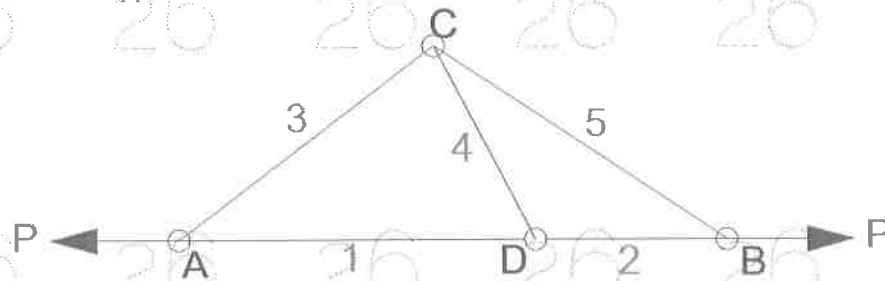


Figure: 1

- b) State and prove the Theorem of Varignon.

[5+5]

OR

- 3.a) A prismatic bar AB of weight $Q = 17.8$ kN is hinged to a vertical wall at A and supported at B by a cable BC, as shown in figure 2. Determine the magnitude and direction of the reaction R_a at the hinge A and the tensile force F in the cable BC.

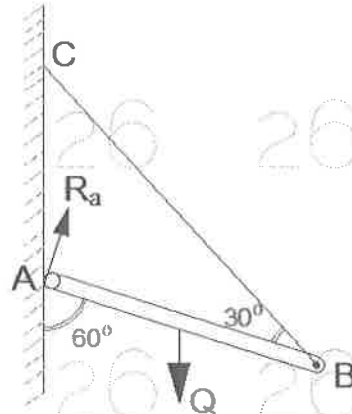


Figure: 2

- b) Differentiate between the moment of a force and couple. [5+5]
4. In a screw – jack, where the helix angle of thread is α and the angle of friction is ϕ , W is the load to be moved up / down, and P is the effort applied horizontally to a lever at a distance L from the axis of the screw, discuss the effects of moving the load (a) up and (b) down, if (i) $\phi < \alpha$, and (ii) $\phi > \alpha$ in each case. [10]
- OR
- 5.a) What is 'Initial tension' in a belt drive? If T_0 is the initial tension, derive the expression $\frac{T_1 - T_0}{T_2 - T_0} = e^{\mu\theta}$, with usual notation of the terms in the expression.
- b) Prove that the angle of friction is equal to the angle of the inclined plane, when a solid body of weight W placed on the inclined plane, is about to slide down. [5+5]
6. Determine the moments of inertia and the radius of gyration of the area, shown in figure 3, with respect to the x and y axes. (All dimensions are in mm). [10]

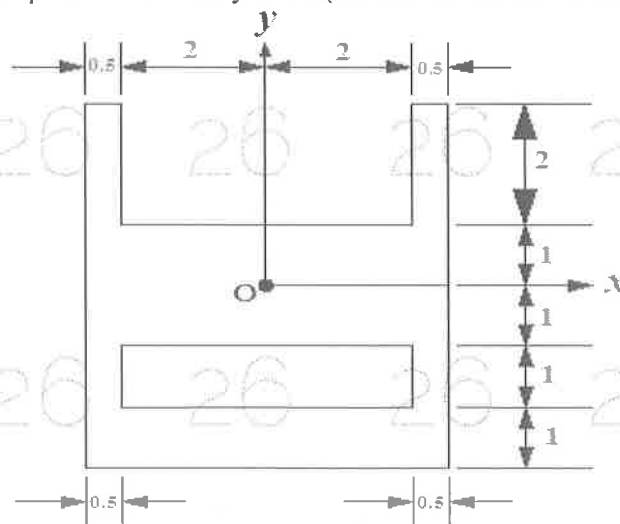


Figure: 3

OR

7. Determine the centroid of a hemisphere of radius R . [10]

8.a) A particle starts from rest and moves along a straight line with constant acceleration a . If it acquires a velocity $v = 3$ m/s after having travelled a distance of $s = 7.5$ m, find the magnitude of the acceleration.

b) Write the equations of plane motion of a rigid body. [5+5]

OR

9.a) A solid circular cylinder and a sphere are started from rest from the top of an inclined plane at the same time, and both roll without sliding down the plane. When the sphere reaches the bottom of the incline, if the cylinder is 3.6 m behind it, what is the total length of the inclined plane?

b) What are the different types of rigid body motion? Explain. [5+5]

10.a) The driver of an automobile moving with a constant speed $v_0 = 64$ kmph along a straight level road steps on the accelerator so as to increase the power by 20 percent. How far will the car travel before attaining a speed of 80 kmph? Assume that the resistance to motion remains constant and equal to 5% of the weight of the car.

b) What do you mean by period of vibration, cycle, frequency and resonance as applied to vibratory motions? Explain. [5+5]

OR

11.a) Define Impulse and Momentum, and derive their expressions from the differential equation of rectilinear motion of a particle.

b) In a spring – mass vibrating system, the natural frequency of vibration is 3.56 Hz. When the amount of suspended mass is increased by 5 kg, the natural frequency is lowered to 2.9 Hz. Determine the original unknown mass and the spring constant. [5+5]

---ooOoo---

R07

Code No: Z0221

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

APPLIED PHYSICS

(Common to EEE, ECE, CSE, IT)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Calculate the packing fraction of SC, BCC and FCC crystals.
b) What is cohesive energy? Estimate the cohesive energy of a molecule. [8+8]
- 2.a) What is the physical significance of a wave function and explain Heisenberg Uncertainty principle.
b) Derive the time independent Schrödinger's wave equation. [8+8]
- 3.a) Give brief account of Kronig-Penny model. What are its main conclusions?
b) Explain Fermi-Dirac distribution of particles in energy states. [8+8]
- 4.a) Derive Clausius-Mosotti relation in dielectric materials.
b) Define magnetic moment. Explain the origin of magnetic moment at the atomic level. What is Bohr magneton? [8+8]
- 5.a) Obtain an expression for carrier concentration in extrinsic semiconductors.
b) Mention any four applications of Superconductors and also explain flux quantization. [8+8]
- 6.a) Deduce the relation between the Einstein coefficients.
b) Describe the construction and working principle of He-Ne laser and also mention few applications. [8+8]
- 7.a) Define the terms numerical aperture and acceptance angle. Derive the relation between them.
b) Describe the construction and reconstruction of image on hologram. [8+8]
- 8.a) Why nanomaterials exhibiting different properties? Explain in detail.
b) Discuss the Chemical Vapour deposition method of synthesis of nanomaterials. [8+8]

---ooOoo---

R16

Code No: 132AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

APPLIED PHYSICS

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Define stress and mention its types. [2]
- b) What is young's modulus? [3]
- c) What is meant by acoustics of building? [2]
- d) What are the factors affecting the acoustics quality of the building? [3]
- e) Distinguish between audible, infrasonic and ultrasonic waves. [2]
- f) Define piezoelectric effect. [3]
- g) What is meant by polarization in a dielectric material? [2]
- h) What is meant by dielectric loss? [3]
- i) Define magnetic dipole and magnetic flux density. [2]
- j) What are different types of magnetic materials? [3]

PART-B

(50 Marks)

- 2.a) Explain various kinds of moduli of elasticity.
 - b) Find the amount of work done in twisting the steel wire of radius 2mm and length 50cm through an angle 45° . The rigidity modulus of steel is $8 \times 10^8 \text{ Nm}^{-2}$. [5+5]
- OR**
- 3.a) Derive the rigidity modulus of the wire using Torsional pendulum.
 - b) How much force is required to stretch a steel wire to double its length when its area of cross section is 2 sq cm and Young's modulus is $2 \times 10^{11} \text{ N/m}^2$. [5+5]
- 4.a) What are the basic requirements of an acoustically good hall?
 - b) Explain the various factors that affect architectural acoustics and suggest their remedies? [5+5]
- OR**
- 5.a) Define and explain the sound absorption coefficient of materials.
 - b) Derive Sabine's mathematical relation for reverberation time. [5+5]

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6.a) Explain the construction and production of ultrasonic waves using magnetostriction method.

b) Write notes on applications of ultrasonic waves. [5+5]

OR

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7.a) Explain the construction and production of ultrasonic waves using piezoelectric method.

b) How are ultrasonic waves used in non-destructive testing of materials? [5+5]

8.a) What is orientation polarization? Derive an expression for the mean dipole moment when a polar material is subjected to an external field.

26 26 26 26 26 26 26 26 26 2

b) The dielectric constant of helium, measured at 0°C and 1 atmosphere is $\epsilon_r = 1.0000684$. Under these conditions the gas contains 2.7×10^{25} atoms/ m^3 . Calculate the radius of the electron cloud. Also calculate the displacement when a helium atom is subjected to an electric field of 10^6 V/m? [5+5]

OR

9.a) Discuss in detail the origin of ferroelectricity in barium titanate.

b) If the relative permittivity of sulphur is 4.0. Calculate its atomic polarizability. [Given that sulphur in cubic form has a density of 2.08×10^3 kg/ m^3 and its atomic weight is 32]. [5+5]

26 26 26 26 26 26 26 26 26 2

10.a) Explain in detail domain theory of ferromagnetism.

b) The saturation magnetic induction of nickel is $0.65 \text{wb}/\text{m}^2$. If the density of nickel is $8906 \text{kg}/\text{m}^3$ and its atomic weight is 58.7, calculate the magnetic moment of the nickel atom in Bohr magneton. [5+5]

OR

11.a) What is Meissner effect? Explain.

b) Write applications of superconductivity. [5+5]

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R16

Code No: 132AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

MATHEMATICS-II

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

- 1.a) Find the Laplace transform of $f(t) = \begin{cases} K, & 0 < t < 2 \\ 0, & 2 < t < 4 \end{cases}$, $f(t+4) = f(t), \forall t > 0$. [2]
- b) Find the Laplace transform of $f(t) = \frac{1-e^t}{t}$. [3]
- c) Evaluate $\beta\left(\frac{9}{2}, \frac{7}{2}\right)$. [2]
- d) Evaluate $\int_0^{\infty} e^{-x^2} dx$. [3]
- e) Evaluate $\int_0^{\frac{\pi}{2}} \sin^2 \theta \cos^2 \theta d\theta$ using beta and gamma functions. [2]
- f) Show that the area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is $\frac{16}{3}a^2$. [3]
- g) Find a vector normal to the surface $xyz^2 = 20$ at the point $(1, 1, 2)$. [2]
- h) If $u\vec{F} = \nabla u$, where u, v are scalar fields and \vec{F} is a vector field, show that $\vec{F} \cdot \text{curl } \vec{F} = 0$. [3]
- i) State Green's theorem. [2]
- j) Find the work done by a force $y\vec{i} + x\vec{j}$ which displays a particle from origin to a point $(\vec{i} + \vec{j})$ along the line $y = x$. [3]

PART-B

(50 Marks)

- 2.a) Express the function $f(t)$ in terms of unit step function, where $f(t) = \begin{cases} t-1, & 1 < t < 2 \\ 3-t, & 2 < t < 3 \end{cases}$. Hence find its Laplace transform. [5+5]
 - b) Find the Laplace transform of $\int_0^{\infty} te^{-3t} \sin t dt$. [5+5]
- OR
- 3.a) State the convolution theorem on Laplace transforms. Using it find the inverse Laplace transform of $\frac{1}{s(s^2+a^2)}$. [5+5]
 - b) Solve $y'' + 2y' + 5y = e^{-t} \sin t$, $y(0) = 0$ and $y'(0) = 1$ using Laplace transforms. [5+5]
- 4.a) Evaluate $\int_0^1 x^{5/2} (1-x)^{3/2} dx$ using Beta, Gamma functions. [5+5]
 - b) Evaluate $\int_0^1 \frac{dx}{(1-x^n)^{1/n}}$. [5+5]

OR

5.a) Show that $\int_0^{\infty} \frac{t^{m-1}}{(a+bt)^{m+n}} dt = \frac{\beta(m,n)}{a^n b^m}$, where m, n, a, b are positive integers.

b) Evaluate $\int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx$. [5+5]

6.a) Evaluate $\int_0^1 \int_0^x \frac{x \cdot x^3 dx \cdot dy}{\sqrt{x^2 + y^2}}$ by changing into polar coordinates.

b) By double integration, calculate the area bounded by the curve $a^2 x^2 = y^3(2a - y)$. [5+5]

OR

7.a) Find the area enclosed in the first quadrant by the curve $\left(\frac{x}{a}\right)^\alpha + \left(\frac{y}{b}\right)^\beta = 1$, $\alpha > 0, \beta > 0$, using beta gamma functions.

b) Find the center of gravity of the area of the cardioid $r = a(1 + \cos \theta)$. [5+5]

8.a) Show that $\nabla^2(r^n) = n(n+1)r^{n-2}$.

b) If $f = (x^2 + y^2 + z^2)^{-n}$, find $\text{div grad } f$ and determine n if $\text{div grad } f = 0$. [5+5]

OR

9.a) Show that the vector $\vec{F} = (x+3y)\vec{i} + (y-3z)\vec{j} + (x-2z)\vec{k}$ is solenoidal and also find $\vec{F} \cdot \text{curl } \vec{F}$.

b) In what direction from $(3, 1, -2)$ is the directional derivative of $\phi = x^3 y^2 + yz$ maximum? Find also the magnitude of this maximum. [5+5]

10. State Stokes theorem. Verify it for the vector field $\vec{F} = (2x-y)\vec{i} - yz^2\vec{j} - y^2z\vec{k}$ over the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$, bounded by its projection on the xy -plane. [10]

OR

11.a) Using Green's theorem, find the area of the region in the first quadrant bounded by the curves $y = x, y = \frac{1}{x}, y = \frac{x}{4}$.

b) Evaluate $\iiint_V \text{div } \vec{F} dV$, where $\vec{F} = y\vec{i} + x\vec{j} + z^2\vec{k}$ over the surface of the cylinder $x^2 + y^2 = a^2, z = 0, z = h$. [5+5]

---ooOoo---

25-may-2017 (FN)

R16

Code No: 131AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

ENGINEERING PHYSICS – I

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) What do you understand by a grating element? [2]
- b) Sketch the neat diagram of Fraunhofer diffraction at a single slit. [3]
- c) What is meant by optical resonator? [2]
- d) Give some applications of lasers in medical applications. [3]
- e) Sketch the ray propagation in multimode Graded Index optical fiber. [2]
- f) How will you classify the optical fibers? [3]
- g) Define atomic radius, co-ordination number? [2]
- h) Draw the following planes of cubic structure (121), (010), (202). [3]
- i) Sketch the neat diagram for screw dislocation. [2]
- j) What are Frenkel and Schottky defects? [3]

Part-B (50 Marks)

- 2.a) Explain spatial and temporal coherence.
 - b) Derive an expression for radius of curvature of Plano convex lens in Newton's rings experiment.
 - c) A screen is placed 2 m away from a narrow slit. Find the slit width if the first minimum lies 5 mm on either side of the central maximum when plane wave of $\lambda = 5 \times 10^{-7}$ m are incident on the slit. [3+4+3]
- OR**
- 3.a) Explain Fresnel and Fraunhofer diffraction.
 - b) Briefly explain Fraunhofer diffraction at single slit experiment?
 - c) Examine if two spectral lines of wavelengths 5890 \AA and 5893 \AA can be clearly resolved in the (i) first order and (ii) second order by a diffraction grating 2 cm wide and having 425 lines/cm. [3+4+3]
- 4.a) What is the difference between polarized and unpolarised light?
 - b) Discuss the construction and working of nicol prism.
 - c) What is the principle of quarter wave plates? [4+3+3]
- OR**
- 5.a) Discuss the characteristics of laser radiation.
 - b) Describe the construction and working of ruby laser.
 - c) Calculate the relative population in the laser transition levels in a ruby laser in thermal equilibrium (without pumping of atoms). The wavelength of the ruby laser light is 6943 \AA at 300 K. [3+4+3]

- 6.a) Derive an expression for the numerical aperture of an optical fiber.
b) Discuss the various factors contributing to attenuation in optical fiber.
c) Explain the advantages of optical fiber in communication. [3+4+3]

OR

- 7.a) Explain briefly the basic principle of optical fiber.
b) Describe the structure of different types of optical fibers with ray paths.
c) Explain how the signal transmits through graded index fiber. [3+4+3]

- 8.a) Explain the terms (i) basis (ii) space lattice (iii) unit cell.
b) Show that FCC crystals are closely packed than BCC crystals?
c) What are Miller indices? How do you obtain for a given plane in a crystal? [3+4+3]

OR

- 9.a) Explain the terms (i) Atomic radius (ii) Coordination number (iii) Packing factor.
b) Find the packing factors for SC and BCC?
c) Derive an expression for the inter planar spacing between two adjacent planes? [3+4+3]

- 10.a) Describe the Laue method of determination of crystal structure.
b) Calculate the Bragg angle at which electrons accelerated from rest through a potential difference of 80 volts will be diffracted from the (111) planes of a FCC crystal of lattice parameter 0.35 nm.
c) Explain the various types of point defects in the crystals? [4+3+3]

OR

- 11.a) Give brief account of powder method for crystal structure analysis.
b) What are crystal defects in crystal? Classify the defects of crystals.
c) Explain the significance of Burger's vector. [4+3+3]

---ooOoo---

R16

Code No: 131AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

MATHEMATICS-II

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub-questions.

Part-A (25 Marks)

- 1.a) Find $\lim_{t \rightarrow 0} f(t)$, if $L(f(t)) = \frac{s}{s^2 + w^2}$. [2]
- b) Find the inverse Laplace Transform of $\frac{s+5}{(s+1)(s+3)}$. [3]
- c) Find the value of $\int_0^{\infty} \frac{dx}{1+x^4}$. [2]
- d) Evaluate $\int_0^1 x^{11}(1-x)^{16} dx$. [3]
- e) Find the area enclosed between the parabola $y = x^2$ and the line $y = x$. [2]
- f) Evaluate $\int_0^{\frac{\pi}{4}} \cos^2 x dx$. [3]
- g) Find the magnitude of the gradient of the function $f(x, y, z) = xyz^3$ at $(1, 0, 2)$. [2]
- h) The velocity vector in 2-dimensional field is $\vec{V} = 2xy\vec{i} + (2y^2 - x^2)\vec{j}$. Find the $\text{curl } \vec{V}$. [3]
- i) Find the Curl of the gradient of the scalar field $V = 2x^2y + 3y^2z + 4z^2x$. [2]
- j) Find the divergence of the vector field \vec{A} at $(1, -1, 1)$ $\vec{A} = x^2z\vec{i} + xy\vec{j} - yz^2\vec{k}$. [3]

Part-B (50 Marks)

- 2.a) State and prove the second shifting theorem of Laplace Transform.

b) Find $L(F(t))$ if $F(t) = \begin{cases} \sin\left(t - \frac{\pi}{3}\right), & t > \frac{\pi}{3} \\ 0, & t < \frac{\pi}{3} \end{cases}$ [5+5]

OR

3.a) Find the Laplace Transform of $F(t) = a + bt + \frac{c}{\sqrt{t}}$.

b) Solve using Laplace Transform $\frac{d^2y}{dt^2} + \frac{dy}{dt} - 2y = 3\cos 3t - 11\sin 3t$, $y(0) = 0$, $y'(0) = 16$. [5+5]

4.a) Show that $\int_0^{\frac{\pi}{2}} \sqrt{\tan \theta} d\theta = \int_0^{\frac{\pi}{2}} \sqrt{\cot \theta} d\theta = \frac{\pi}{\sqrt{2}}$.

b) Evaluate $\frac{\beta(m+1, n)}{\beta(m, n)}$. [5+5]

5. Show that $\Gamma m \Gamma\left(m + \frac{1}{2}\right) = \frac{\sqrt{\pi}}{2^{2m-1}} \Gamma(2m)$, $m > 0$. [10]

6. Find the mass, center of gravity and moment of inertia relative to the x-axis, y-axis and origin of a rectangle $0 \leq x \leq 4$, $0 \leq y \leq 2$ having the mass density function $f(x, y) = xy$. [10]

7. Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xy dy dx$ and integrate it. [10]

8.a) Show that $\text{div}(r^n \bar{r}) = (n+3)r^{-n}$.

b) If $\bar{u} = \frac{1}{r} \bar{r}$, find $\text{grad}(\text{div} \bar{u})$. [5+5]

9.a) Show that $\text{div}(\bar{A} \times \bar{B}) = \bar{B} \cdot \text{curl} \bar{A} - \bar{A} \cdot \text{curl} \bar{B}$.

b) Find the gradient of the Scalar function $f(x, y, z) = x^2y^2 + xy^2 - z^2$ at $(3, 1, 1)$. [5+5]

10. Verify the Gauss's divergence theorem for $\bar{F} = (x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$ over the rectangular parallelepiped $0 \leq x \leq a$, $0 \leq y \leq b$, $0 \leq z \leq c$. [10]

11. Evaluate $\oint_C x^2 dx + 2y dy - dz$ by Stoke's theorem where C is the curve $x^2 + y^2 = 4$, $z = 2$. [10]

R15

Code No: 121AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING PHYSICS

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, AME, MIE, PTM, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) Define space lattice and primitive cell? [2]
- b) What are Bravais lattices? [3]
- c) Define phase space. [2]
- d) Explain the concept of effective mass of an electron. [3]
- e) What is space charge polarization? [2]
- f) What are the characteristics of laser radiation? [3]
- g) What is meant by Neel temperature? [2]
- h) Write a short note on refractive index profiles of step index fiber. [3]
- i) Explain Hall Effect. [2]
- j) Explain surface to volume ratio in nanomaterials. [3]

Part-B (50 Marks)

- 2.a) Derive an expression for the cohesive energy of an ionic crystal. [5+5]
 - b) Explain the powder method of crystal for structure analysis. [5+5]
- OR**
- 3.a) Show that FCC crystals are closely packed than BCC and SC crystals, [5+5]
 - b) Mention the different kinds of crystal imperfections. [5+5]
- 4.a) Explain the physical significance of wave function? A quantum particle confined to one-dimensional box of width 'a' is known to be in its first excited state. Determine the probability of the particle in the centre half. [5+5]
 - b) Explain and compare M.B, B.E and F.D statistical distribution functions. [5+5]
- OR**
- 5.a) Show that the energies of a particle in a potential box are quantized. [5+5]
 - b) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. [5+5]

6.a) Derive an expression for the internal electrical field in dielectrics exposed to a external electric field.

b) Draw and explain B-H curve for a ferromagnetic material. [6+4]

OR

7.a) Distinguish between piezo and ferroelectric effects.

b) Explain how ferrites are superior to ferromagnetic materials? Discuss hard and soft magnetic materials? [4+6]

8.a) How do you obtain circular rings in Newton's rings experiment? Derive an expression for radius of curvature of Newton's rings experiment.

b) Derive the relation between the probabilities of spontaneous emission and stimulated emission of Einstein coefficients? [5+5]

OR

9.a) Distinguish between polarized and unpolarised light.

b) What is population inversion in laser? How is it achieved? [5+5]

10.a) Derive an expression for the carrier concentration in p-type extrinsic semiconductor.

b) What is the reverberation time? Derive Sabine's mathematical relation for reverberation time? [5+5]

OR

11.a) Draw and explain the energy band diagram of a p-n junction. Explain half-wave rectification using p-n diode?

b) Why nanomaterials exhibit different properties. Explain the reason? [5+5]

---ooOoo---

R13

Code No: 111AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING PHYSICS

(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, IT, MCT, ETM, MMT, AE, AME, MIE, PTM, MSNT, AGE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) Define space lattice and primitive cell? [2]
- b) What are Bravais lattices? [3]
- c) Define phase space. [2]
- d) Explain the concept of effective mass of an electron. [3]
- e) What is space charge polarization? [2]
- f) What are the characteristics of laser radiation? [3]
- g) What is meant by Neel temperature? [2]
- h) Write a short note on refractive index profiles of step index fiber. [3]
- i) Explain Hall Effect. [2]
- j) Explain surface to volume ratio in nanomaterials. [3]

Part-B (50 Marks)

- 2.a) Derive an expression for the cohesive energy of an ionic crystal. [5+5]
 - b) Explain the powder method of crystal for structure analysis. [5+5]
- OR**
- 3.a) Show that FCC crystals are closely packed than BCC and SC crystals. [5+5]
 - b) Mention the different kinds of crystal imperfections. [5+5]
- 4.a) Explain the physical significance of wave function? A quantum particle confined to one-dimensional box of width 'a' is known to be in its first excited state. Determine the probability of the particle in the centre half. [5+5]
 - b) Explain and compare M.B, B.E and F.D statistical distribution functions. [5+5]
- OR**
- 5.a) Show that the energies of a particle in a potential box are quantized. [5+5]
 - b) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. [5+5]

26 26 26 26 26 26 26 26
6.a) Derive an expression for the internal electrical field in dielectrics exposed to a external electric field.

b) Draw and explain B-H curve for a ferromagnetic material. [6+4]

OR

26 26 26 26 26 26 26 26
7.a) Distinguish between piezo and ferroelectric effects.

b) Explain how ferrites are superior to ferromagnetic materials? Discuss hard and soft magnetic materials? [4+6]

8.a) How do you obtain circular rings in Newton's rings experiment? Derive an expression for radius of curvature of Newton's rings experiment.

b) Derive the relation between the probabilities of spontaneous emission and stimulated emission of Einstein coefficients? [5+5]

OR

26 26 26 26 26 26 26 26
9.a) Distinguish between polarized and unpolarised light.

b) What is population inversion in laser? How is it achieved? [5+5]

10.a) Derive an expression for the carrier concentration in p-type extrinsic semiconductor.

b) What is the reverberation time? Derive Sabine's mathematical relation for reverberation time? [5+5]

OR

26 26 26 26 26 26 26 26
11.a) Draw and explain the energy band diagram of a p-n junction. Explain half-wave rectification using p-n diode?

b) Why nanomaterials exhibit different properties. Explain the reason? [5+5]

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---ooOoo---

Code No: 51002

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

MATHEMATICS-I

(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, ETM, MMT, AE, BT, AME, MIE, PTM, MSNT, AGE)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Test the convergence of the series whose n^{th} term is $(\sqrt{n+1} - \sqrt{n-1})$.
- b) Test the convergence of the series $\sum_{n=2}^{\infty} \frac{1}{n \log n}$
- c) Prove that the series $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{4}} + \dots$ is conditionally convergent. [5+5+5]
- 2.a) Verify Cauchy's mean value Theorem for $f(x) = x^3$, $g(x) = x^2$ in $[1,2]$.
- b) If $f_1 = xy + yz + zx$, $f_2 = x^2 + y^2 + z^2$ and $f_3 = x + y + z$. Determine whether they are functionally dependent or not. If so find the relation. [7+8]
- 3.a) Prove that the radius of curvature of the curve $xy^2 = a^3 - x^3$ at the point $(a, 0)$ is $\frac{3a}{2}$.
- b) Find the center of curvature of the curve $y^2 = 4ax$ and find the evolute. [7+8]
- 4.a) Find the volume of the solid obtained by revolving one loop of the curve $r^2 = a^2 \cos^2 \theta$ about the line $\theta = \frac{\pi}{2}$.
- b) Calculate $\iint_R r^3 dr d\theta$ over the area included between the circles $r = 2 \sin \theta$ and $r = 4 \sin \theta$. [8+7]
- 5.a) Solve the differential equation $\frac{dy}{dx} + \frac{y}{x \log x} = \frac{\sin 2x}{\log x}$
- b) Find the orthogonal Trajectories of the family of curves $x^{2/3} + y^{2/3} = a^{2/3}$. [7+8]
- 6.a) Solve the differential equation $(D^2 - 4)y = 2 \cos^2 x$.
- b) Solve $\frac{d^2 y}{dx^2} + 4y = \tan 2x$ by the method of variation of parameters. [7+8]
- 7.a) Find $L[te^{-4t} \sin 3t]$.
- b) Find Inverse Laplace transform of $\frac{3s+7}{(s^2-2s-3)}$. [7+8]
8. Verify Green's theorem for $\int_c (xy + y^2) dx + x^2 dy$ where c is bounded by $y = x$ and $y = x^2$. [15]

R07

Code No: Z0421

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ELECTRONIC DEVICES AND CIRCUITS

(Common to ECE, CSE, IT)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Derive the expression for electrostatic deflection sensitivity.
- b) Explain the principle of CRT. [8+8]
- 2.a) Explain the volt ampere characteristics of PN diode.
- b) Explain the characteristics of Tunnel diode with energy band diagrams. [8+8]
- 3.a) Derive the ripple factor expression for HWR with capacitor filter and also explain the same.
- b) Write the differences between HWR and FWR. [10+6]
- 4.a) Explain the construction and working function of NPN transistor in detail.
- b) Draw and explain small signal model of JFET. [10+6]
- 5.a) Explain stability factor in detail.
- b) Explain the factor affecting stability of Q point. [8+8]
6. Analyze single stage CE amplifier using hybrid model and then derive the expressions for A_i , A_v , Z_i and Z_o . [16]
- 7.a) Explain general characteristics of negative feedback amplifier.
- b) Classify negative feedback amplifiers. [10+6]
8. Draw a neat circuit diagram of RC phase shift oscillator using FET and explain its working principle and then derive the expression for frequency of oscillation and condition for oscillation. [16]

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R07

Code No: Y0221

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

BASIC ELECTRONIC DEVICES AND CIRCUITS

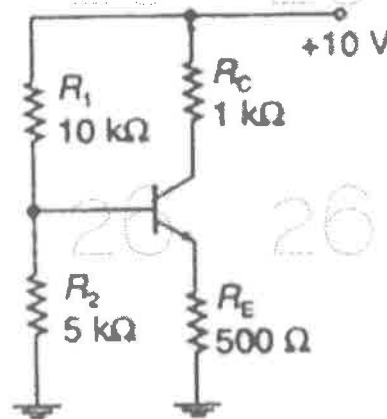
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 80

**Answer any five questions
All questions carry equal marks**

- 1.a) With neat diagram, explain working principal of CRO.
b) Explain electrostatic deflection in CRT with diagram and necessary equations. [6+10]
- 2.a) Derive an expression for conductivity in a intrinsic semiconductor in terms of electron and hole concentration.
b) Find the concentration of holes and electrons in the P-type silicon at 300°K assuming its resistivity as $0.02\Omega\text{-cm}$, $\mu_p=475\text{cm}^2/\text{vs}$, $\eta_i=1.45\times 10^{10}/\text{cm}^3$. [8+8]
- 3.a) How Zener diode can be used as voltage regulator? Explain.
b) What are the advantages of Capacitor filter over Inductor filter?
c) Define Voltage regulation. [10+3+3]
- 4.a) Explain the operation of enhancement mode NMOSFET.
b) Distinguish between BJT and FET. [8+8]
- 5.a) For the circuit shown in the figure, determine the value of I_C and V_{CE} . Assume $V_{BE} = 0.7\text{V}$ and $\beta=100$.



- b) How thermal run away can be avoided? Discuss. [10+6]
- 6.a) Draw the small signal model for a common- drain FET amplifier.
b) A FET amplifier in the common-source configuration uses a load resistance of $300\text{ k}\Omega$. The ac drain resistance of the device is $100\text{ k}\Omega$ and the transconductance is 0.5mA/V . Find the Voltage gain of the amplifier. [8+8]

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- 7.a) Draw the block diagram of a voltage series feedback amplifier and derive the equation for input impedance, output impedance and the voltage gain.
- b) Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having $A_v = 300$, $R_i = 1.5 \text{ k}\Omega$, $R_o = 50 \text{ k}\Omega$ and $\beta = 1/15$. [10+6]
- 8.a) Briefly discuss the crystal oscillator.
- b) Derive the oscillation frequency of a wien bridge oscillator. [6+10]

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R16

Code No: 132AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

MATHEMATICS-III

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

1.a) If the probability density function of a random variable is given by

$$f(x) = \begin{cases} k(1-x^2), & 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}, \text{ find } k. \quad [2]$$

b) Define geometric distribution and find its mean. [3]

c) State central limit theorem. [2]

d) If $n = 100$, $\sigma = 5$, find the maximum error with 95% confidence limits. [3]

e) Write about type I error and type II error. [2]

f) State the test statistic for an ANOVA test. [3]

g) Find the Newton-Raphson iterative formula to find the reciprocal of a number N , $N > 0$. [2]

h) Derive normal equations to fit the straight line $y = ax + b$. [3]

i) In Trapezoidal rule, if the interval of $\int_1^{10} f(x) dx$ is divided into 9 equal sub intervals, find h . [2]

j) Find the approximate value of $y(0.2)$ for the initial value problem $y' = x + y$, $y(0) = 1$ by Euler's method with step size $h = 0.1$. [3]

PART-B

(50 Marks)

2.a) A random variable X has the following distribution:

x:	0	1	2	3	4
P(x):	K	2k	2k	K ²	5k ²

Determine i) the distribution function of X and ii) variance of X .

b) Define moment generating function and state its properties. [5+5]

OR

3.a) Two dice are thrown 5 times. Find the probability of getting 7 as sum i) at least once and ii) exactly two times.

b) Find the mean and standard deviation of a normal distribution in which 7% of items are under 35 and 89% are under 63. [5+5]

4. A population consists of five numbers 3, 6, 9, 15, 27. Consider all possible samples of size 3 that can be drawn without replacement from this population. Find a) the population mean b) the population standard deviation c) the mean of the sampling distribution of means and d) the standard deviation of the sampling distribution of means. [10]

OR

- 5.a) Define χ^2 -distribution and write its properties.
 b) A random sample of size 81 is taken whose variance is 20.25 and mean is 32. Construct 98% confidence interval. [5+5]

- 6.a) Explain the terms i) one-tailed and ii) two-tailed tests.
 b) The sizes and means of two independent random samples are 400, 225; 3.5 and 3.0 respectively. Can we conclude that the samples are drawn from the same population with standard deviation 1.5? [5+5]

OR

7. The following table shows the data obtained for two samples selected at random from two populations that are independent and normally distributed with equal variances.

Sample A	Sample B
15	10
16	9
12	12
9	17
12	15
19	8
17	9

Using one-way ANOVA procedure, test at 5% significance level whether the means of the populations from which these samples are drawn are equal. [10]

- 8.a) Find a root of the equation $xe^x=1$ using the method of false position correct to two decimal places.
 b) Find the smallest positive root of $x^3+x-1=0$ by iteration method. [5+5]

OR

- 9.a) Perform three iterations of Gauss-Jacobi method to solve the system of equations $2x-y=3$, $-x+2y-z=-4$, $-y+2z=3$.
 b) Fit the parabola $y=a+bx+cx^2$ to the following data: [5+5]

x:	0	1	2	3	4
y:	1	0	3	10	21

- 10.a) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's $\frac{3}{8}$ th rule.
 b) Use Taylor series method to solve $y' = 2y + 3e^x$, $y(0) = 0$ at $x = 0.1$. Compare with exact solution. [5+5]

OR

11. Explain Picard's method of successive approximations to solve the initial value problem $y' = f(x, y)$, $y(x_0) = y_0$. Hence obtain the solution of $y' = x - y^2$, $y(0) = 1$ and Compute $y(0.1)$ correct to three decimal places. [10]

27-May-2017 (FN)

R16

Code No: 131AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

ENGINEERING PHYSICS

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) What are the conditions to get the interference of light? [2]
- b) What is a plane diffraction grating? Explain. [3]
- c) State and explain Brewster's law. [2]
- d) Distinguish between spontaneous and stimulated emissions. [3]
- e) Distinguish between the single mode and multimode optical fiber. [2]
- f) Find the numerical aperture of an optical fiber having a core refractive index of 1.6 and cladding refractive index of 1.50. [3]
- g) Define unit cell and lattice parameters. [2]
- h) What are Miller indices? Explain. [3]
- i) What are Laue spots? Explain. [2]
- j) What are grain boundaries? Explain. [3]

Part-B (50 Marks)

- 2.a) Discuss the formation of interference fringes in a thin wedge-shaped film.
- b) Explain what will happen when the air in the inter space is replaced by a transparent liquid in Newton's rings experiment.
- c) Find the thickness of a wedge-shaped air film at a point where fourth bright fringe is situated. Wavelength of light is 589.3 nm. [3+4+3]

OR

- 3.a) Describe how would you employ a plane diffraction grating to determine the wavelength of light.
- b) How many orders will be visible if the wavelength of incident light is 500 nm and the number of lines on the grating is 2620 in one inch? [5+5]

- 4.a) State and explain Malus's law.
- b) Explain how a quarter wave plate and a half wave plate could be constructed. Describe their properties.
- c) Calculate the thickness of a mica sheet required for making a quarter wave plate for 546 nm wavelength. The indices of refraction for the ordinary and extraordinary rays in mica are 1.586 and 1.592 respectively. [2+5+3]

OR

- 5.a) What are Einstein's coefficients?
- b) Obtain a relationship between them.
- c) Explain the role of optical resonator in a laser. [3+4+3]

- 26
- 6.a) Using ray theory derive the condition for transmission of light within an optical fiber.
b) What are the characteristics of an optical fiber?
c) An optical fiber has a numerical aperture of 0.20 and a cladding refractive index of 1.59. Find the acceptance angle for the fiber in water which has a refractive index of 1.33.

[3+4+3]

OR

- 26
- 7.a) Discuss the advantages of optical communication system over the conventional coaxial communication system.
b) Give the block diagram of Optical fiber communication system explaining the functions of different blocks.
c) Explain the principle of any two fiber optic sensors.

[3+4+3]

- 26
- 8.a) What is meant by atomic packing factor?
b) Calculate the atomic packing factor for SC and BCC structures.
c) Sodium crystallizes in a cubic lattice. The edge of the unit cell is 4.3 \AA . The density of sodium is 963 Kg/m^3 and its atomic weight is 23. What type of unit cell does sodium form?

[3+4+3]

OR

- 9.a) Derive an expression for inter planar spacing in a cubic crystal.
b) In a crystal a lattice plane cuts intercepts of $1a$, $2b$ and $3c$ along the three axes where a , b and c are primitive vectors of the unit cell. Determine the Miller indices of the given plane.

[6+4]

- 26
- 10.a) Describe with suitable diagram the powder method for determination of crystal structure.
b) X-rays of wavelength 0.36 \AA diffracted in a Bragg's spectrometer at an angle of $40^\circ 48'$. Find the effective value of atomic spacing.

[7+3]

OR

- 26
- 11.a) Explain edge and screw dislocations with neat diagrams.
b) Draw Burger's circuit for an edge dislocation and screw dislocation.
c) What is the significance of Burgér's vector?

[4+3+3]

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R16

Code No: 131AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

ENGINEERING CHEMISTRY

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part - A (25 Marks)

- 1.a) What is hard water? What are the salts that cause hardness to water? [2]
b) How are the salts from sea water removed? [3]
c) Differentiate between primary and secondary cell. [2]
d) Write the Nernst equation and mention its importance? [3]
e) Write the structures of natural rubber and vulcanized rubber? [2]
f) Write a brief note on compounding of plastics. [3]
g) Define Cracking and knocking. [2]
h) How the volatile matter content in coal is determined? [3]
i) Define Refractory and Lubricant? [2]
j) Write the composition of Portland cement? [3]

Part - B (50 Marks)

- 2.a) Explain about the ion exchange method of softening of water.
b) A sample of water contains following dissolved salts per liter.
Ca(HCO₃)₂=16.2mg, Mg(HCO₃)₂=14.6mg, CaCl₂=11.1mg and MgSO₄=12mg.
Calculate the total, permanent and temporary hardness of water? [5+5]
- OR**
- 3.a) What is disinfection of water? Explain the chlorination method.
b) Explain the steps involved in sewage treatment. [5+5]
- 4.a) Explain the construction and working of calomel electrode in the determination of pH of a solution
b) Calculate the EMF of the following cell.
Zn/ZnSO₄//FeSO₄/Fe
The standard electrode potentials of Zn⁺²/Zn = - 0.76V and Fe⁺²/Fe = 0.44V. [7+3]
- OR**
- 5.a) What is electrochemical series? Give its five applications.
b) Explain the construction and functioning of Nickel -Cadmium cell. [5+5]
- 6.a) Write the differences between thermoplastics and thermosetting plastics.
b) Give preparation, properties and engineering applications of Bakelite. [5+5]

OR

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7.a) Write preparation, properties and engineering applications of i) Buna-S and ii) Thiokol rubber?

b) Explain the mechanism of conduction in conducting polymers with respect to transpolyacetylene? [5+5]

26 26 26 26 26 26 26 2

8.a) Explain the proximate analysis of coal and give its significance?

b) A coal sample has 80% of carbon, 9% of hydrogen, 6% of sulphur and remaining is ash. Calculate the HCV and LCV of the coal sample? [5+5]

OR

9.a) What is Octane number and Cetane number? What is their significance?

b) Explain about moving bed catalytic cracking. [5+5]

26 26 26 26 26 26 26 2

10.a) Write a note on special cements.

b) What viscosity of lubricant? How is it determined? [5+5]

OR

11.a) What is Cloud point, Pour point, Flash point and Fire point of a lubricant? Give their significance.

b) What are the characteristics of a good refractory? [6+4]

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26 26 26 26 26 26 26 2

26 26 26 26 26 26 26 2

26 26 26 26 26 26 26 2

R15

Code No: 121AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING CHEMISTRY

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, AE, MIE, PTM, CEE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub-questions.

Part- A (25 Marks)

- 1.a) How pitting corrosion can be controlled? [2]
- b) The equivalent conductance of NaCl, HCl and CH₃COONa at infinite dilution are 49.45, 357.14 and 86.23 $\Omega^{-1}\text{cm}^2\text{eq}^{-1}$ respectively at 25°C. Calculate the equivalent conductance of acetic acid at infinite dilution. [3]
- c) Write the structure of Bakelite. [2]
- d) What are the essential requirements of good refractory materials? [3]
- e) What are the specifications of portable water? [2]
- f) What is Caustic embrittlement? [3]
- g) What is octane and cetane rating? [2]
- h) Define Gross and Net calorific value and give their inter relation. [3]
- i) What is eutectic point? [2]
- j) What are micelles? Give examples. [3]

Part-B (50 Marks)

- 2.a) Describe the construction and working of standard calomel electrode. [5]
 - b) What is Cathodic Protection? Explain Sacrificial anodic method. [5]
- OR**
- 3.a) What are the advantages of Electro plating? Describe the Electro plating of copper. [5]
 - b) Explain the different constituents of paint and their functions. [5]
- 4.a) What are Biodegradable polymers explain preparation and applications of polylactic acid. [5]
 - b) Discuss the various steps involved in setting and hardening of cement with chemical equations. [5]
- OR**
- 5.a) How does Fiber reinforced plastics made? Explain their applications. [5]
 - b) How to prepare Nanomaterials by chemical vapour deposition method. [5]

- 26 26 26 26 26 26 26 2
- 6.a) Describe the Reverse Osmosis process for softening of hard water.
b) Calculate the amount of lime and soda required in kg for softening 5,000 lt of water containing following impurities.
Ca(HCO₃)₂=162mg/L, CaSO₄=68mg/L, MgSO₄=84mg/L, MgCl₂=130mg/L. [5+5]

OR

- 26 26 26 26 26 26 26 2
- 7.a) Explain the disinfection of water by Chlorination and Ozonisation.
b) What is the principle involved in the estimation of hardness of water by EDTA method. [5+5]
- 8.a) What is cracking? What are the advantages of catalytic cracking?
b) What is petrol? How is it synthesized by Bergius process? [5+5]

OR

- 26 26 26 26 26 26 26 2
- 9.a) Calculate the Gross and Net Calorific value of coal sample having the following composition. C = 82%, H = 7%, O = 3%, S = 3.5%, N = 2.2% and ash 2.3%.
b) How does Carbon and Hydrogen determined in the ultimate analysis of coal. [5+5]
- 10.a) Draw the phase diagram of iron-carbon system.
b) Derive Langmuir adsorption isotherm. Explain its advantages. [5+5]

OR

- 26 26 26 26 26 26 26 2
- 11.a) Discuss optical properties of colloids.
b) Describe the phase diagram of one-component water system. [5+5]

---ooOoo---

R13

Code No: 111AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING CHEMISTRY

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, AME, MIE, PTM, AGE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) How pitting corrosion can be controlled? [2]
- b) The equivalent conductance of NaCl, HCl and CH₃COONa at infinite dilution are 49.45, 357.14 and 86.23 $\Omega^{-1}\text{cm}^2\text{eq}^{-1}$ respectively at 25⁰C. Calculate the equivalent conductance of acetic acid at infinite dilution. [3]
- c) Write the structure of Bakelite. [2]
- d) What are the essential requirements of good refractory materials? [3]
- e) What are the specifications of portable water? [2]
- f) What is Caustic embrittlement? [3]
- g) What is octane and cetane rating? [2]
- h) Define Gross and Net calorific value and give their inter relation. [3]
- i) What is eutectic point? [2]
- j) What are micelles? Give examples. [3]

Part-B (50 Marks)

- 2.a) Describe the construction and working of standard calomel electrode. [5+5]
 - b) What is Cathodic Protection? Explain Sacrificial anodic method. [5+5]
- OR**
- 3.a) What are the advantages of Electro plating? Describe the Electro plating of copper. [5+5]
 - b) Explain the different constituents of paint and their functions. [5+5]
- 4.a) What are Biodegradable polymers explain preparation and applications of polylactic acid. [5+5]
 - b) Discuss the various steps involved in setting and hardening of cement with chemical equations. [5+5]
- OR**
- 5.a) How does Fiber reinforced plastics made? Explain their applications. [5+5]
 - b) How to prepare Nanomaterials by chemical vapour deposition method. [5+5]

- 26 26 26 26 26 26 26
- 6.a) Describe the Reverse Osmosis process for softening of hard water.
b) Calculate the amount of lime and soda required in kg for softening 5,000 lt of water containing following impurities.
 $\text{Ca}(\text{HCO}_3)_2=162\text{mg/L}$, $\text{CaSO}_4=68\text{mg/L}$, $\text{MgSO}_4=84\text{mg/L}$, $\text{MgCl}_2=130\text{mg/L}$. [5+5]

OR

- 26 26 26 26 26 26 26
- 7.a) Explain the disinfection of water by Chlorination and Ozonisation.
b) What is the principle involved in the estimation of hardness of water by EDTA method. [5+5]
8.a) What is cracking? What are the advantages of catalytic cracking?
b) What is petrol? How is it synthesized by Bergius process? [5+5]

OR

- 26 26 26 26 26 26 26
- 9.a) Calculate the Gross and Net Calorific value of coal sample having the following composition. C = 82%, H = 7%, O = 3%, S = 3.5%, N = 2.2% and ash 2.3%.
b) How does Carbon and Hydrogen determined in the ultimate analysis of coal. [5+5]
10.a) Draw the phase diagram of iron-carbon system.
b) Derive Langmuir adsorption isotherm. Explain its advantages. [5+5]

OR

- 26 26 26 26 26 26 26
- 11.a) Discuss optical properties of colloids.
b) Describe the phase diagram of one-component water system. [5+5]

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R09

Code No: 51003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING MECHANICS

(Common to CE, ME, MMT, AE, MIE, PTM)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Forces 20kN, 30kN, 60kN and 40kN are concurrent at $O(1, 2, 3)$ and are directed through $M(6, 3, -2)$, $N(-4, -2, 5)$, $P(-3, 2, 4)$ and $Q(4, -3, 6)$ respectively. Determine the resultant of the system.
- b) A wheel of 60 cm diameter resting on the ground touches a rectangular block of 10 cm height. Find the minimum pull required through the center of the wheel just to turn the wheel over the corner of the block. Also, find the reaction of the block to the wheel. Take weight of the wheel as 3000 N. Assume that all surfaces are smooth. [7+8]
2. A vertical pole OP , 12m high, may be taken to coincide with z-axis and its base O being at the origin of $x-y-z$ orthogonal axes. The top of the pole is tied to three guy wires PA , PB and PC where ends A , B and C have the coordinates $A(4, 2, 0)$, $B(-2, -2, -2)$ and $C(0, 3, 0)$ and forces in the wires are 80, 50 and 25 kN respectively. Find the resultant force at top point P on the pole. [15]
3. Determine the co-ordinates of the C.G. of the area OAB shown in figure 1, if the curve AB is represented by the equation $(x^2/a^2) + (y^2/b^2) = 1$. [15]

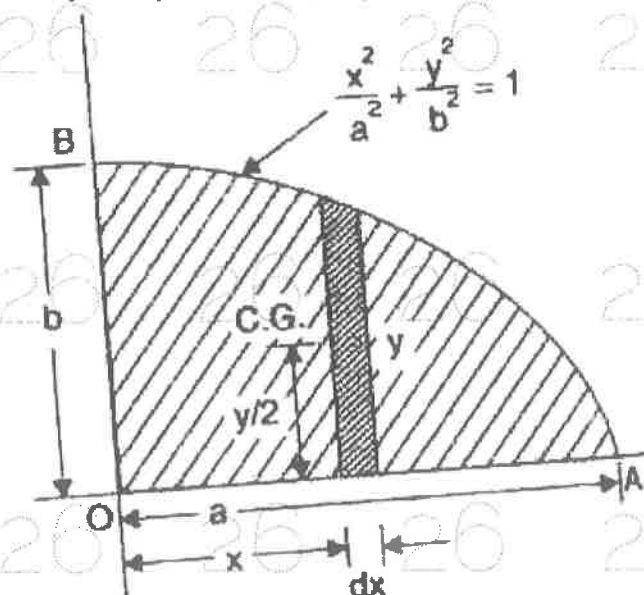


Figure: 1

- 4.a) State and prove transfer theorem of moment of inertia.
 b) Find the mass moment of inertia of a solid conical body of mass density ρ , base radius ' r ' and height ' h ' about its centroidal axes. [7+8]
- 5.a) Give the classification of frames.
 b) Find the forces acting in all the members of the assemblage shown in figure 2. [7+8]

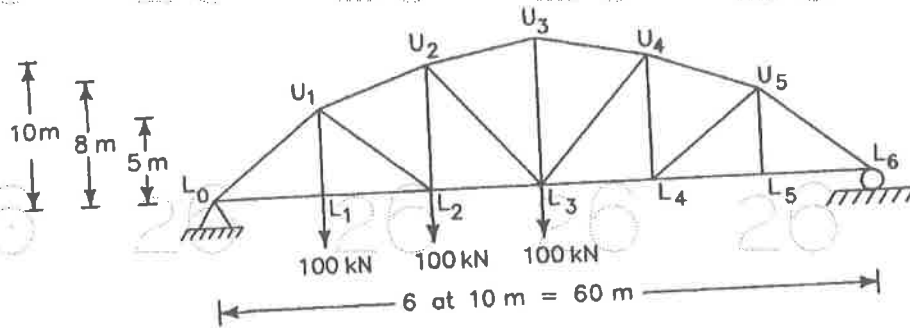


Figure: 2

6. A particle moves along a straight line so that its displacement in meters from a fixed point is given by, $s=2t^3+5t^2+7t-10$. Find:
 a) Velocity at start
 b) Velocity after 6 seconds
 c) Acceleration at start
 d) Acceleration after 5 seconds. [15]
7. A flywheel, of mass 6000 Kg and having a radius of gyration 1.2m, loses its speed from 500 rpm to 220 rpm in 3 minutes. Calculate
 a) The retarding torque acting on it
 b) Change in the kinetic energy during the above period and
 c) Change in its angular momentum during the period. [15]
8. For the arrangement of beams shown in figure 3 find the support reaction at B for equilibrium using virtual work principle. [15]

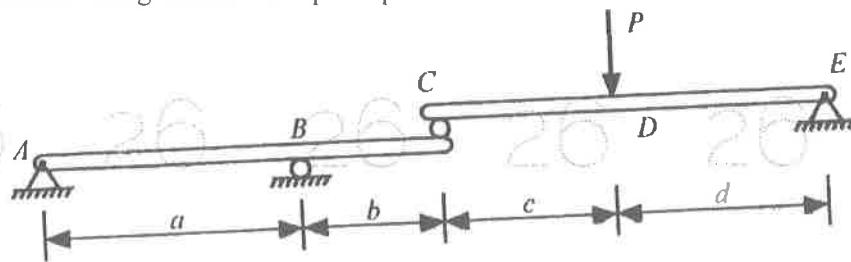


Figure: 3

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R09

Code No: 51008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

MATHEMATICAL METHODS

(Common to EEE, ECE, CSE, EIE, BME, IT)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

1.a) Reduce the matrix $A = \begin{bmatrix} 1 & 3 & 6 & -1 \\ 1 & 4 & 5 & 1 \\ 1 & 5 & 4 & 3 \end{bmatrix}$ into its normal form and hence find its rank.

b) Solve the following system of linear equations by using Gaussian elimination method
 $2x + 4y - 6z = -4$; $x + 5y + 3z = 10$; $x + 3y + 2z = 5$. [7+8]

2.a) Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$.

b) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find its inverse. [7+8]

3.a) Prove that the Eigen values of Hermitian matrix are real.

b) Reduce the quadratic form $x_1^2 + 3x_2^2 + 3x_3^2 - 2x_2x_3$ into canonical form and also find the nature of the quadratic form. [7+8]

4.a) Using Regula-Falsi method, compute the real root of the equation $x^3 - 4x - 9 = 0$.

b) Evaluate $\Delta^2 (\tan^{-1} x)$.

c) Using Newton's forward formula, find the value of $f(1.6)$, if [4+5+6]

x	1	1.4	1.8	2.2
$f(x)$	3.49	4.82	5.96	6.5

5.a) Fit a least squares quadratic curve $y = a_0 + a_1x + a_2x^2$ to the following data

x	1	2	3	4
y	1.7	1.8	2.3	3.2

Estimate $y(2.4)$.

b) Determine $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ at $x = 0$ from the following data

x	0	1	2	3	4	5
y	4	8	15	7	6	2

[7+8]

26 26 26 26 26 26 26 2

6.a) Find $y(0.1)$ by Taylor's series expansion when $\frac{dy}{dx} = x - y^2$, $y(0) = 1$.

b) Find the value of y at $x = 0.1$ by Picard's method, given that $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$.

26 26 26 26 26 26 26 [7+8] 2

7.a) Find the Fourier series for the function $f(x) = \begin{cases} x & , 0 \leq x \leq \pi \\ 2\pi - x & , \pi \leq x \leq 2\pi \end{cases}$. Also deduce

$$\text{that } \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \dots = \frac{\pi^2}{8}.$$

26 26 26 26 26 26 26 [8+7] 2

b) Obtain the Fourier expansion of $f(x) = x \sin x$ as a cosine series in $(0, \pi)$.

8.a) Derive the partial differential equation by eliminating the constants a and b from the equation $z = (x^2 + a^2)(y^2 + b^2)$.

b) Solve the partial differential equation $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.

c) Solve by the method of separation of variables $4u_x + u_y = 3u$ and $u(0, y) = e^{-5y}$.

26 26 26 26 26 26 26 [4+5+6] 2

---ooOoo---

R07

Code No: Z0121

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

C PROGRAMMING AND DATA STRUCTURES

(Common to CE, EEE, ECE, CSE, IT)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) What are the advantages and disadvantages of structured programming?
- b) Explain various repetition statements in 'C' with clear syntax and example code. [8+8]
2. Why are storage classes required? Explain various storage classes in C with an example. [16]
- 3.a) Differentiate between calloc(), malloc(), realloc() functions.
- b) What are command line arguments? Explain briefly. [8+8]
- 4.a) Explain the general format for declaring and accessing members of a structure.
- b) How is union different from a structure in 'C'? Explain giving suitable examples. [8+8]
5. Explain various standard library functions in 'C' for handling files with a clear syntax. [16]
6. What is the idea behind binary search? Write down the algorithm and explain with an example. [16]
- 7.a) What is a stack data structures? What are the basic operations performed on a stack? Explain briefly.
- b) Write the pseudo code for deleting an element from a circular linked list. [8+8]
8. Describe various binary tree traversal techniques with relevant diagrammatic examples. [16]

---ooOoo---

Code No: 132AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

COMPUTER PROGRAMMING IN C

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Explain various logical operators that are used in 'C'. [2]
- b) Differentiate between break and continue statement with an example. [3]
- c) Explain about auto storage class. [2]
- d) What are the applications of an array? [3]
- e) Explain the array of pointers with example. [2]
- f) What is null pointer? What is a void pointer? Explain when null pointer and void pointer are used. [3]
- g) Explain how does enum is differ from type def in 'C'. [2]
- h) Explain about the preprocessor commands. [3]
- i) Explain about fseek(). [2]
- j) Discuss about the different modes available for opening a file. [3]

PART-B**(50 Marks)**

- 2.a) Draw the flowchart to find the roots of the given equation $ax^2 + bx + c = 0$. [5]
 - b) Explain the relational operators with an example. [5]
- OR**
- 3.a) Explain the different types of data types used in 'C' language. [5]
 - b) What is a programming language? Briefly explain the classification of programming languages. [5]
- 4.a) Explain the concept of declaring, accessing and storing elements in a 1-dimensional array. [5]
 - b) Write a program to sort the elements by using bubble sort. [5]
- OR**
- 5.a) Explain the different types of functions with an example. [5]
 - b) Write a program to print transpose of a given matrix. [5]
- 6.a) Explain any five string manipulation functions with examples. [5]
 - b) Write a program using pointers to compute the sum of all elements stored in an array. [5]
- OR**
- 7.a) Explain the concept of passing strings to functions as dynamic arrays with a program. [5]
 - b) Write a program to find the length of a given string by using string function. [5]

- 26 26 26 26 26 26 26
- 8.a) How to declare a union in 'C' explain with an example.
b) Write a 'C' program to compute the monthly pay of 100 employees using each employee name and basic pay. The DA is computed as 2.5% of the basic pay, Gross salary (Basic pay + DA). Display the employees name and gross salary. [5+5]
- 26 26 26 26 26 26 26
- 9.a) Differentiate between structure and union in 'C'.
b) Write a program to calculate grade, average marks and total marks in a class of 60 students by using structure concept. [5+5]
- 10.a) Write a 'C' program to count the number of characters in a file.
b) Explain various standard library functions for handling files. [5+5]
- 26 26 26 26 26 26 26
11. Write a 'C' program to create a file contains a series of integer numbers and then reads all numbers of this file and write all odd numbers to other file called odd and write all even numbers to a file called even. [10]

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R16

Code No: 132AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

PROFESSIONAL COMMUNICATION IN ENGLISH

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) **Fill in the blanks with the right article given in brackets.** [2]
i) According to the European Pizza-Makers' Association, making a good pizza is not _____ straightforward skill to learn.
ii) Although brand image is not _____ only reason why certain products are successful, it is an extremely important part of an overall marketing strategy.
- b) **Fill in the blanks with the right preposition given in brackets.** [3]
i) It is generally believed that tempers grow shorter _____ (along/in/away) hot, muggy weather.
ii) Cancer is not caused _____ (bye/by/with) a single element in cigarette smoke.
iii) Most of any city's population is engaged _____ (on/in/with) providing goods and services for the city itself.
- c) **Fill in the blanks with suitable form of the word given in brackets.** [2]
i) Many of the artists admit to being _____ (fascinate) by iron.
ii) This is a process of _____ (toxification). It deals with giving medical treatment to someone in order to remove the effects of poisoning from drinking too much alcohol or taking too many drugs.
- d) **Fill in the blanks with the right homophone given in brackets.** [3]
i) They sat under the _____ (pare/pear) tree in the garden.
ii) Scientists _____ (worn/warn) that further extremely high winds are likely.
iii) She's still waiting for a _____ (knight /night) in shining armour to come and rescue her.
- e) **Fill in the blanks with the right phrasal verb given in brackets.** [2]
i) His eyes LIT _____ (off/up/on) with pleasure when she came into the room.
ii) We MEET _____ (with/up/out) after school on Tuesdays and go to someone's house to play computer games.
- f) **Fill in the blanks with suitable forms of the verbs given in brackets.** [3]
i) I think it's disgusting that some chickens are _____ (feed) meat.
ii) The vaccine _____ (develop) in Switzerland in 1974.
iii) She _____ (learn) classical music since her childhood.
- g) **Fill in the blanks with the right question tag given in brackets.** [2]
i) I'll make tea, _____ (will I/shall I)?
ii) War quickens our awareness, _____ (isn't it/doesn't it)?
- h) **Fill in the blanks with the right word given in brackets.** [3]
i) I tried to persuade him, but with little or no _____ (affect/effect).
ii) Isn't it 11 o'clock _____ (all ready/already)?
iii) Vinegar is an _____ (alkali/acid).

- i) **Fill in the blanks with suitable idiom given in brackets.** [2]
i) To _____ (bite the bullet/bite off more than one can chew) is to try to do something which is too difficult.
ii) There is always a temptation to _____ (cut the mustard/cut corners) when time is short.
- j) **Fill in the blanks with the right one word substitute given in brackets.** [3]
i) Study of the origin of names is _____ (onomatopoeia/onomastics).
ii) Proper way to use the internet is _____ (netiquette/etiquette).
iii) Beyond what is necessary is _____ (supererogatory/superstitious).

PART-B

(50 Marks)

2. How did Kalam make every citizen of India realize that small aim is crime though his Presidential Address? [10]
- OR**
3. According to Dr. Kalam, how should India face the challenges such as cross-boarder terrorism, unemployment? [10]
4. What did Nadella predict for the future of technology? How does Nadella want to take all his employees along with him for attaining success? [10]
- OR**
5. How did family solidarity, his own curiosity and thrust for learning contributed to Nadella's growth? [10]
6. Submit a letter of application for the post of Software Executive in Wipro, Hyderabad. Enclose your resume. [10]
- OR**
- 7.a) Write a letter of requisition to place an order for all prescribed textbooks to be placed in your library.
b) Write a letter to the Bank Manager, State Bank of India in your locality to open a savings account. [5+5]
8. 'Good manners are also important when you are with your own friends.' How do you understand this statement by J.C. Hill? [10]
- OR**
9. According to J.C. Hill's Good Manners, how should one speak to others and why? [10]
10. Do you agree that rigid schooling will deprive a child of joy of learning? Justify your answer with reference to 'Oh Father, Dear Father' by Raj Kinger. [10]
- OR**
11. What are the parts of a report written in manuscript format? Explain. [10]

---ooOoo---

R16

Code No: 132AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

ENGINEERING GRAPHICS

(Common to CSE, IT)

Time: 3 hours

Max Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Draw a parabola having an abscissa of 30 mm and the double ordinate are 70 mm.
b) An area of 144 sqcm on a map represents an area of 9 sqkm on the field. Find the R.F. of the scale for this map and draw a diagonal scale to show kilometers, hectametres and decameters and to measure upto 6 kilometres. Indicate on the scale a distance of 4 kilometres, 5 hectametres and 6 decameters. [7+8]

OR

- 2.a) Draw a parabola having conjugate axes of 60 mm and 40 mm long and inclined at 75° to each other.
b) Construct a Diagonal scale of $RF = 3:200$ showing meters, decimeters and centimeters. The scale should measure up to 6 meters. Show a distance of 4.56 meters. [7+8]

- 3.a) Line AB is 75 mm long and is making 30° and 40° inclination to HP and VP respectively. End A is 12mm above HP and 10 mm in front of VP. Draw projections. Line is in 1st quadrant.
b) Draw the front view, top view and side view of a square lamina. The surface of the lamina is inclined at 45° to HP and perpendicular to VP. [8+7]

OR

- 4.a) Line AB 75mm long makes 45° inclination with VP while it's FV makes 55° . End A is 10 mm above HP and 15 mm in front of VP. If line is in 1st quadrant draw it's projections and find it's inclination with HP.
b) A circular plate of diameter 80 mm is resting on a point of its periphery on H.P. such that it makes an angle of 40° to the H.P. The diameter passing through the point of its resting on H.P. makes an angle of 60° with V.P. Draw the projections of it. [8+7]

- 5.a) A pentagonal prism has height 60 mm and the side of a base 30 mm. The prism rests on one of its sides of the base on the H.P. and makes an angle of 45 degrees with the V.P. Draw its projections.
b) A cone of diameter of base 60 mm and axis length equal to 100 mm rests on one of its slant generators on H.P. such that its axis is inclined at an angle of 65° with the V.P. Keep its apex near to the V.P. and draw the projections. [7+8]

OR

- 6.a) A hexagonal pyramid of 30 mm side of base and 70 mm height, resting on the H.P. such that the axis is inclined at 30° to the H.P. and the edge is inclined at 45° to VP. Draw its projections.
b) A pentagonal prism of side of base equal to 40 mm and axis height 110 mm rests on one of its corner of its base on H.P. such that the axis is inclined at an angle of 40° with H.P. and 60° with the V.P. Draw its projections. [8+7]

7. A cylinder of diameter 50 mm and axis height 60 mm is resting on its base on H.P as shown in figure 1. One square hole of size 25 mm is cut through the cylinder such that the axis of the square hole is parallel to H.P. perpendicular to V.P. and in the center of the vertical axis of the cylinder. The sides of the square hole are equally inclined with the H.P. Develop the lateral surface of the cylinder. [15]

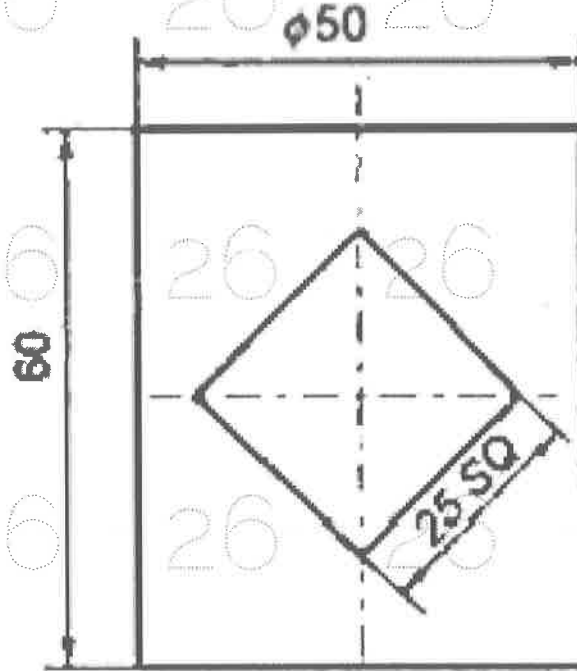


Figure: 1
OR

8. The cone of diameter of base 50 mm and axis height 60 mm is resting on its base on H.P, as shown in the figure 2 below. One square hole of size 20 mm is cut through the cone as per the figure given below. Develop the surface of the cone. [15]

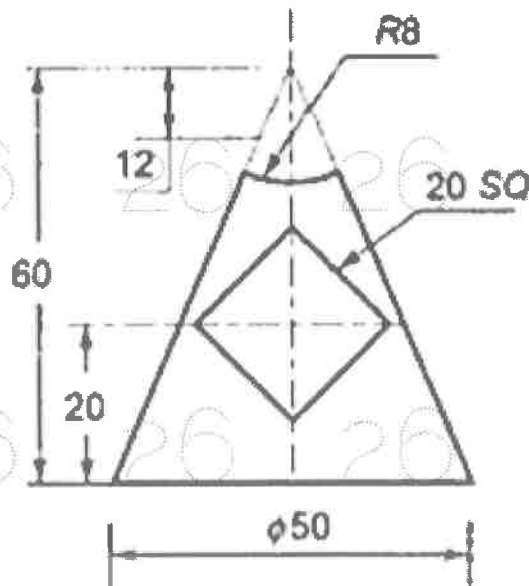


Figure: 2

9. Draw the orthographic view of the following figure 3. All dimensions are in mm. [15]

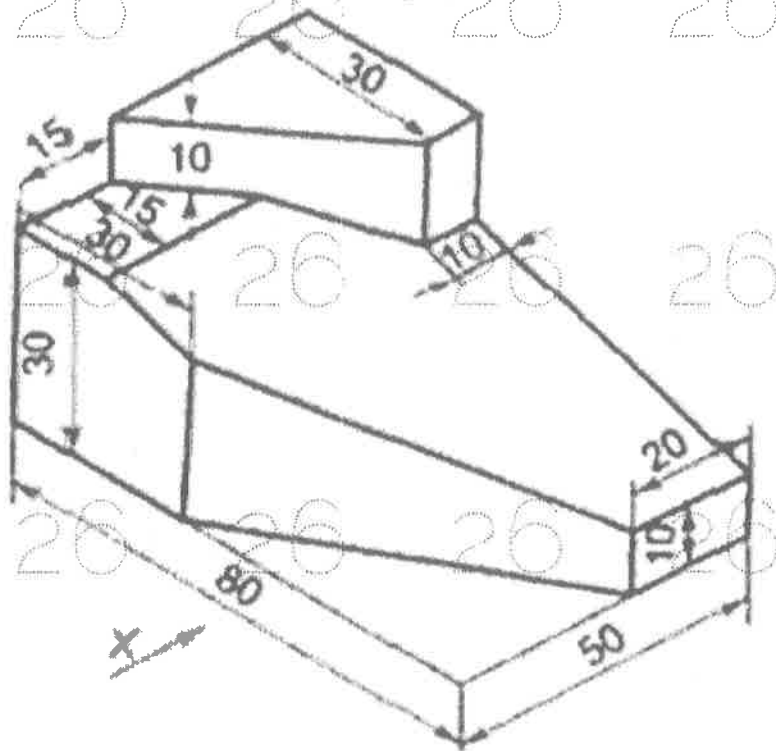


Figure: 3
OR

- 10 Draw the isometric view of the following figure 4. All dimensions are in mm. [15]

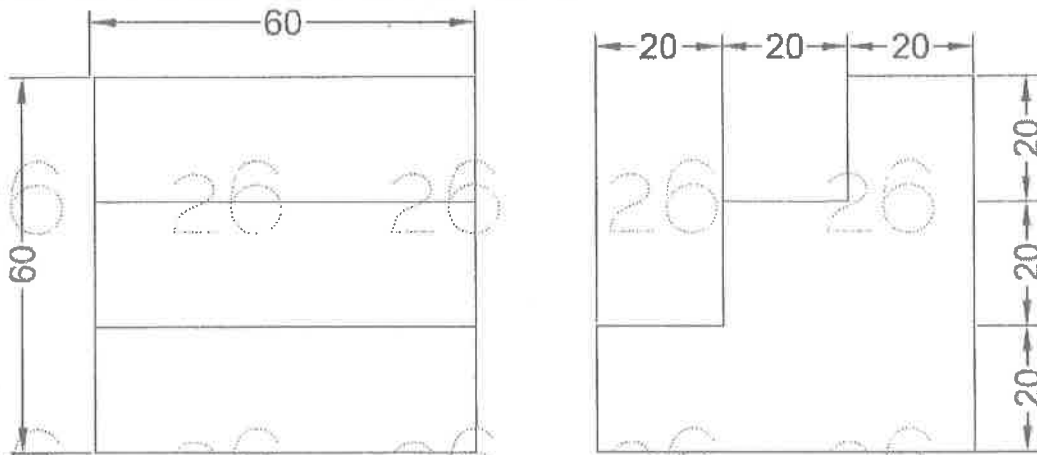


Figure: 4

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R16

Code No: 132AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CE, ME, MCT, MMT, MIE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub-questions.

PART- A

(25 Marks)

- 1.a) Draw the V-I characteristics of resistor. [2]
- b) What is reactance? How it varies in case of inductance. [3]
- c) Define Quality factor. [2]
- d) How to calculate Norton's current? [3]
- e) What is diffusion capacitance? [2]
- f) What is ripple factor? How it varies? [3]
- g) What is an NPN transistor? [2]
- h) Draw Common emitter configuration of BJT? [3]
- i) State the applications of Varactor diode. [2]
- j) What is meant by avalanche breakdown? [3]

PART-B

(50 Marks)

- 2.a) With an example, explain in detail about Nodal analysis.
- b) Find the result in both rectangular and polar forms, for the following, using complex quantities. [5+5]

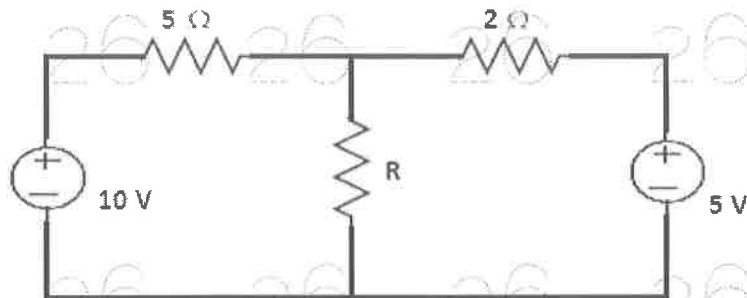
$$\left(30\angle 45^\circ + \frac{1}{3\sqrt{2}\angle -90^\circ}\right) \cdot 2\angle 120^\circ + 5\angle -60^\circ - 8\angle 135^\circ$$

OR

- 3.a) Explain in detail about different representations of sinusoidal quantities.
- b) A certain voltage source has a terminal voltage of 120 V when the load current is 1A. When the load current is 2A, the terminal voltage is 100V. Calculate the internal resistance of the voltage source, open-circuit voltage and short circuit current. [5+5]
- 4.a) State and explain Millman's theorem for DC excitations.
- b) A series combination of resistance of 100Ω and a coil with inductance 0.5 H and winding resistance 50Ω and a capacitor of $0.36\ \mu\text{F}$ is connected to an AC supply with internal resistance 50Ω . Find the resonant frequency and quality factor. [5+5]

OR

- 5.a) Draw the admittance locus diagram of series RC circuit and explain.
 b) Using maximum power transfer theorem, determine the maximum power that is delivered to the unknown resistor R in the circuit below. [5+5]



- 6.a) Draw the Energy band diagram of PN junction diode and explain.
 b) A single phase half wave rectifier operates from 230V, 50 Hz supply. The load resistance is 5Ω . Find out the output voltage and current. [5+5]

OR

- 7.a) Draw the V-I characteristics of P-N junction diode and explain.
 b) A single phase full wave rectifier operates from 230V, 50 Hz supply. The load resistance is 10Ω . Draw the wave forms of all the diode currents and represent the values. [5+5]

- 8.a) Discuss in detail about the construction of BJT.
 b) Draw the CB configuration of BJT and explain in detail. [5+5]

OR

- 9.a) Explain in detail about the principle of operation of BJT.
 b) Explain in detail about the Emitter feedback bias of transistor with neat sketch. [5+5]

- 10.a) Explain in detail about the principle of operation of JFET.
 b) Draw the characteristics of Zener diode and explain. [5+5]

OR

- 11.a) Give the detailed comparison of BJT and FET.
 b) Explain in detail about the principle of operation of SCR. [5+5]

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R16

Code No: 132AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May/June - 2017

ENGINEERING GRAPHICS

(Common to EEE, ECE, EIE)

Time: 3 hours

Max Marks: 75

**Answer any five questions
All questions carry equal marks**

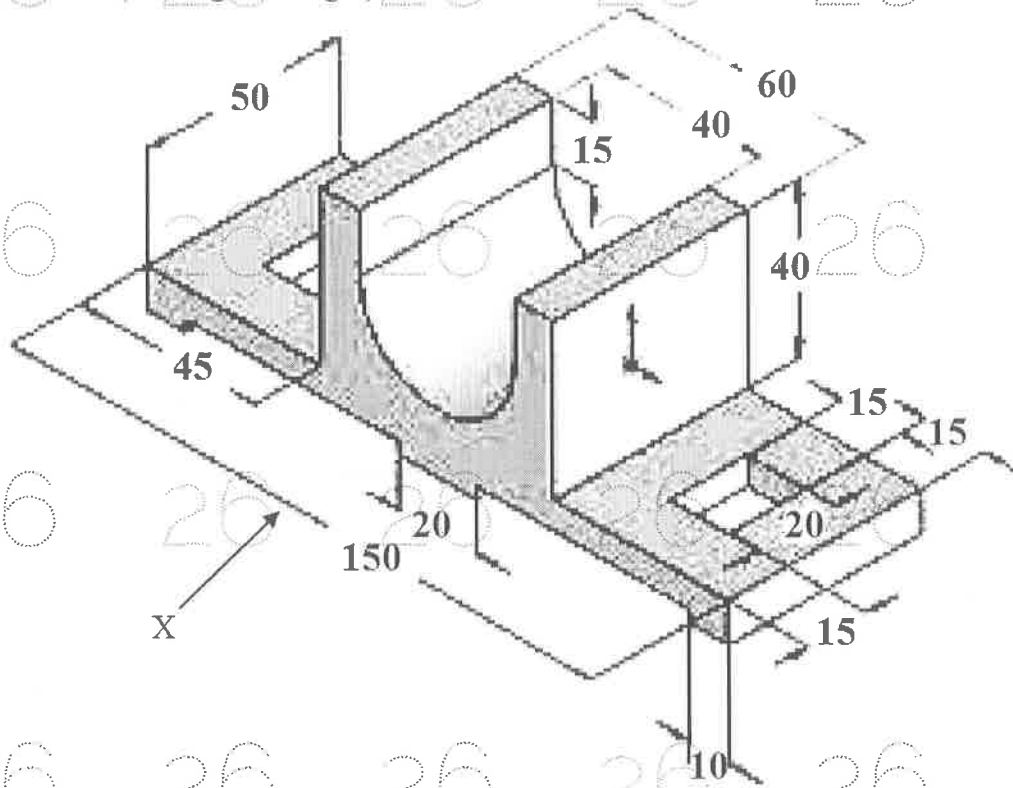
- 1.a) Draw a diagonal scale of RF = $\frac{3}{100}$, showing meters, decimeters and centimeters and to measure up to 5 meters. Show the length of 3.69 meters on it.
- b) Draw the hyperbola given by the equation: $\frac{x^2}{36} - \frac{y^2}{9} = 1$, and label the vertices. Determine whether the transverse axis is horizontal or vertical. [7+8]
- OR**
- 2.a) Construct a scale of R.F = $\frac{1}{2.5}$ to show decimeters and centimeters and by a vernier to read millimeters, to measure up to 4 decimeters. Show on it lengths 2.34 dm.
- b) Draw the ellipse given by the equation: $\frac{(x-1)^2}{16} + \frac{(y+3)^2}{4} = 1$. [7+8]
3. A straight line AB of true length 100 mm has its end A 20 mm above HP and 30 mm in front of VP. The top view of the line is 80 mm and front view is 70 mm. Draw the projections (Top View and Front View) of the line AB and obtain the true inclinations of the line AB with HP and VP. [15]
- OR**
4. A regular pentagon lamina of 30 mm side, surface is inclined at 30° to VP and side on which it rests on V.P makes an angle of 45° to H.P. Draw its projections. [15]
5. A tetrahedron of 50 mm long edges is resting on one edge in the HP, while one triangular face containing this edge is vertical and is inclined at 45° to VP. Draw its projections. [15]
- OR**
6. A cone of 40 mm base diameter and 50 mm axis is resting on one of its generators in the HP which makes 30° inclination with the VP. Draw its projections. [15]
7. A pentagonal pyramid of 30 mm side of base and height of 45mm stands on its base with an edge of the base parallel to VP. A section plane making an angle of 45° to HP cuts the pyramid at a distance of 15mm from apex. Draw its top view and front view. [15]
- OR**
8. A cone made up of Aluminium sheet with base circle diameter 65 mm and axis length 75 mm is kept with its base on the ground. A circular hole of 30 mm diameter is cut through the cone such that its axis remains perpendicular to V.P.; 10 mm to the right of the axis of cone and 25 mm above the base of cone. Develop the surface of the cone. [15]

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9. A sphere of 60 mm diameter is placed centrally on the top of a frustum of a square pyramid. The base of the frustum is 60 square, top is 40 square, and its height 50 mm. Draw the isometric projection of the arrangement. [15]

OR

10. The isometric view is shown in the figure below. Draw the front view, top view and side view (looking from right). All dimensions are in mm. [15]



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R16

Code No: 131AE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

ENGINEERING MECHANICS

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, MHE, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part-A (25 Marks)

- 1.a) Define the term free body diagram and state the importance of drawing such diagram. [2]
- b) A force $F = (10 i + 8 j - 5 k)$ N acts at point A (2, 5, 6) m. What is the moment of the force about the point B (3, 1, 4). [3]
- c) Define angle of friction and angle of repose. [2]
- d) The force required to pull a body of weight 100 N on a rough horizontal plane is 30 N. Determine the coefficient friction if the force applied is at an angle of 15° with the horizontal. [3]
- e) Find the centroidal coordinates of rectangular area of width w and depth d . [2]
- f) Determine the moment of inertia of an area of semi-circle of radius 2.5 cm about the centroidal x and y axes. [3]
- g) State parallel axis theorem as applied to mass moment of inertia. [2]
- h) Mention the forces which are generally omitted while applying the principle of virtual work. [3]
- i) Write the impulse-momentum equation and mention its application. [2]
- j) Show that when a particle moves with simple harmonic motion, its time for complete oscillation is independent of the amplitude of its motion. [3]

Part-B (50 Marks)

- 2.a) A bracket is constructed by attaching member ABC to wall CD with a frictionless hinge at C and a horizontal cable at A, as shown in Figure 1. A smooth cylinder of weight 1.2 kN is placed in the bracket as shown. Determine the force acting on the cylinder at contact points B and D and the tension in the cable and reactions at support C.

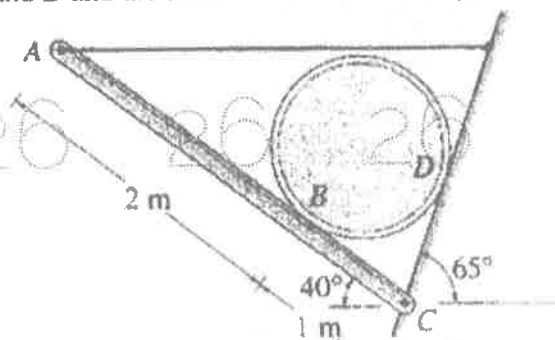


Figure: 1

- b) Refer to figure 2. If the maximum allowable strength for each cable is 10.5 kN, determine the permissible weight of the homogeneous circular plate of diameter 4m. [5+5]

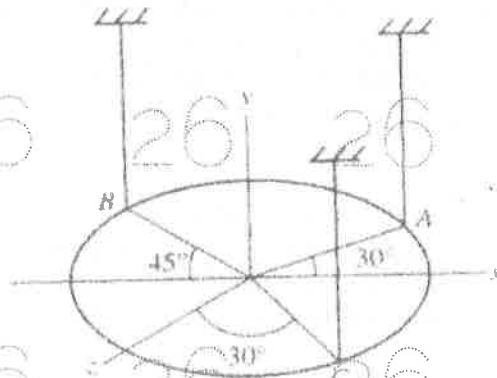


Figure: 2
OR

- 3.a) Find the reactions at supports A and B for the force system acting on the beam as shown in Figure 3.

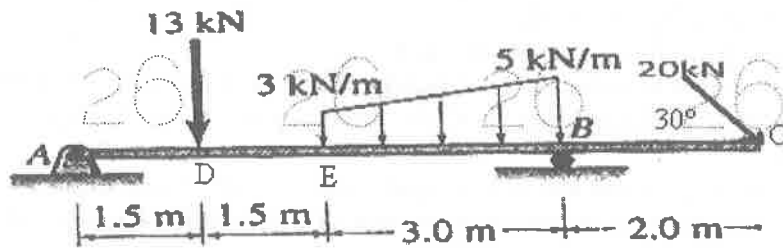


Figure: 3

- b) A crate of weight $W = 1.5$ kN is supported as shown in figure 4, by members AO and AB and cable AC. Determine the force in the cable AC and in members AO and AB. [5+5]

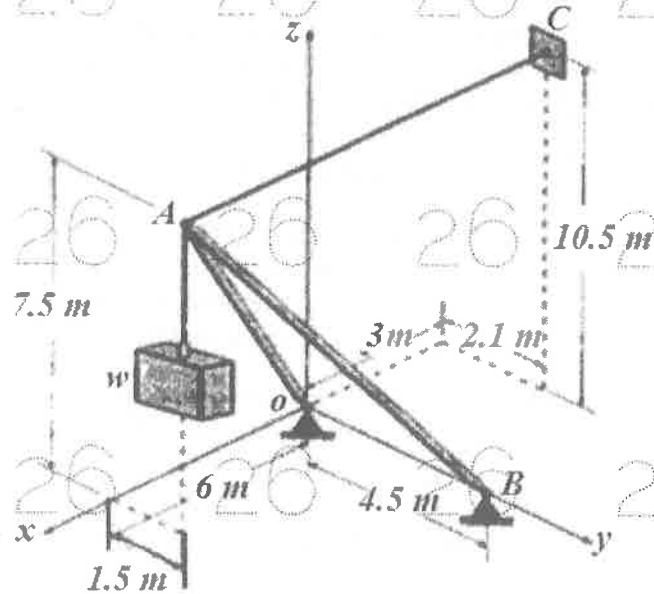


Figure: 4

- 4.a) As shown in figure 5, two blocks each weighing 20 kN and resting on a horizontal surface, are to be pushed apart by a 30° wedge. The angle of friction is 15° for all contact surfaces. What value of P is required to start movement of the blocks?

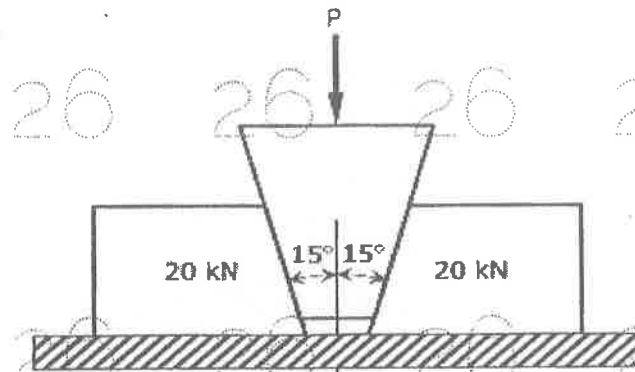


Figure: 5

- b) A screw jack has square threads of mean diameter 6 cm, of helix angle 10° and coefficient of friction 0.25. Determine the force that must be applied to the end of 50 cm lever to i) rise ii) lower a weight of 2500 N. [5+5]

OR

- 5.a) A ladder 5 m long rests on a horizontal ground and leans against a smooth vertical wall at an angle of 70° with the horizontal. The weight of the ladder is 300 N. The ladder is on the verge of sliding when a man weighing 750 N stands on a rung 1.5 m along the ladder. Calculate the coefficient of friction between the ladder and the floor.
- b) What should be the value of θ in figure 6 which will make the motion of 900 N block down the plane to impend? The coefficient of friction for all contact surfaces is 0.3. [5+5]

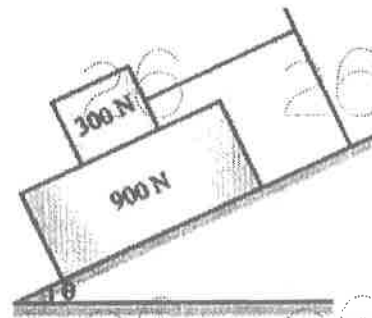


Figure: 6

- 6.a) Find the centroidal coordinates of the area of the plane as shown in figure 7. Given $a = 30$ cm, $b = 30$ cm, $c = 60$ cm, $d = 40$ cm, and $r = 20$ cm.

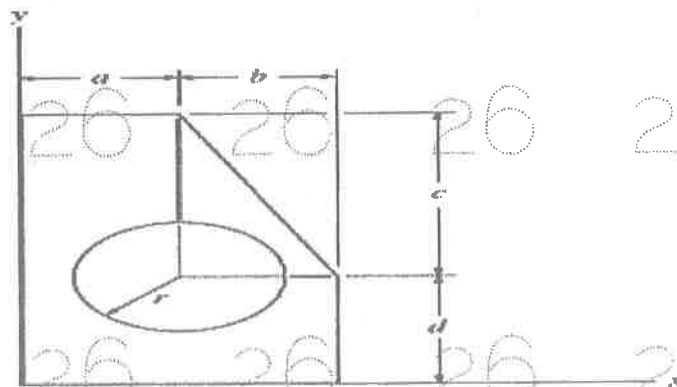


Figure: 7

- b) For the shaded area as shown in figure 8, determine the Moment of Inertia of an area of plane figure about their centroidal axes. All units are in centimeters. [5+5]

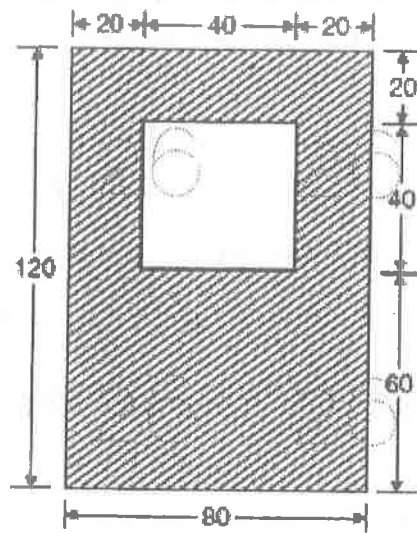


Figure: 8
OR

- 7.a) Determine the centroidal coordinates of shade area with respect to x and y axes as shown in figure 9.

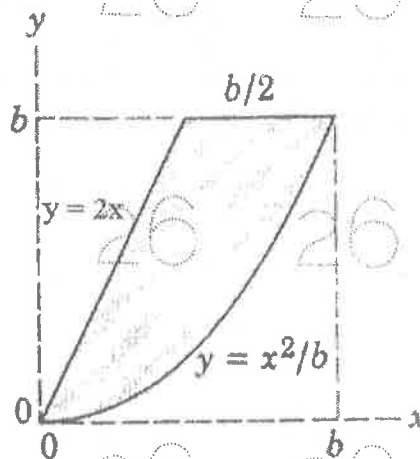


Figure: 9

- b) Determine the moment of inertia an area of a triangle with a rectangular cut as shown in figure 10, about the base $A-B$ and the centroidal axis parallel to AB . (All dimensions are in Centimetres). [5+5]

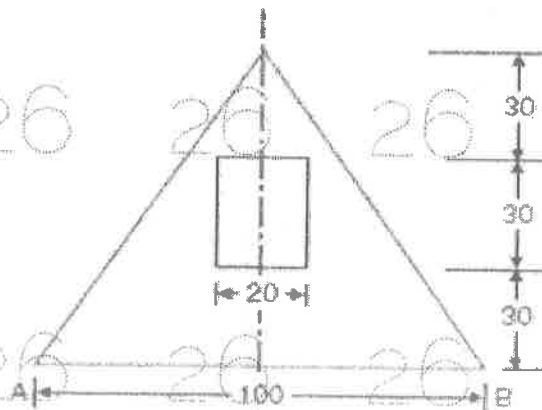


Figure: 10

- 8.a) Find the mass moment of inertia of a solid sphere of radius r and mass m about any axis.
 b) The arrangement as shown in figure 11 is required to remain in state of equilibrium. Derive an expression for tension in the cable in terms of θ and W . Use method of virtual work. [5+5]

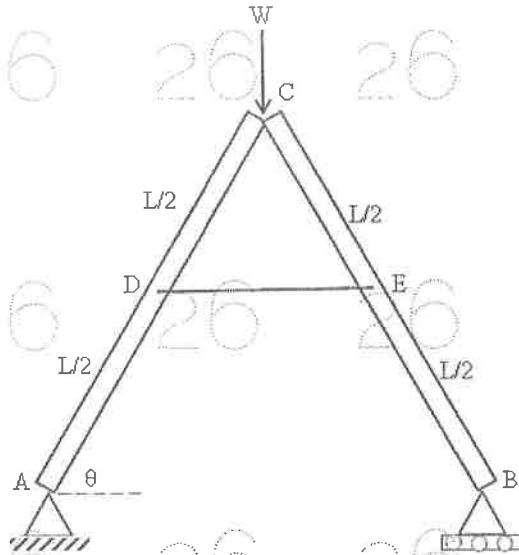


Figure: 11
OR

- 9.a) Find the mass moment of inertia of a solid cylinder of radius r , height h and mass m about centroidal x and y axes.
 b) A uniform ladder of 200 N weights rests against a smooth vertical wall and a rough horizontal floor making an angle of 60° with the horizontal. Use the method of virtual work, find the frictional force between the foot of the ladder and the rough horizontal floor. [5+5]
- 10.a) An elevator gross weight 15 kN is moving in the upward direction, such that the displacement is given by $x = t^3 - 4t^2 + 6t + 7$ m. Determine the tension in the cable supporting the elevator at $t = 2$ seconds.
 b) A car starts from rest on a curved road of 250 m radius and accelerates at a constant tangential acceleration of 0.6 m/sec^2 . Determine the distance and time for which that car travel before the magnitude of total acceleration attained it becomes 0.75 m/sec^2 . [5+5]
- OR
- 11.a) A body of mass 10 kg is suspended by a string of length 1m. It is struck by a bullet travelling horizontally with a velocity of 450 m/sec. The bullet weights 30 grams and gets embedded into the body after striking it. Determine the maximum angle through which the body swings.
 b) A body moving with simple harmonic motion has amplitude of 1 m and a period of oscillation of 2 seconds. What will be its velocity and acceleration 0.4 seconds after passing an extreme position? [5+5]

Code No: 121AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGLISH

(Common to CE, EEE, ME, ECE, CSE, IT, MMT, MIE, PTM, CEE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) Fill in the blanks with suitable **articles** to make it a meaningful sentence. [2]
 i) My son wants to join in ___ college where his friend has already taken up admission.
 ii) ___ oranges are rich in vitamin C.
- b) Fill in the blanks with suitable **forms of the word** given in brackets. [3]
 i) All the information will be treated as strictly ___ (confidence).
 ii) He was badly ___ (treated) as a child. He was treated cruelly and violently.
 iii) His handwriting is almost ___ (legible), it is difficult to read.
- c) Fill in the blanks with suitable **prepositions** to make it a meaningful sentence. [2]
 i) Social media is still ___ its infancy.
 ii) Sue was good ___ to Johnsy.
- d) Fill in the blanks with **suitable words** given in brackets. [3]
 i) He gave me a piece of ___ (advise/advice).
 ii) Do you prefer a window seat or an ___ (aisle/isle) seat?
 iii) The ___ (stationery/stationary) shop is close to my school.
- e) Fill in the blanks with suitable **phrasal verbs** given in brackets. [2]
 i) GHMC is going to ___ (knock down/knock out/knock off) all the encroachments and widen the roads.
 ii) While I was waiting, I ___ (leafed through/leafed out/leafed at) the magazine.
- f) Fill in the blanks with suitable form of the **verb** given in brackets. [3]
 i) If you had read all series of Harry Potter, you ___ (write) a review.
 ii) She ___ (count) the coins now.
 iii) I wish ___ (learn) French.
- g) Provide **meanings** of the following one word substitutes. [2]
 i) Bibliomania
 ii) Aristocracy
- h) Rewrite the following sentences after making necessary **corrections**. [3]
 i) I looked at me in the mirror.
 ii) Come here and look at that paper.
 iii) Everybody were late.
- i) Fill in the blanks with suitable **idioms** given in brackets. [2]
 i) She was friendly only when he was safely ___ (at arm's length/ at hair split edge).
 ii) The action moves at ___ (a snail's pace/at a snail mail) in this film as if all the characters are fast asleep.
- j) Fill in the blanks with suitable **question tags** in the following sentences. [3]
 i) The results have not yet been analysed, ___ (have they/haven't they)?
 ii) Children made these carpets, ___ (isn't it/ didn't they)?
 iii) You spent your childhood in a village, ___ (weren't you/didn't you)?

Part-B (50 Marks)

- 2.a) How did Indu and Prem get ready for the party in 'A Tea Party' by Ruth PraverJhabvala?
b) How did Sir MV tame the river Musi and what is his great contribution to the city of Hyderabad? [5+5]

OR

- 3.a) What is the purpose of Mr. Chaddha's talk? Do you feel he behaved more like a sycophant at the party 'A Tea Party' by Ruth PraverJhabvala?
b) What is the significance of the clarion call – *industrialise or perish* given by Sir MV? [5+5]

- 4.a) What are the features of polymer banknotes? Do you think it would be appropriate to introduce them in India?
b) According to Helen Keller, how should one awake the dormant and sluggish faculties? Describe the beginning of the essay 'Three Days to See'. [5+5]

OR

- 5.a) What makes counterfeiting polymer banknotes difficult? Discuss the security features.
b) What is the essential message that you can learn from Helen Keller's 'Three Days to See'? [5+5]

- 6.a) Write a letter to the editor of a newspaper on the safety measures to be followed in fireworks manufacturing or outlet factories based on the lesson 'Risk Management'.
b) Do you think that 'Leela's Friend' by R.K. Narayan stands for reality and displays compassionate humanism in the short story? Exemplify. [5+5]

OR

- 7.a) What are your impressions as a student of engineering on the prescribed lesson 'Risk Management'? What do you think should the regulatory authorities, fireworks manufacturers and civilians should do?
b) How did Sidda mesmerize Leela through his narration of stories and what was the relation between Sidda and Leela? [5+5]

- 8.a) '*A Spirit of non-violence is a state of feeling inspired by a moral ideal.*' What is the Indian outlook of non-violence as explained by the British historian Arnold Toynbee in 'India's Contribution to World Unity'?
b) What was the sudden twist at the end of the short story 'The Last Leaf' by O Henry? [5+5]

OR

- 9.a) How does the British historian Arnold Toynbee support his statement that Indians do not continue to feel hatred or anger towards someone who hurt them in the past?
b) How did Behrman paint his 'masterpiece' in 'The Last Leaf' by O Henry? [5+5]

- 10.a) You are Aditi Kaur, a graduate in aeronautical engineering from the IIT Bombay. You have a year's experience as a trainee maintenance engineer with Mahindra Aerospace, manufacturers of small aircraft for the Indian general aviation market. Write an email application letter in response to an advertisement for the post of assistant structural engineer in Hindustan Aeronautics limited, Bengaluru. Refer only briefly to your educational qualifications and work experience in the body of the email letter and say that you are attaching your CV and testimonials for the company's reference.
b) What was the message given by Dr. N.R.N. Murthy at the Convocation? [5+5]

OR

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11.a) What are the do's and don'ts of a formal email?

b) Imagine that you are a candidate in an interview and your favourite sportsperson is Sachin Tendulkar. How would you respond to the question on the secret of his success? Build a formal situational dialogue between the interviewer and interviewee in about 200 words. You may refer to the qualities of Sachin mentioned in the prescribed lesson on 'Sports and Health'. [5+5]

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R13

Code No: 111AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGLISH

(Common to CE, EEE, ME, ECE, CSE, AE, MIE, PTM)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

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- 26 26 26 26 26 26 26
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Part-B (50 Marks)

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- 7.a) What are your impressions as a student of engineering on the prescribed lesson 'Risk Management'? What do you think should the regulatory authorities, fireworks manufacturers and civilians should do?
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- 5.a) What makes counterfeiting polymer banknotes difficult? Discuss the security features.
b) What is the essential message that you can learn from Helen Keller's 'Three Days to See'? [5+5]

- 6.a) Write a letter to the editor of a newspaper on the safety measures to be followed in fireworks manufacturing or outlet factories based on the lesson 'Risk Management'.
b) Do you think that 'Leela's Friend' by R.K. Narayan stands for reality and displays compassionate humanism in the short story? Exemplify. [5+5]

OR

- 7.a) What are your impressions as a student of engineering on the prescribed lesson 'Risk Management'? What do you think should the regulatory authorities, fireworks manufacturers and civilians should do?
b) How did Sidda mesmerize Leela through his narration of stories and what was the relation between Sidda and Leela? [5+5]

- 8.a) 'A Spirit of non-violence is a state of feeling inspired by a moral ideal.' What is the Indian outlook of non-violence as explained by the British historian Arnold Toynbee in 'India's Contribution to World Unity'?

- b) What was the sudden twist at the end of the short story 'The Last Leaf' by O Henry? [5+5]

OR

- 9.a) How does the British historian Arnold Toynbee support his statement that Indians do not continue to feel hatred or anger towards someone who hurt them in the past?
b) How did Behrman paint his 'masterpiece' in 'The Last Leaf' by O Henry? [5+5]

- 10.a) You are Aditi Kaur, a graduate in aeronautical engineering from the IIT Bombay. You have a year's experience as a trainee maintenance engineer with Mahindra Aerospace, manufacturers of small aircraft for the Indian general aviation market. Write an email application letter in response to an advertisement for the post of assistant structural engineer in Hindustan Aeronautics limited, Bengaluru. Refer only briefly to your educational qualifications and work experience in the body of the email letter and say that you are attaching your CV and testimonials for the company's reference.

- b) What was the message given by Dr. N.R.N. Murthy at the Convocation? [5+5]

OR

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11.a) What are the do's and don'ts of a formal email?

b) Imagine that you are a candidate in an interview and your favourite sportsperson is Sachin Tendulkar. How would you respond to the question on the secret of his success? Build a formal situational dialogue between the interviewer and interviewee in about 200 words. You may refer to the qualities of Sachin mentioned in the prescribed lesson on 'Sports and Health'. [5+5]

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Code No: 121AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGLISH

(Common to CE, EEE, ME, ECE, CSE, IT, MMT, MIE, PTM, CEE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

- 1.a) Fill in the blanks with suitable **articles** to make it a meaningful sentence. [2]
 i) My son wants to join in ___ college where his friend has already taken up admission.
 ii) ___ oranges are rich in vitamin C.
- b) Fill in the blanks with suitable **forms of the word** given in brackets. [3]
 i) All the information will be treated as strictly ___ (confidence).
 ii) He was badly ___ (treated) as a child. He was treated cruelly and violently.
 iii) His handwriting is almost ___ (legible), it is difficult to read.
- c) Fill in the blanks with suitable **prepositions** to make it a meaningful sentence. [2]
 i) Social media is still ___ its infancy.
 ii) Sue was good ___ to Johnsy.
- d) Fill in the blanks with **suitable words** given in brackets. [3]
 i) He gave me a piece of ___ (advise/advice).
 ii) Do you prefer a window seat or an ___ (aisle/isle) seat?
 iii) The ___ (stationery/stationary) shop is close to my school.
- e) Fill in the blanks with suitable **phrasal verbs** given in brackets. [2]
 i) GHMC is going to ___ (knock down/knock out/knock off) all the encroachments and widen the roads.
 ii) While I was waiting, I ___ (leafed through/leafed out/leafed at) the magazine.
- f) Fill in the blanks with suitable form of the **verb** given in brackets. [3]
 i) If you had read all series of Harry Potter, you ___ (write) a review.
 ii) She ___ (count) the coins now.
 iii) I wish ___ (learn) French.
- g) Provide **meanings** of the following one word substitutes. [2]
 i) Bibliomania
 ii) Aristocracy
- h) Rewrite the following sentences after making necessary **corrections**. [3]
 i) I looked at me in the mirror.
 ii) Come here and look at that paper.
 iii) Everybody were late.
- i) Fill in the blanks with suitable **idioms** given in brackets. [2]
 i) She was friendly only when he was safely ___ (at arm's length/ at hair split edge).
 ii) The action moves at ___ (a snail's pace/at a snail mail) in this film as if all the characters are fast asleep.
- j) Fill in the blanks with suitable **question tags** in the following sentences. [3]
 i) The results have not yet been analysed, ___ (have they/haven't they)?
 ii) Children made these carpets, ___ (isn't it/ didn't they)?
 iii) You spent your childhood in a village, ___ (weren't you/didn't you)?

R09

Code No: 51005

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING CHEMISTRY

(Common to CE, EEE, ME, ECE, CSE, EIE, BME, IT, MCT, ETM, MMT, AE, BT, AME, MIE, PTM)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Describe the construction and working of Glass electrode.
b) What are fuel cells? Give the applications of fuel cells.
c) Explain how Nernst equation is useful in calculating pH of a solution and determination of electrode potential. [5+4+6]
- 2.a) Discuss the electrochemical theory of corrosion by taking rusting of iron as an example.
b) What are the cathodic protection methods? Explain. [7+8]
- 3.a) What are conducting polymers? Explain the mechanism of conduction in poly acetylene.
b) How do you prepare Buna-S and butyl rubber? Mention their properties and uses.
c) Explain the processing of raw rubbers. [5+6+4]
- 4.a) What are scales and sludges? How they formed? How do you remove scales?
b) Discuss about ion exchange process for softening of water.
c) Explain about electro dialysis. [6+5+4]
- 5.a) Differentiate physical adsorption and chemical adsorption.
b) Give any two methods for the preparation of nano materials.
c) Describe Langmuir adsorption isotherms? What are its advantages over Freundlich's adsorption? [5+5+5]
- 6.a) Give an account on the advantages and disadvantages of solid fuels over gaseous fuels.
b) Define Calorific value of a fuel. How LCV and HCV are related? Define and give expression.
c) Define octane number of gasoline. What is its significance and how is it measured. Why ethylene dibromide is added to gasoline. [5+4+6]
- 7.a) State the phase rule and explain the terms involved with suitable examples.
b) What is heat treatment? Explain about hardening and normalizing.
c) What is significance of Gibb's phase rule? [5+7+3]
- 8.a) Give the reaction involved in setting and hardening of cement.
b) Define and explain cloud point and pour point, flash and fire points. What is their significance? [6+9]

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R16

Code No: 131AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

ENGINEERING GRAPHICS

(Common to ME, MCT, MMT, MSNT)

Time: 3 hours

Max Marks: 75

Answer any five questions

All questions carry equal marks

-
- 1.a) Draw an parabola having conjugate axes of 50 mm and 30 mm long and inclined at 75° to each other.
- b) Construct a Diagonal scale of RF = 3:200 showing meters, decimeters and centimeters. The scale should measure up to 6 meters. Show a distance of 4.56 meters. [7+8]
- 2.a) Draw an ellipse having the major axis of 60 mm and the minor axis of 40 mm.
- b) Draw a Vernier scale of R.F. = 1/25 to read up to 4 meters on it show lengths 2.39 m and 0.91 m. [7+8]

OR

- 3.a) Line AB is 55 mm long and it is 25° & 45° inclined to HP & VP respectively. End A is 15 mm above HP and 15 mm in front of VP. Draw projections. Line is in 1st quadrant.
- b) A pentagonal plate of side 40 mm is held on V.P. on one of its corner. The edge opposite to that corner makes an angle of 55° with the H.P. The flat surface of pentagon is inclined at 30° to the V.P. Draw the projections. [7+8]

OR

- 4.a) Line AB is 85 mm long. It's FV and TV measure 55 mm and 65 mm long respectively. An end is 10 mm above HP and 25 mm in front of VP. Draw projections of line AB if end B is in first quadrant. Find angle with HP and VP.
- b) A square lamina of side 80 mm rests on a corner on H.P. and it is inclined with H.P. such that its plan is a rhombus with a diagonal of 40 mm. The long diagonal is inclined with the V.P. at 45° . Determine its inclination with H.P. and draw it's projections. [7+8]

- 5.a) A pentagonal pyramid has height 60 mm and the side of a base 30 mm. The pyramid rests on one of its slant edges on the H.P. and makes an angle of 45 degrees with the V.P. Draw its projections.
- b) A cone of diameter of base 40 mm and axis length equal to 80 mm rests on one of its slant generators on H.P. such that its axis is inclined at an angle of 45° with the V.P. Keep its apex near to the V.P. and draw the projections. [8+7]

OR

- 6.a) A cone of diameter of base 60 mm and axis length equal to 120 mm rests on a point of its periphery of the base on H.P such that its axis is inclined at an angle of 35° with the H.P. and 60° with the V.P. and the apex is near to the observer. Draw its projection.
- b) A hexagonal pyramid of side of base 30 mm and axis length 90 mm rests on one of its slant edge on the H.P such that the plane containing that slant edge on which it rests on H.P. is inclined at 45° to V.P. and the apex is near to the V.P. Draw the projection of it. [7+8]

7. A hexagonal prism is resting on H.P on its base with two edges of base parallel to V.P. It is cut by an A.I.P. which is perpendicular to V.P. and inclined to H.P. by 45 degrees and passing through a point 40 mm above the base and on axis. Draw elevation, sectional plan, sectional side view and true shape of section. Take side of base 30 mm and height 60 mm. [15]

OR

8. A triangular pyramid of side of base 50 mm and height of axis 100 mm resting on its base on the H.P. such that one of the edges of the base parallel to V.P. and near to V.P. The pyramid is cut by a cutting plane parallel to V.P. and perpendicular to H.P. by passing through the distance 20 mm from the axis of the pyramid. Draw sectional front view and top view of the triangular pyramid. [15]
9. Draw the orthographic view of the following figure 1. All dimensions are in mm. [15]

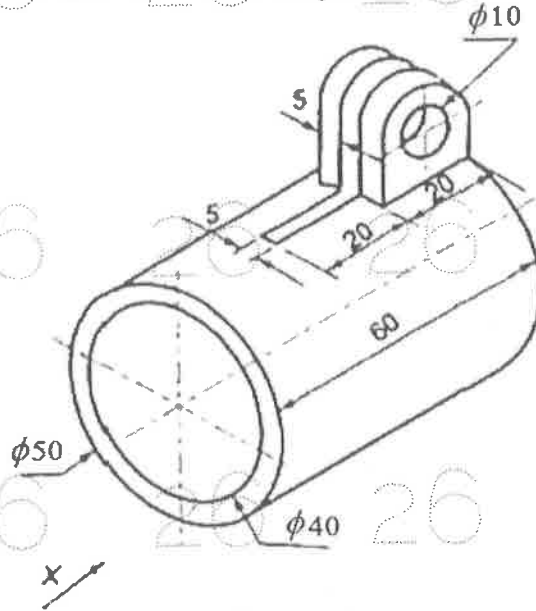


Figure: 1
OR

10. Draw the isometric view of the following figure 2. All dimensions are in mm. [15]

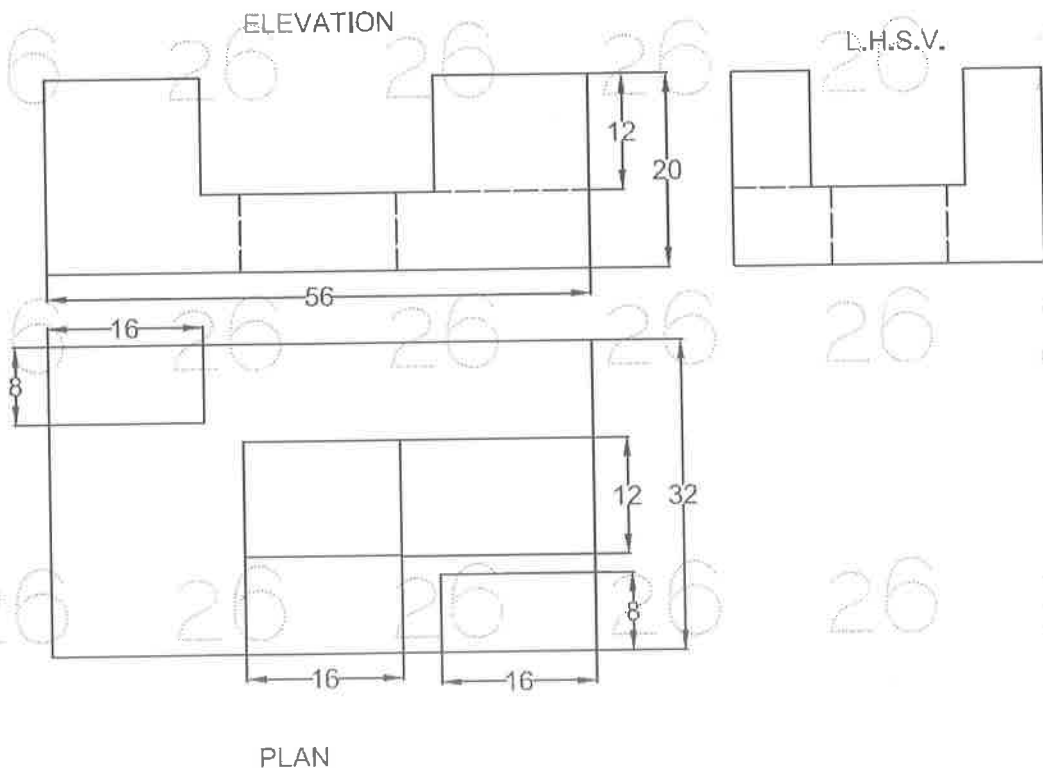


Figure: 2

R16

Code No: 131AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) State ohm's law and mention the limitations of it. [2]
- b) Mention the advantages of sinusoidal alternating quantity. [3]
- c) Explain what is meant by Bandwidth and Q factor? [2]
- d) Give the statement of Reciprocity theorem. [3]
- e) What is forward bias and reverse bias in a PN junction? [2]
- f) Define ripple factor. What is the value of ripple factor for FWR and HWR? [3]
- g) Why transistor is called as a current controlled device? [2]
- h) Explain how h_{ie} is different from h_{fe} in CE configuration. [3]
- i) How is drain current controlled in a JFET? [2]
- j) List some applications of varactor diode. [3]

PART-B

(50 Marks)

- 2.a) For the circuit shown in figure 1, find the current flowing in all the branches.

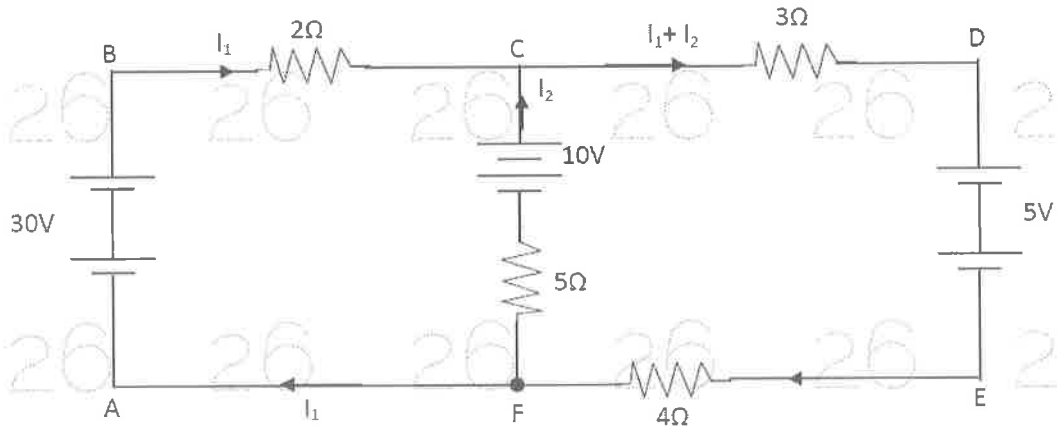


Figure: 1

- b) Find the rms value, average value and form factor of a half wave rectified voltage. [5+5]

OR

3.a) Define the following:

- i) Alternating Quantity
- ii) R.M.S. Value
- iii) Average value
- iv) Form factor.

b) Deduce an expression for the equivalent capacitance of three capacitors connected in

- i) Parallel
- ii) Series.

Hence calculate the equivalent capacitance if three capacitors of capacitances 2, 4, and 8 micro – Farads are connected in 1) Series 2) Parallel

If a voltage of 10 V is connected, calculate the charge stored in each case. [5+5]

4.a) A series circuit comprising R, L and C is supplied at 220 V, 50 Hz. At resonance, the voltage across the capacitor is 550 V. The current at resonance is 1A. Determine the circuit parameters R, L and C.

b) In the network shown in figure 2, find the value of Z_L so that the power transferred from the source is maximum. Also find P_{max} . [5+5]

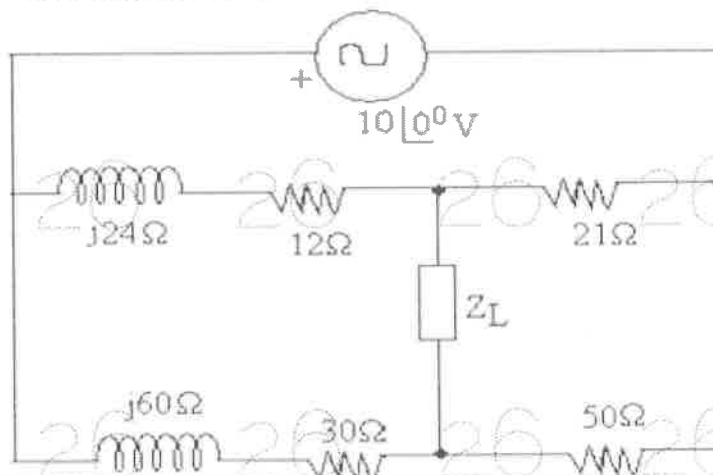


Figure: 2

OR

5.a) A coil having a resistance of 10 ohms and an inductance of 0.2H is connected in series with a 100×10^{-6} F capacitor across a 230V, 50Hz supply, Calculate:

- i) The active and reactive components of the current
- ii) The voltage across the coil, Draw the phasor diagram.

b) Using Thevenin's theorem, calculate the current I through the resistance connected between the terminal A and B (All resistances are in ohms) as shown in figure 3. [5+5]

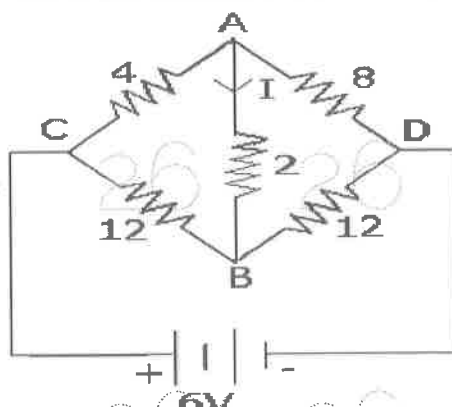


Figure: 3

- 6.a) Draw and explain the V-I characteristics of a pn junction.
b) Compare Half wave rectifier, Full wave rectifier and Bridge rectifier in any four aspects. [5+5]

OR

- 7.a) What are the applications of the semiconductor diode? Explain each one with suitable circuit diagram.
b) A silicon diode operates at forward voltage of 0.4V. Calculate the factor by which the current will be multiplied when the temperature is increased from 25°C to 150°C. [5+5]

- 8.a) Draw the input and output characteristics of n-p-n transistor in common base configuration and explain how they are obtained.
b) In a fixed bias circuit using n-p-n transistor, find the operating point if $V_{CC} = 24V$, $R_B = 220k$, $R_C = 4.7k$. [5+5]

OR

- 9.a) Draw the circuit and explain the characteristics of CB configuration.
b) Write short notes on thermal runaway problems. [6+4]
- 10.a) What is a zener diode? Draw the equivalent circuit of an ideal zener in the break down region.
b) How is zener diode used as a voltage regulator? [5+5]

OR

- 11.a) Draw the circuit and explain the drain and gate characteristics of a JFET.
b) Give the parameter values and specifications of a JFET. [6+4]

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R16

Code No: 131AF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May/June - 2017

ENGINEERING GRAPHICS

(Common to CE, MIE, CEE)

Time: 3 hours

Max Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) A point 'M' is 2.5 cms from x-axis and 3.5 cms from y-axis. Draw a hyperbola passing through this point.
- b) A circle of 40 mm diameter is rolling outside the circle of radius 60 mm. Draw the locus of a point on the circumference of rolling circle for one complete revolution. [7+8]

OR

- 2.a) If 1 cm long line measures a real distance of 40 m. Find R.F. The scale is to measure upto metre and long enough upto 500 m. Mark on it a distance of 256 m.
- b) Draw involute of circle of 40 mm diameter and draw tangent and normal to the curve from any point on the curve. [7+8]
- 3.a) A 60 mm long line is parallel to V.P. and inclined at 30° to H.P. Its one end is 10 mm above H.P. and 25 mm in front of V.P. Draw the projections.
- b) A Hexagon of 3 cm side is resting on a corner in HP and its surface is 30° inclined to H.P. and perpendicular to V.P. Draw the projections. [7+8]

OR

4. The diagonals of Rhombus are 120 mm and 50 mm. The longer diagonal is lying on its corner in H.P. with its surface inclined at 30° to H.P. and smaller diagonal is parallel to both H.P. and V.P. Draw the projections. [15]
5. A hexagonal pyramid of side 3 cm height 6.5 cms is resting on one of its base edges in V.P. and inclined at 30° to H.P. Its axis is inclined at 40° to V.P. Draw the projections. [15]

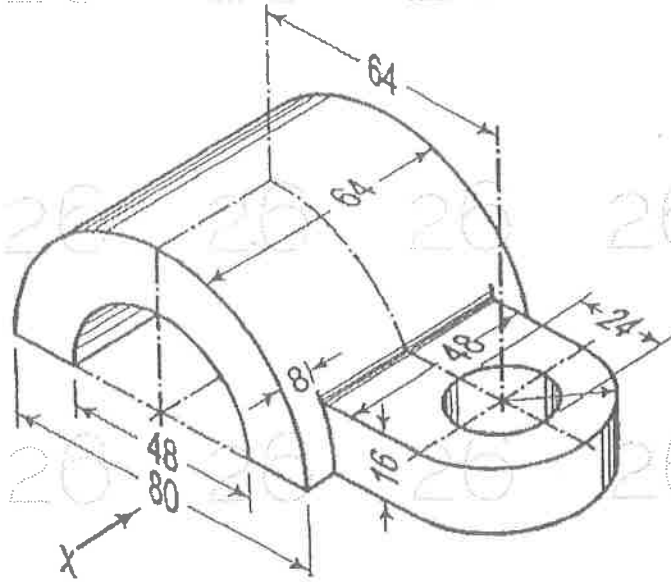
OR

6. A cylinder of 40 mm diameter, height 70 mm is resting on a point on the circumference of base circle in H.P. such that its axis is inclined at 30° to H.P. and top view of the axis is inclined at 40° to V.P. Draw the projections. [15]
7. A pentagonal prism of side 3 cm height 7 cms is resting on its base in H.P. such that one of the base edges is parallel to V.P. It is cut by a section plane perpendicular to V.P. and inclined at 60° to H.P. and passes through a point 15 mm below the top center. Draw the sectional top view and true shape of section. [15]
8. A cone of 40 mm diameter 70 mm height is resting on its base in H.P. It is cut by a section plane perpendicular to V.P. parallel to one of the generators and passes through a point 15 mm below the apex. Draw the sectional top view and true shape of section. [15]

9. Draw the isometric projection of a hemisphere of 4 cm diameter resting on its curved surface centrally on the top of a frustum of square pyramid with top face of 3 cm side and bottom face of 5 cm side having a height of 5 cm. [15]

OR

10. Draw the front view, top view and side view for the component shown in figure. All dimensions are in mm. [15]



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Code No: 121AB

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

MATHEMATICS-I

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, AME, MIE, PTM, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub-questions.

Part- A (25 Marks)

1.a) Find the inverse of the matrix $\text{diag}[a, b, c]$, $a \neq 0, b \neq 0, c \neq 0$. [2]

b) Find the quadratic form corresponding to the symmetric matrix $\begin{bmatrix} 1 & -1 & 2 \\ -1 & 2 & -2 \\ 2 & -2 & 3 \end{bmatrix}$. [3]

c) Find C of the mean value theorem, if $f(x) = x(x-1)(x-2)$ and $a = 0, b = 0.5$. [2]

d) If $u = \frac{x+y}{1-xy}$, $v = \tan^{-1} x + \tan^{-1} y$ find $\frac{\partial(u,v)}{\partial(x,y)}$. [3]

e) Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$. [2]

f) Evaluate $\int_{-1}^1 \int_{-2}^2 \int_{-3}^3 dx dy dz$. [3]

g) Find the general solution of $(4D^2 + 4D + 1)y = 0$. [2]

h) Find $\frac{1}{D^2 - 1} e^x$. [3]

i) Find $L[te^{2t}]$. [2]

j) Find $L^{-1}\left\{\frac{s}{(s-1)(s-2)}\right\}$. [3]

Part-B (50 Marks)

2. Find for what values of λ the equations $x+y+z=1, x+2y+4z=\lambda, x+4y+10z=\lambda^2$ have a solution and solve them in each case. [10]

OR

3. If $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ verify Cayley-Hamilton theorem. Find A^{-1} using Cayley - Hamilton theorem. [10]

- 4.a) Verify Lagrange's mean value theorem for the function $f(x) = e^x$ in $[0, 1]$.

- b) Expand $\log \cos(x+h)$ in powers of h by Taylor's theorem. [5+5]

OR

- 5.a) If u and v are functions of x and y and $J = \frac{\partial(u, v)}{\partial(x, y)}, J' = \frac{\partial(x, y)}{\partial(u, v)}$ then prove that $JJ' = 1$.

- b) Find the minimum values of $x^2 + y^2 + z^2$ if $x + y + z = 3a$. [5+5]

6. Show that $\int_0^{\pi/2} \sin^p \theta \cos^q \theta d\theta = \frac{\Gamma\left(\frac{p+1}{2}\right)\Gamma\left(\frac{q+1}{2}\right)}{2\Gamma\left(\frac{p+q+2}{2}\right)}$. [10]

OR

7. Change the order of integration and evaluate $\int_0^a \int_{\frac{y}{a}}^{\frac{\sqrt{x}}{a}} (x^2 + y^2) dy dx$. [10]

- 8.a) Solve $x^3 \sec^2 y \frac{dy}{dx} + 3x^2 \tan y = \cos x$.

- b) If the surroundings are maintained at 30°C and the temperature of body cools from 80°C to 60°C in 12 minutes, find the temperature of body after 24 minutes. [5+5]

OR

- 9.a) Solve $(D^2 + 3D + 2)y = e^{-x} + \cos x$.

- b) Solve $(D^3 - 7D^2 + 14D - 8)y = e^x \cos 2x$. [5+5]

- 10.a) Find $L^{-1} \left\{ \log \left(1 + \frac{a^2}{s^2} \right) \right\}$

- b) Find $L^{-1} \left\{ \frac{s}{(s^2 + 4)^2} \right\}$ by convolution theorem. [5+5]

OR

11. Solve $\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 5x = e^{-t} \sin t, x(0) = 0, x'(0) = 1$ by Laplace transform. [10]

R13

Code No: 111AB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

MATHEMATICS-I

(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, MCT, ETM, MMT, AE, AME, MIE, PTM, AGE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A (25 Marks)

1.a) Find the inverse of the matrix $\text{diag}[a, b, c]$, $a \neq 0, b \neq 0, c \neq 0$. [2]

b) Find the quadratic form corresponding to the symmetric matrix $\begin{bmatrix} 1 & -1 & 2 \\ -1 & 2 & -2 \\ 2 & -2 & 3 \end{bmatrix}$. [3]

c) Find C of the mean value theorem, if $f(x) = x(x-1)(x-2)$ and $a = 0, b = 0.5$. [2]

d) If $u = \frac{x+y}{1-xy}$, $v = \tan^{-1} x + \tan^{-1} y$ find $\frac{\partial(u,v)}{\partial(x,y)}$. [3]

e) Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$. [2]

f) Evaluate $\int_{-1}^1 \int_{-2}^2 \int_{-3}^3 dx dy dz$. [3]

g) Find the general solution of $(4D^2 + 4D + 1)y = 0$. [2]

h) Find $\frac{1}{D^2 - 1} e^x$. [3]

i) Find $L[te^{2t}]$. [2]

j) Find $L^{-1}\left\{\frac{s}{(s-1)(s-2)}\right\}$. [3]

Part-B (50 Marks)

2. Find for what values of λ the equations $x + y + z = 1, x + 2y + 4z = \lambda, x + 4y + 10z = \lambda^2$ have a solution and solve them in each case. [10]

OR

3. If $A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ verify Cayley-Hamilton theorem. Find A^{-1} using Cayley - Hamilton theorem. [10]

- 4.a) Verify Lagrange's mean value theorem for the function $f(x) = e^x$ in $[0, 1]$.

- b) Expand $\log \cos(x+h)$ in powers of h by Taylor's theorem. [5+5]

OR

- 5.a) If u and v are functions of x and y and $J = \frac{\partial(u,v)}{\partial(x,y)}, J' = \frac{\partial(x,y)}{\partial(u,v)}$ then prove that $JJ' = 1$.

- b) Find the minimum values of $x^2 + y^2 + z^2$ if $x + y + z = 3a$. [5+5]

6. Show that $\int_0^{\pi/2} \sin^p \theta \cos^q \theta d\theta = \frac{\Gamma\left(\frac{p+1}{2}\right)\Gamma\left(\frac{q+1}{2}\right)}{2\Gamma\left(\frac{p+q+2}{2}\right)}$. [10]

OR

7. Change the order of integration and evaluate $\int_0^a \int_{\frac{y}{a}}^{\sqrt{xy/a}} (x^2 + y^2) dy dx$. [10]

- 8.a) Solve $x^3 \sec^2 y \frac{dy}{dx} + 3x^2 \tan y = \cos x$.

- b) If the surroundings are maintained at 30°C and the temperature of body cools from 80°C to 60°C in 12 minutes, find the temperature of body after 24 minutes. [5+5]

OR

- 9.a) Solve $(D^2 + 3D + 2)y = e^{-x} + \cos x$.

- b) Solve $(D^3 - 7D^2 + 14D - 8)y = e^x \cos 2x$. [5+5]

- 10.a) Find $L^{-1} \left\{ \log \left(1 + \frac{a^2}{s^2} \right) \right\}$

- b) Find $L^{-1} \left\{ \frac{s}{(s^2 + 4)^2} \right\}$ by convolution theorem. [5+5]

OR

11. Solve $\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 5x = e^{-t} \sin t, x(0) = 0, x'(0) = 1$ by Laplace transform. [10]

R09

Code No: 51006

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

COMPUTER PROGRAMMING AND DATA STRUCTURES

(Common to CE, EEE, ME, ECE, CSE, IT, ETM, MMT, AE, BT, AME, MIE, PTM)

Time: 3 hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Explain different computer languages in brief.
b) Explain the structure of 'C' programming also creating and running of 'C' program. [7+8]
- 2.a) Explain about operator precedence with an example.
b) Explain Bitwise operators in detail.
c) Write a 'C' program to print numbers from 1 to N using while statement. [5+5+5]
- 3.a) Explain different storage classes in detail.
b) What is recursion? Write a 'C' program to print factorial of a given number using recursion.
c) Write a 'C' program to add two matrices and print the result. [5+5+5]
- 4.a) What is a Pointer? Explain about pointers to void and pointer to functions with example.
b) What is a String? Write a 'C' program to print a given string elements in reverse order without using functions. [10+5]
- 5.a) What is the difference between structure and union?
b) Explain Bit Fields and self referential structures. [7+8]
- 6.a) Explain the following High level functions with example
i) fopen () ii) fclose ()
iii) putw () iv) rewind ()
b) Write a Program to read data from keyboard, write it to a file called INPUT, again read the same data from the INPUT file, and display it on the screen. [8+7]
- 7.a) Explain merge sort with an example.
b) Explain binary search method with a sample program. [10+5]
- 8.a) What is stack? Explain the basic operations required to manipulate stack.
b) Explain array representation of stacks.
c) What is a Queue? Explain basic operations of a Queue. [5+5+5]

---ooOoo---

R07

Code No: Z0224

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

MATHEMATICAL METHODS

(Common to EEE, ME, ECE, CSE, IT)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) Find two non-singular matrices P and Q such that PAQ is in the normal form where

$$A = \begin{bmatrix} 3 & 2 & -1 & 5 \\ 5 & 1 & 4 & -2 \\ 1 & -4 & 11 & -19 \end{bmatrix}$$

- b) Solve the equations

$$\lambda x + 2y - 2z - 1 = 0, 4x + 2\lambda y - z - 2 = 0, 6x + 6y + \lambda z - 3 = 0 \text{ considering specially the case when } \lambda = 2. \quad [8+8]$$

- 2.a) Show that the matrices $B^{-1}AB$ and A have the same Eigen values.

b) If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ find the value of the matrix $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$.

[8+8]

- 3.a) Show that the Eigen values of a skew-Hermitian matrix are purely imaginary or zero.

b) Show that the matrix $\begin{bmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{bmatrix}$ is unitary. Find the Eigen values and Eigen vectors. [8+8]

- 4.a) Find a root of the equation $x^3 - 4x - 9 = 0$ using the method of false position.

- b) Given $x = 0, 1, 2, 5$ and $f(x) = 2, 3, 12, 147$ respectively, find the interpolation polynomial. [8+8]

- 5.a) Find the curve of best fit of the type $y = ae^{bx}$ to the following data by the method of least squares.

x	1	5	7	9	12
y	10	15	12	15	21

- b) Compute $\int_0^4 e^x dx$ by Simpson's one-third rule with 10 subdivisions. [8+8]

6. Using modified Euler's method, find an approximate value of y when $x = 1.3$, given that $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2}$, $y(1) = 1$. [16]

- 7.a) Find the Fourier series for the function $f(x) = x \sin x$ in $(-\pi, \pi)$. Hence deduce that $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \dots = \frac{\pi-2}{4}$.

- b) Find the inverse Fourier sine transform $f(x)$ of $F_s\{p\} = \frac{e^{-ap}}{p}$ and hence deduce $F_s^{-1}\{1/p\}$. [8+8]

- 8.a) Solve $(p^2 - q^2)z = x - y$.

- b) If $f(z) = \frac{5z^2 + 3z + 12}{(z-1)^4}$, find the values of $f(2)$ and $f(3)$. [8+8]

---ooOoo---

R15

Code No: 121AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Common to ME, IT, MMT, AME)

Time: 3 hours

Max Marks: 75

**Answer any five questions
All questions carry equal marks**

1. a) Construct a plain scale of $RF=1/40$ to read meters and decimeters. Maximum length to be measured using it is 5 meters. Mark on it a distance of 3.4 m.
b) Draw an involute of a circle of 50 mm diameter. Also draw a normal and a tangent at a point distant 100 mm from the centre of the circle. [7+8]

OR

2. a) The distance between two places is 240 km and its equivalent distance on map measures 12cm. Draw a diagonal scale to indicate 273 km and 128 km.
b) A point moves such that the sum of its distances from two fixed points 100 mm apart is always constant and is equal to 140 mm. Draw the locus of the point, the tangent and normal to the curve at any point on it. [7+8]

3. a) A point A is in the HP and 25 mm in front of VP. Another point B is also in HP and behind VP. The distance between their end projectors is 55mm. Draw its Projections when the line joining their plans makes an angle of 50° with reference Line. Also find the distance of the point B from the VP.
b) A line AB is 85mm long has its end A 25mm away from both the reference planes and is in the first quadrant. The line is inclined at 50° to HP and 30° to VP. Draw its projections and mark the traces of the line. [8+7]

OR

4. a) A line AB is 80 mm long and it has end 20 mm above HP and 25 mm in front of VP. The line is inclined at 45° to HP and 35° to VP. Draw its projections.
b) A straight line PQ has its end P 20 mm above the H.P and 30 mm in front of the V.P and the end Q is 80 mm above the H.P and 70 mm in front of V.P. If the end projectors are 60 mm apart, draw the projections of the line. Determine its true length and true inclinations with the reference planes. [7+8]

5. A hexagonal pyramid, base 25 mm side and axis 55 mm long, has one of its slant edges on the ground. A plane containing that edge and the axis is perpendicular to the H.P. and inclined at 45° to the V.P. Draw its projections when the apex is nearer the V.P. than the base. [15]

OR

6. A square prism, base side 40 mm, axis 80 mm long has its base on the H.P. and its faces equally inclined to the V.P. It is cut by a plane, perpendicular to the V.P. inclined at 60° to the H.P. and passing through a point on the axis, 55 mm above the H.P. Draw its front view, sectional top view and another top view on an A.I.P. parallel to the section plane. [15]

7. A cylinder of base diameter 50 mm and axis length 60 mm is resting on HP on its base, cut by a plane inclined at 55° to HP and perpendicular to VP. The cutting plane is passing through a point on the axis at a distance 30mm from the top end. Draw the development of the lateral surface of the remaining portion of the cylinder. [15]

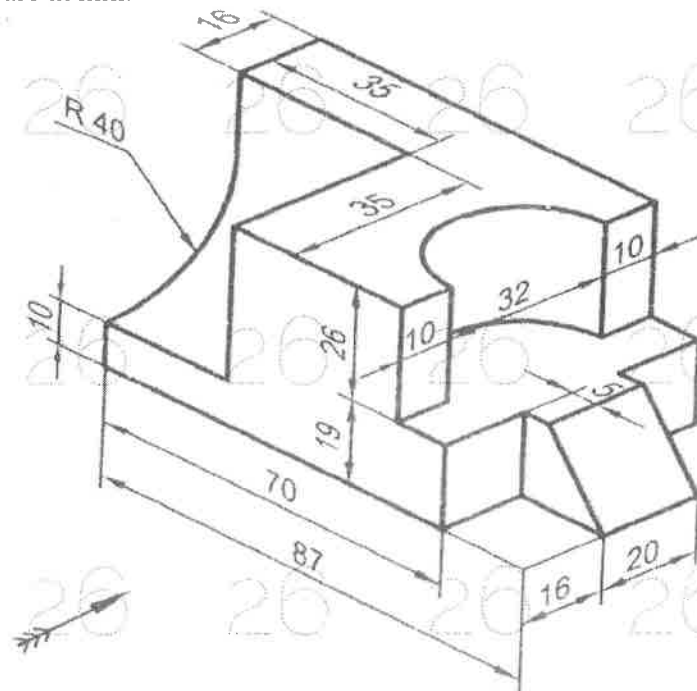
OR

8. A cylinder of 50 mm diameter stands vertically with its base on HP. It is completely penetrated by an cylinder of 50 mm diameter. The axis of the penetrating cylinder is parallel to VP, inclined at 30° to HP and bisects the axis of the vertical cylinder. Draw the curves of intersection. [15]

9. A sphere of radius 20 mm is kept on the top face of a square prism of side of base 40 mm and height 20 mm. The latter is placed on the top face of a cylinder of 65 mm diameter and 25 mm height. All the three solids have the common axis. Draw the isometric projection of combination of solids. [15]

OR

10. Draw the front view, top view and left-side view of the object given in figure. All dimensions are in mm. [15]



R13

Code No: 111AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Common to ME, IT, MCT, MMT, AME)

Time: 3 hours

Max Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Construct a plain scale of RF=1/40 to read meters and decimeters. Maximum length to be measured using it is 5 meters. Mark on it a distance of 3.4 m.
- b) Draw an involute of a circle of 50 mm diameter. Also draw a normal and a tangent at a point distant 100 mm from the centre of the circle. [7+8]

OR

- 2.a) The distance between two places is 240 km and its equivalent distance on map measures 12cm. Draw a diagonal scale to indicate 273 km and 128 km.
- b) A point moves such that the sum of its distances from two fixed points 100 mm apart is always constant and is equal to 140 mm. Draw the locus of the point, the tangent and normal to the curve at any point on it. [7+8]

- 3.a) A point A is in the HP and 25 mm in front of VP. Another point B is also in HP and behind VP. The distance between their end projectors is 55mm. Draw its Projections when the line joining their plans makes an angle of 50° with reference Line. Also find the distance of the point B from the VP.
- b) A line AB is 85mm long has its end A 25mm away from both the reference planes and is in the first quadrant. The line is inclined at 50° to HP and 30° to VP. Draw its projections and mark the traces of the line. [8+7]

OR

- 4.a) A line AB is 80 mm long and it has end 20 mm above HP and 25 mm in front of VP. The line is inclined at 45° to HP and 35° to VP. Draw its projections.
- b) A straight line PQ has its end P 20 mm above the H.P and 30 mm in front of the V.P and the end Q is 80 mm above the H.P and 70 mm in front of V.P. If the end projectors are 60 mm apart, draw the projections of the line. Determine its true length and true inclinations with the reference planes. [7+8]

5. A hexagonal pyramid, base 25 mm side and axis 55 mm long, has one of its slant edges on the ground. A plane containing that edge and the axis is perpendicular to the H.P. and inclined at 45° to the V.P. Draw its projections when the apex is nearer the V.P. than the base. [15]

OR

6. A square prism, base side 40 mm, axis 80 mm long has its base on the H.P. and its faces equally inclined to the V.P. It is cut by a plane, perpendicular to the V.P. inclined at 60° to the H.P. and passing through a point on the axis, 55 mm above the H.P. Draw its front view, sectional top view and another top view on an A.I.P. parallel to the section plane. [15]

26 26 26 26 26 26 26

7. A cylinder of base diameter 50 mm and axis length 60 mm is resting on HP on its base, cut by a plane inclined at 55° to HP and perpendicular to VP. The cutting plane is passing through a point on the axis at a distance 30mm from the top end. Draw the development of the lateral surface of the remaining portion of the cylinder. [15]

OR

26 26 26 26 26 26 26

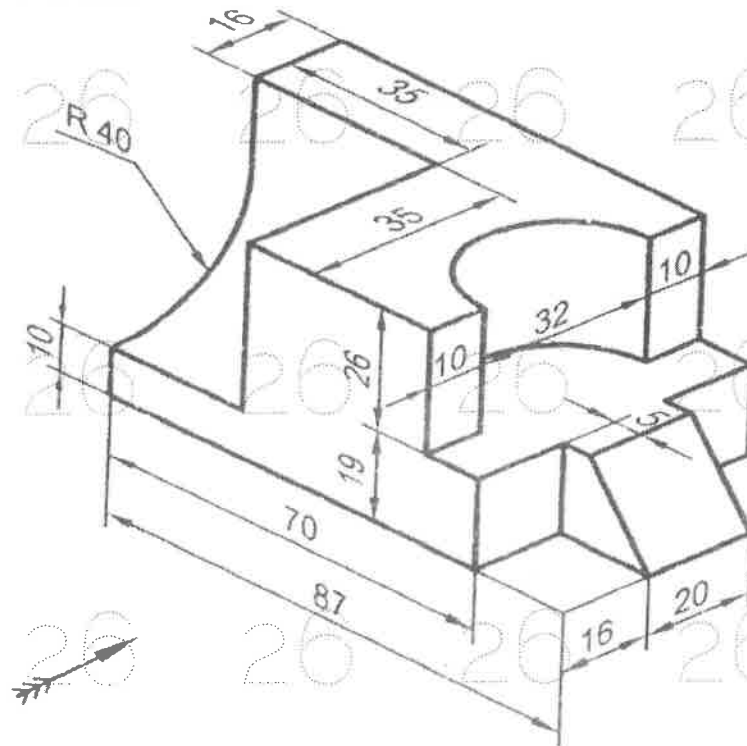
8. A cylinder of 50 mm diameter stands vertically with its base on HP. It is completely penetrated by an cylinder of 50 mm diameter. The axis of the penetrating cylinder is parallel to VP, inclined at 30° to HP and bisects the axis of the vertical cylinder. Draw the curves of intersection. [15]

26 26 26 26 26 26 26

9. A sphere of radius 20 mm is kept on the top face of a square prism of side of base 40 mm and height 20 mm. The latter is placed on the top face of a cylinder of 65 mm diameter and 25 mm height. All the three solids have the common axis. Draw the isometric projection of combination of solids. [15]

OR

10. Draw the front view, top view and left-side view of the object given in figure. All dimensions are in mm. [15]



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Code No: 51014

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

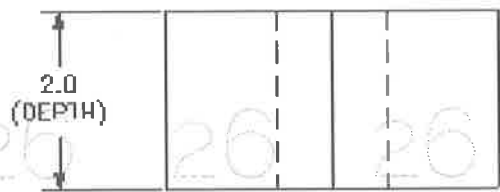
(Computer Science and Engineering)

Time: 3 hours

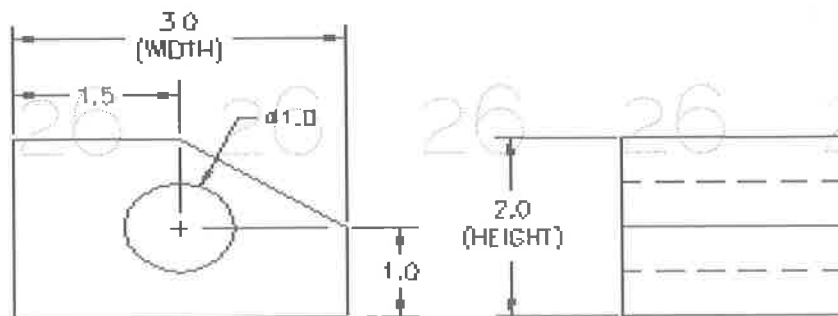
Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. A circle of diameter 30 mm rolls on a flat surface without slipping. Trace the path of a point lying on its circumference for one and a half revolution of the circle. Draw a normal and tangent to the curve at a point 20 mm above the directing line. [15]
2. A line AB of 70 mm long has its end A at 10 mm above H.P and 15 mm in front of V.P. Its front view and top view measure 50 mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with H.P and V.P. [15]
3. A regular pentagon lamina of 30 mm side, surface is inclined at 30° to VP and side on which it rests on V.P makes an angle of 45° to H.P. Draw its projections. [15]
4. A square prism of 32 mm side and 100 mm height is lying on its base on HP such that the edges of the base are equally inclined to VP. The prism is cut by a section plane passing through the mid-point of the axis such that the true shape of section is a rhombus of diagonals of 102 mm and 42 mm. Draw the development of bottom part. [15]
5. A vertical cylinder of base diameter 60 mm is penetrated by a horizontal cylinder of base diameter 80 mm. The axes intersect each other at right angles. Draw the curves of intersection. [15]
6. By using the following views, draw the isometric view of the figure 1. All dimensions are in mm. [15]



TOP VIEW



FRONT VIEW

RIGHT SIDE VIEW

Figure: 1

7. For the following isometric view shown in figure 2, draw a) Front view by seeing from 60 mm width side b) top view c) left side view. All dimensions are in mm. [15]

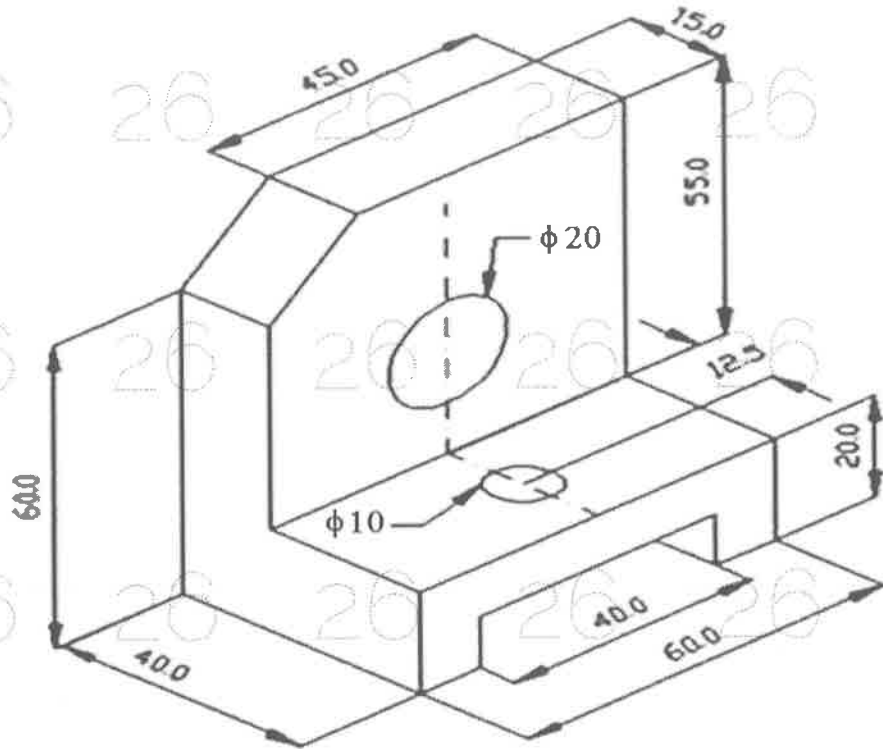


Figure: 2

8. A hexagonal lamina of 25 mm side stands vertically on the ground plane and inclined at 50° to PP. The corner nearest to PP is 20 mm behind it. The station point is 45 mm in front of PP, 50 mm above the ground plane and lies in a central plane which passes through the center of the lamina. Draw the perspective projection. [15]

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Code No: 51011

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

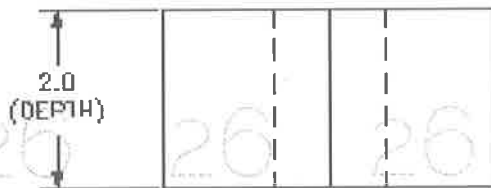
(Electrical and Electronics Engineering)

Time: 3 hours

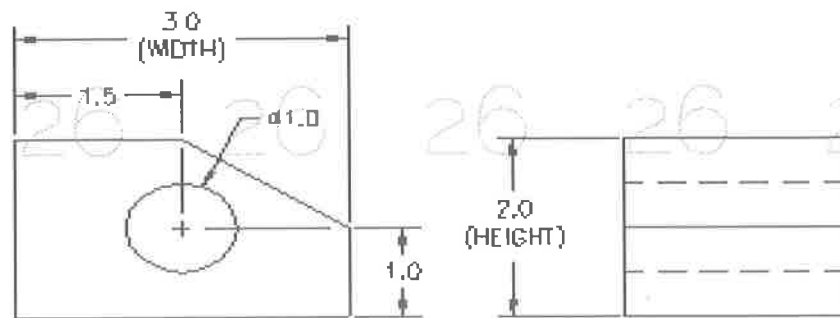
Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. A circle of diameter 30 mm rolls on a flat surface without slipping. Trace the path of a point lying on its circumference for one and a half revolution of the circle. Draw a normal and tangent to the curve at a point 20 mm above the directing line. [15]
2. A line AB of 70 mm long has its end A at 10 mm above H.P and 15 mm in front of V.P. Its front view and top view measure 50 mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with H.P and V.P. [15]
3. A regular pentagon lamina of 30 mm side, surface is inclined at 30° to VP and side on which it rests on V.P makes an angle of 45° to H.P. Draw its projections. [15]
4. A square prism of 32 mm side and 100 mm height is lying on its base on HP such that the edges of the base are equally inclined to VP. The prism is cut by a section plane passing through the mid-point of the axis such that the true shape of section is a rhombus of diagonals of 102 mm and 42 mm. Draw the development of bottom part. [15]
5. A vertical cylinder of base diameter 60 mm is penetrated by a horizontal cylinder of base diameter 80 mm. The axes intersect each other at right angles. Draw the curves of intersection. [15]
6. By using the following views, draw the isometric view of the figure 1. All dimensions are in mm. [15]



TOP VIEW



FRONT VIEW

RIGHT SIDE VIEW

Figure: 1

7. For the following isometric view shown in figure 2, draw a) Front view by seeing from 60 mm width side b) top view c) left side view. All dimensions are in mm. [15]

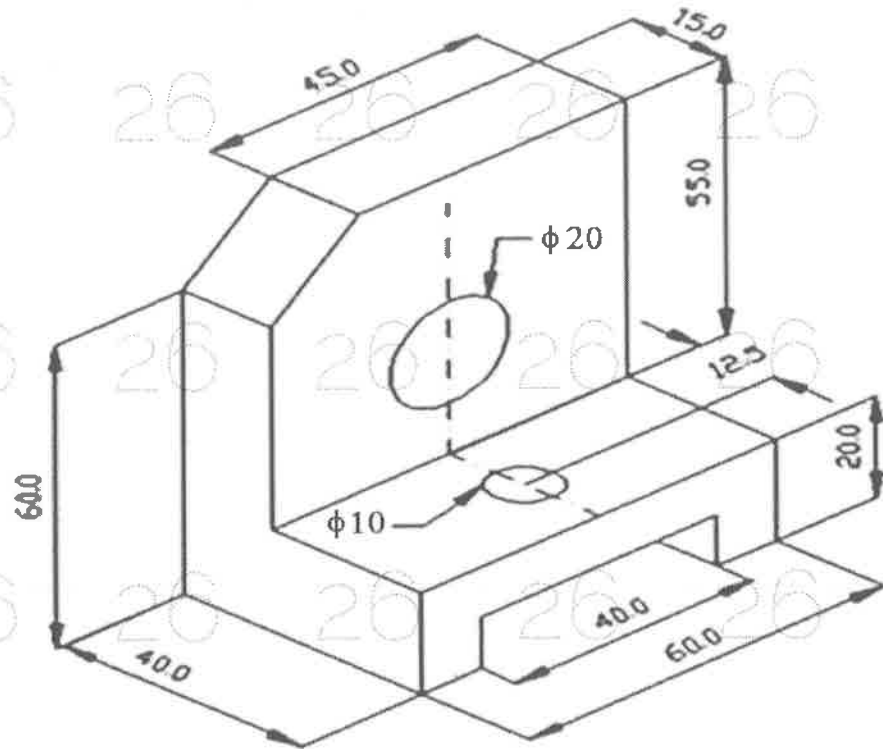


Figure: 2

8. A hexagonal lamina of 25 mm side stands vertically on the ground plane and inclined at 50° to PP. The corner nearest to PP is 20 mm behind it. The station point is 45 mm in front of PP, 50 mm above the ground plane and lies in a central plane which passes through the center of the lamina. Draw the perspective projection. [15]

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Code No: 51010

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Common to CE, BME)

Time: 3 hours

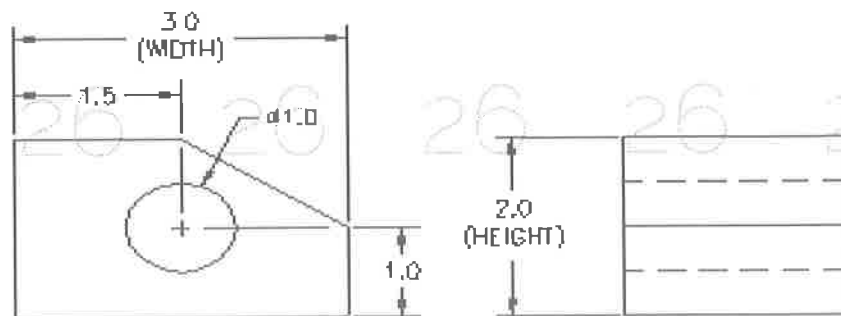
Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. A circle of diameter 30 mm rolls on a flat surface without slipping. Trace the path of a point lying on its circumference for one and a half revolution of the circle. Draw a normal and tangent to the curve at a point 20 mm above the directing line. [15]
2. A line AB of 70 mm long has its end A at 10 mm above H.P and 15 mm in front of V.P. Its front view and top view measure 50 mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with H.P and V.P. [15]
3. A regular pentagon lamina of 30 mm side, surface is inclined at 30° to VP and side on which it rests on V.P makes an angle of 45° to H.P. Draw its projections. [15]
4. A square prism of 32 mm side and 100 mm height is lying on its base on HP such that the edges of the base are equally inclined to VP. The prism is cut by a section plane passing through the mid-point of the axis such that the true shape of section is a rhombus of diagonals of 102 mm and 42 mm. Draw the development of bottom part. [15]
5. A vertical cylinder of base diameter 60 mm is penetrated by a horizontal cylinder of base diameter 80 mm. The axes intersect each other at right angles. Draw the curves of intersection. [15]
6. By using the following views, draw the isometric view of the figure 1. All dimensions are in mm. [15]



TOP VIEW



FRONT VIEW

RIGHT SIDE VIEW

Figure: 1

7. For the following isometric view shown in figure 2, draw a) Front view by seeing from 60 mm width side b) top view c) left side view. All dimensions are in mm. [15]

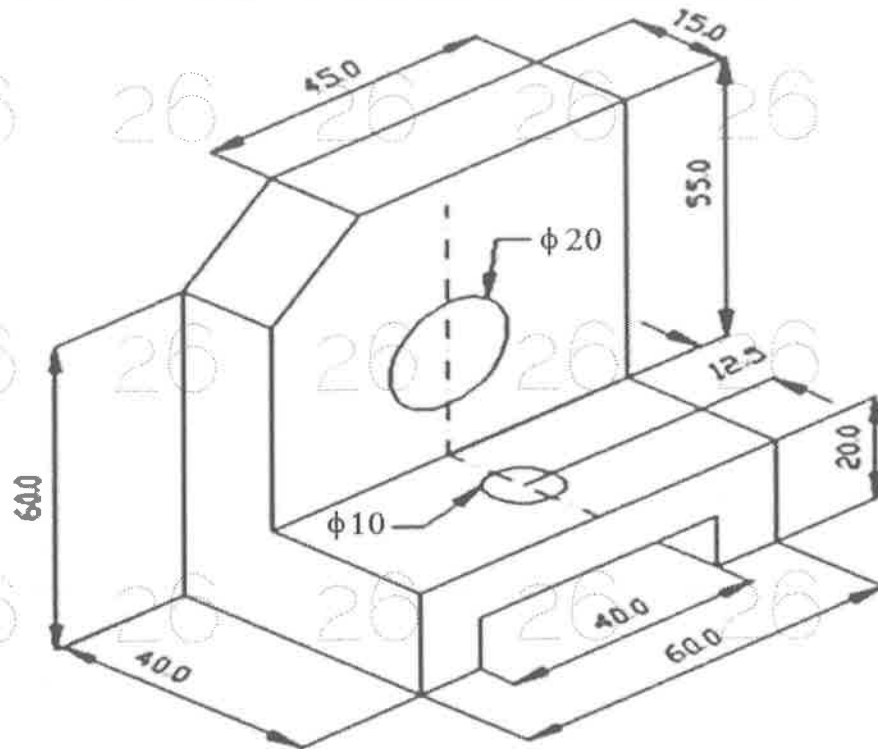


Figure: 2

8. A hexagonal lamina of 25 mm side stands vertically on the ground plane and inclined at 50° to PP. The corner nearest to PP is 20 mm behind it. The station point is 45 mm in front of PP, 50 mm above the ground plane and lies in a central plane which passes through the center of the lamina. Draw the perspective projection. [15]

---ooOoo---

R07

Code No: Z1221

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Information Technology)

Time: 3 hours

Max. Marks: 80

Answer any five questions

All questions carry equal marks

- 1.a) Show by means of a drawing that when the diameter of the directing circle is twice that of the generating circle, the hypocycloid is a straight line. Take the diameter of the generating circle equal to 50 mm.
- b) A fixed point is 75 mm from a fixed straight line. Draw the locus of a point P moving such a way that its distance from the fixed straight line is (i) twice its distance from the fixed point; (ii) equal to its distance from the fixed point. [8+8]
- 2.a) Two points A and B are in the H.P. The point A is 30 mm in front of the V.P., while B is behind the V.P. The distance between their projectors is 75 mm and the line joining their top views makes an angle of 45° with xy. Find the distance of the point B from the V.P.
- b) The top view of a 75 mm long line CD measures 50 mm. C is 50 mm in front of the V.P. and 15 mm below the H.P. D is 15 mm in front of the V.P. and is above the H.P. Draw the front view of CD and find its inclinations with the H.P. and the V.P. Show also its traces. [8+8]
- 3.a) A straight line AB 70 mm long has one of its ends 25 mm behind VP and 20 mm below HP. The line is inclined at 30° to HP and 50° to VP. Draw its projections.
- b) A regular hexagon of side 20 mm has one of its sides inclined at 30° to VP. Its surface makes an angle of 60° with the ground. Draw its projections. [8+8]
- 4.a) Draw the projections of a circular plate of 50 mm diameter when its surface is perpendicular to the VP and inclined at 45° to the HP.
- b) A regular hexagonal plate of 30 mm side has one corner touching the VP and the opposite corner touching the HP. The plate is inclined at 60° to the HP and 30° to the VP. Draw the projections of the plate assuming its thickness equal to line thickness. [8+8]
- 5.a) A semi-circular plate of 80 mm diameter has its straight edge in the VP and inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections.
- b) The projectors of the ends of a line PQ are 90 mm apart. P is 20 mm above the HP while Q is 45 mm behind the VP. The HT and VT of the line are away from the projector of the end P. Draw the projections of PQ and determine its true length and inclinations with the two planes. [8+8]
- 6.a) A square pyramid, base 40 mm side and axis 90 mm long, has a triangular face on the ground and the vertical plane containing the axis makes an angle of 45° with the VP. Draw its projections.
- b) A cone, base 70 mm diameter, axis 75 mm long and resting on its base on the HP, is cut by a vertical section plane, the HT of which makes an angle of 60° with the reference line and is 12 mm away from the top view of the axis. i) Draw the sectional front view and the true shape of the section. ii) Also draw the sectional front view and the top view when the same section plane is parallel to the VP. [8+8]

7.a) Draw the isometric view of the following Figure 1. All dimensions are in mm.

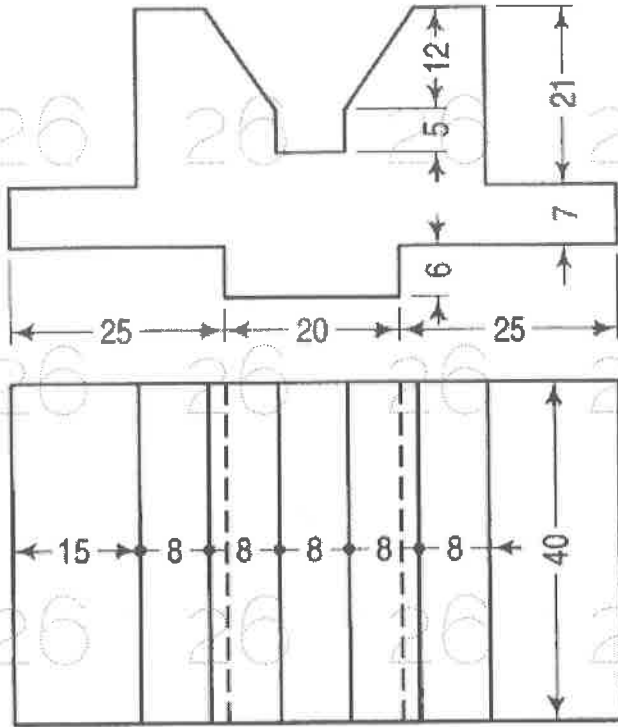


Figure: 1

b) Draw the i) Front view ii) Side view iii) Top view for the following Figure 2. All dimensions are in mm. [8+8]

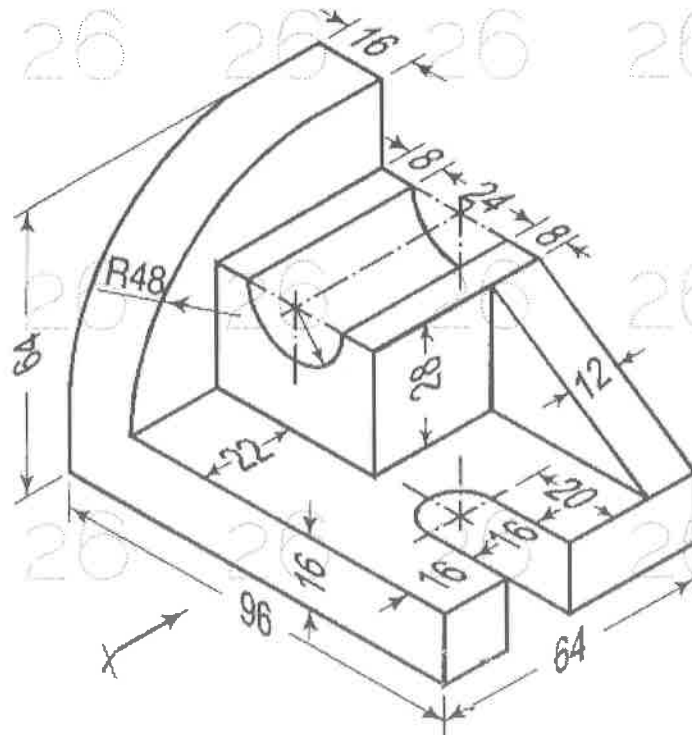


Figure: 2

8.a) Draw the isometric view of the following Figure 3. All dimensions are in mm.

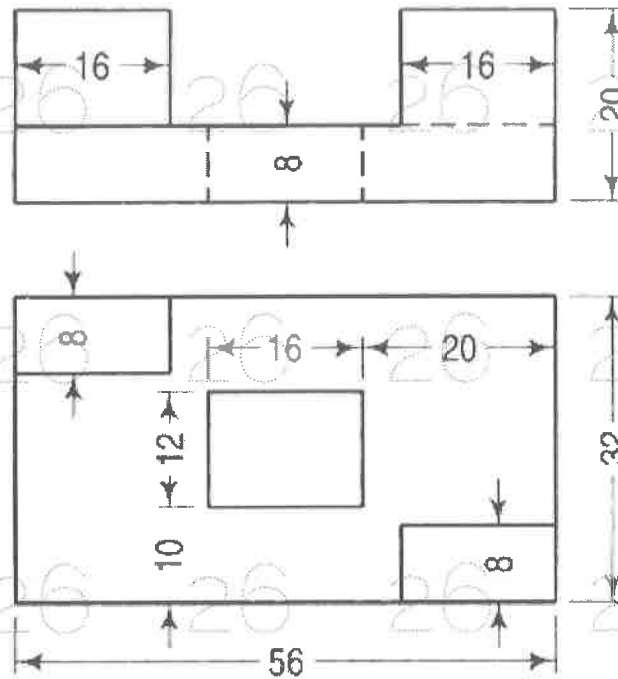


Figure: 3

b) Draw the i) Front view ii) Side view iii) Top view for the following figure 4. All dimensions are in mm. [8+8]

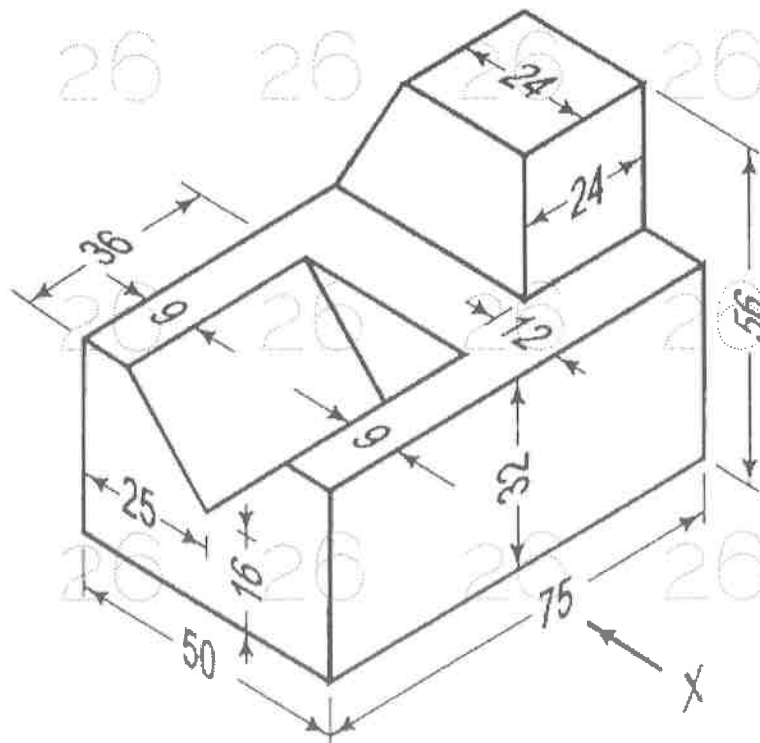


Figure: 4

R07

Code No: Z0522

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

-
- 1.a) Show by means of a drawing that when the diameter of the directing circle is twice that of the generating circle, the hypocycloid is a straight line. Take the diameter of the generating circle equal to 50 mm.
- b) A fixed point is 75 mm from a fixed straight line. Draw the locus of a point P moving such a way that its distance from the fixed straight line is (i) twice its distance from the fixed point; (ii) equal to its distance from the fixed point. [8+8]
- 2.a) Two points A and B are in the H.P. The point A is 30 mm in front of the V.P., while B is behind the V.P. The distance between their projectors is 75 mm and the line joining their top views makes an angle of 45° with xy. Find the distance of the point B from the V.P.
- b) The top view of a 75 mm long line CD measures 50 mm. C is 50 mm in front of the V.P. and 15 mm below the H.P. D is 15 mm in front of the V.P. and is above the H.P. Draw the front view of CD and find its inclinations with the H.P. and the V.P. Show also its traces. [8+8]
- 3.a) A straight line AB 70 mm long has one of its ends 25 mm behind VP and 20 mm below HP. The line is inclined at 30° to HP and 50° to VP. Draw its projections.
- b) A regular hexagon of side 20 mm has one of its sides inclined at 30° to VP. Its surface makes an angle of 60° with the ground. Draw its projections. [8+8]
- 4.a) Draw the projections of a circular plate of 50 mm diameter when its surface is perpendicular to the VP and inclined at 45° to the HP.
- b) A regular hexagonal plate of 30 mm side has one corner touching the VP and the opposite corner touching the HP. The plate is inclined at 60° to the HP and 30° to the VP. Draw the projections of the plate assuming its thickness equal to line thickness. [8+8]
- 5.a) A semi-circular plate of 80 mm diameter has its straight edge in the VP and inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections.
- b) The projectors of the ends of a line PQ are 90 mm apart. P is 20 mm above the HP while Q is 45 mm behind the VP. The HT and VT of the line are away from the projector of the end P. Draw the projections of PQ and determine its true length and inclinations with the two planes. [8+8]
- 6.a) A square pyramid, base 40 mm side and axis 90 mm long, has a triangular face on the ground and the vertical plane containing the axis makes an angle of 45° with the VP. Draw its projections.
- b) A cone, base 70 mm diameter, axis 75 mm long and resting on its base on the HP, is cut by a vertical section plane, the HT of which makes an angle of 60° with the reference line and is 12 mm away from the top view of the axis. i) Draw the sectional front view and the true shape of the section. ii) Also draw the sectional front view and the top view when the same section plane is parallel to the VP. [8+8]

7.a) Draw the isometric view of the following Figure 1. All dimensions are in mm.

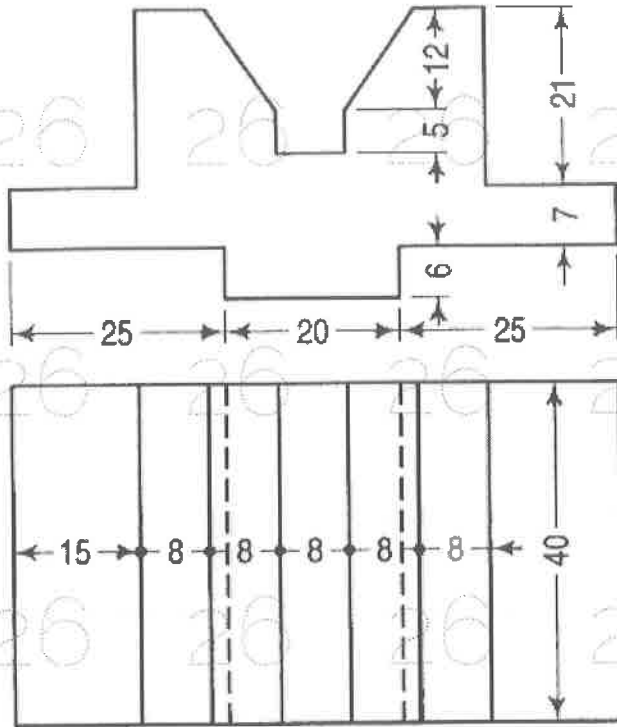


Figure: 1

b) Draw the i) Front view ii) Side view iii) Top view for the following Figure 2. All dimensions are in mm. [8+8]

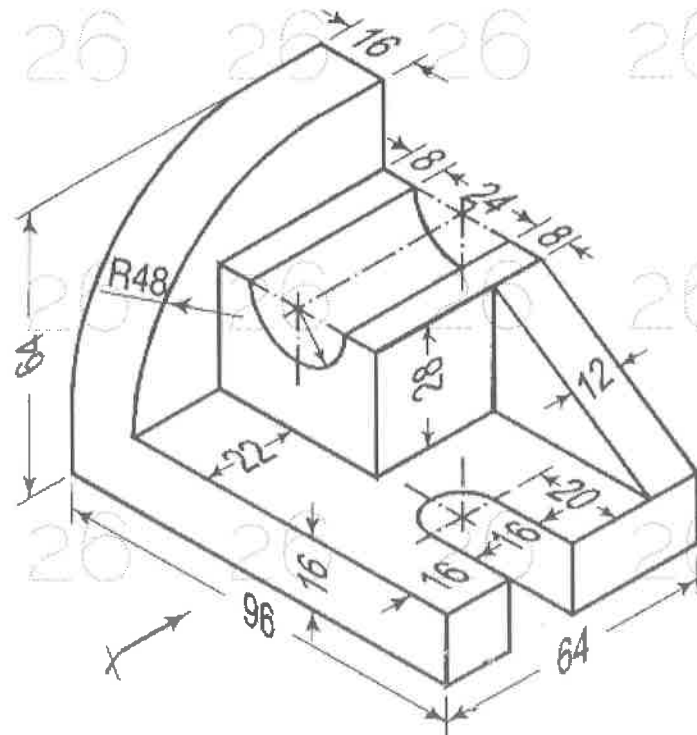


Figure: 2

8.a) Draw the isometric view of the following Figure 3. All dimensions are in mm.

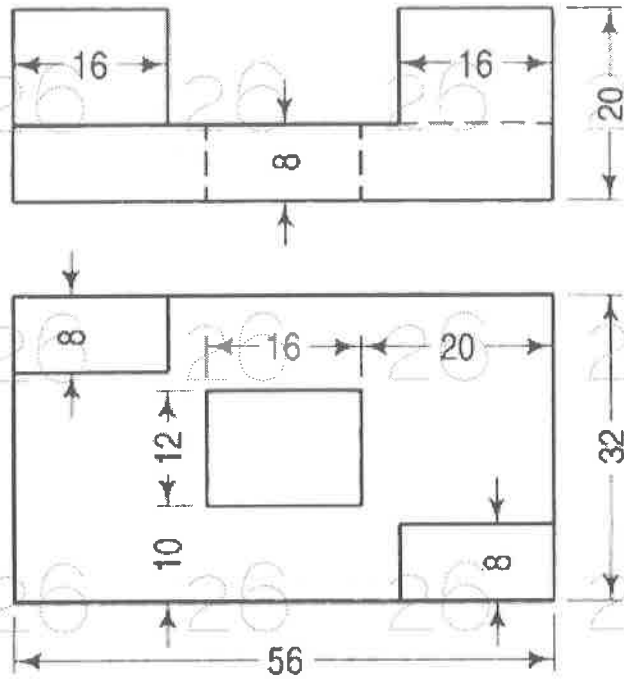


Figure: 3

b) Draw the i) Front view ii) Side view iii) Top view for the following figure 4. All dimensions are in mm. [8+8]

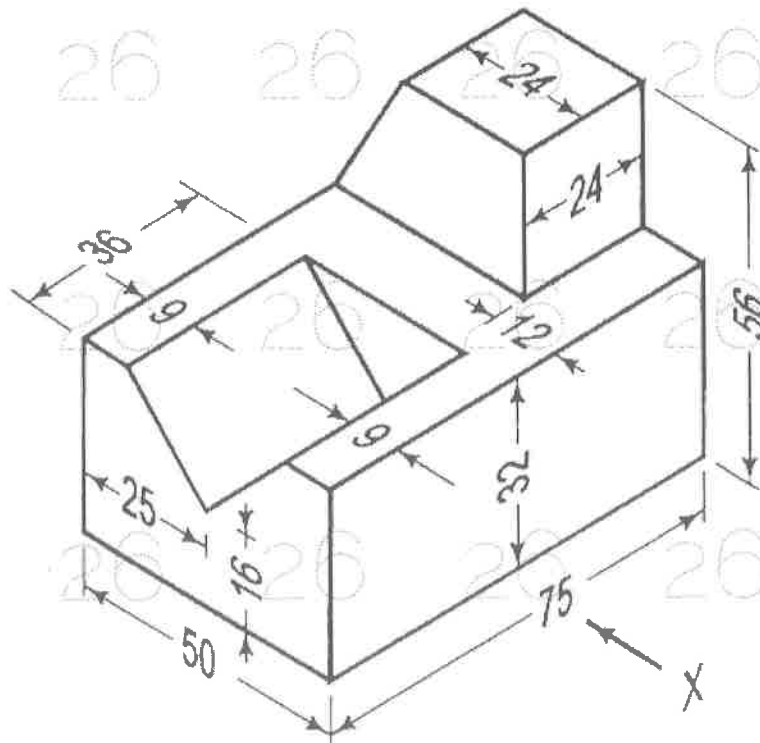


Figure: 4

R09

Code No: 51012

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Common to ME, MMT)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Draw a hyperbola of $e = 4/3$ if the distance of the focus from the directrix = 60 mm.
- b) Construct a plain comparative Scales of RF = $1/624000$ to read up to 50 kms and 40 miles. On these show the kilometer equivalent to 18 miles. [7+8]
- 2.a) Front View of line AB is 50° inclined to XY and measures 55 mm long while its top view is 60° inclined to XY line. If end A is 10 mm above HP and 15 mm in front of VP, draw its projections, find true length, inclinations of line with HP & VP.
- b) Projectors drawn from HT and VT of a line AB are 70 mm apart and those drawn from its ends are 40 mm apart. End A is 15 mm above HP, VT is 25 mm below HP while its HT is 35 mm in front of VP. Draw projections, locate traces and find TL of line and inclinations with HP and VP. [7+8]
- 3.a) A regular hexagonal plate 35 mm side is resting on one of its corners in H.P. The diagonal through that corner is inclined at 35° to H.P. and the plan of that diagonal inclined to V.P. by 25° . Draw the projection of the plate.
- b) A hexagonal prism of 30 mm side of base and 70 mm height, resting on the H.P. such that the axis is inclined at 60° to the H.P. and the base edge is inclined at 30° to the V.P. Draw its projections. [7+8]
4. The cylinder of diameter of base 40 mm and axis height 60 mm is resting on its base on H.P. A section plane inclined at 45° to H.P cuts the axis of the cylinder 10 mm from the top. Develop the surface of the bottom part of the cylinder. [15]
5. A vertical cylinder of 80 mm diameter is completely penetrated by another cylinder of 60 mm diameter, their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of the penetrating cylinder to be parallel to the VP. [15]

6. Draw the isometric view of the following figure 1. All dimensions are in mm. [15]

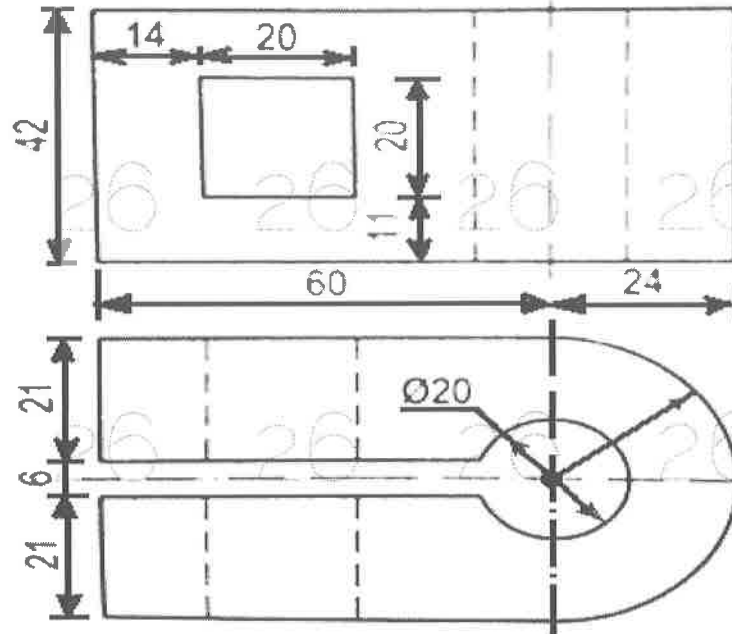


Figure: 1

7. Draw the orthographic views (front view, top view and side view) of the following figure 2. All dimensions are in mm. [15]

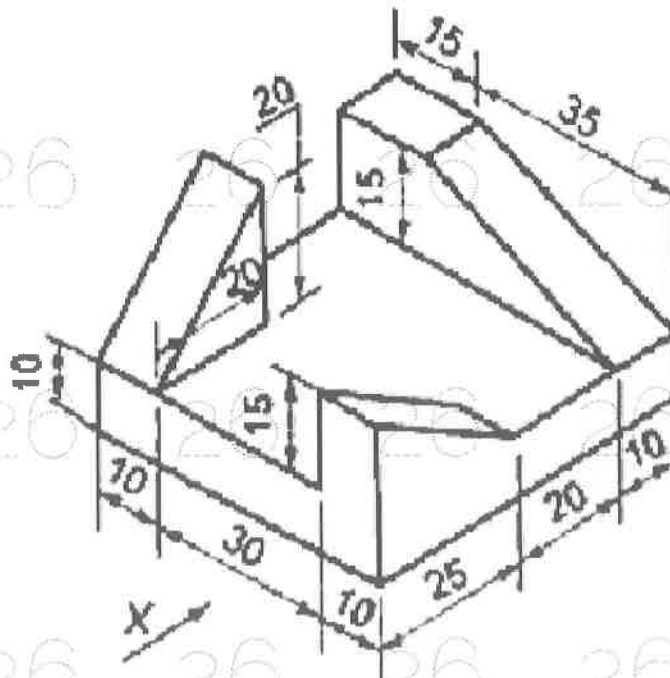


Figure: 2

8. Draw the perspective view of a square pyramid of base 30 mm, side and height of apex 45 mm rests on GP. The nearest edge of the base is parallel to and 20 mm behind the picture plane. The station point is situated at a distance of 70 mm in front of the PP and 40 mm to the right of the axis of the pyramid and 60 mm above the ground. [15]

Code No: 111AK

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Common to CE, EEE, CHEM, AE, CEE, AGE)

Time: 3 hours

Max Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Construct a vernier scale to read meters, decimeters and long enough to measure up to 8 m, when 1 m is represented by 20 mm. Find R.F. and show a distance of 5.38 m on it.
- b) The transverse axis of a hyperbola is 70 mm long. Its double ordinate is 80 mm long and the corresponding abscissa is 50 mm. Construct the hyperbola. [8+7]

OR

- 2.a) In a vernier scale the difference between 1VSD and 1MSD was found to be 1 cm. RF is 1:80. The scale is to measure a distance of 10 m. Construct a scale and show on it a length of 3.09m.
- b) Draw two branches of rectangular hyperbola having its vertices 50 mm apart and determine its directrices and foci graphically. [8+7]
3. A line PQ, inclined at 35° to the V.P., has a 50 mm long front view. The end P is 10 mm from both the principal planes while the end Q is 35 mm above the H.P. Draw the projections of the line and determine its true length and inclinations with the principal planes. Also, locate its traces. [15]

OR

4. A composite plate of negligible thickness is made up of a rectangle with sides 50 mm and 40 mm long and a semicircle on its longer side. The plate is situated in the H.P. with one of its shorter side parallel to the V.P. Draw its projections. [15]
5. A pentagonal prism, having a base with a 30 mm side and a 70 mm long axis, is resting on a base in the H.P. with an edge of the base perpendicular to the V.P. It is cut by an A.I.P. in such a way that the true shape of the section is a trapezium with one of its parallel sides of 40 mm length, another side of maximum possible length and 60 mm altitude. Draw the projections and true shape of the section. [15]
6. A hollow cylinder, with a 60 mm outside diameter, a 65 mm axis and 8 mm thickness, is resting on its base on the H.P. An A.I.P. inclined at 30° to the H.P., and passing through a point on the axis 12 mm from its top end, cuts the cylinder. Draw its sectional top view, sectional side view and true shape of the section. [15]

OR

7. A horizontal triangular prism, with 60 mm edges at its base and 80 mm in length, completely penetrates a vertical cylinder 60 mm in diameter and 70 mm in length. Draw three views showing curves of intersection if a rectangular face of the prism is inclined at 45 degrees to the HP and if the two axes bisect each other while the plane containing the two axes is perpendicular to the VP. [15]
8. A cylinder of diameter 50 mm and height 75 mm is resting on the ground on its flat end. It is cut by a sectional plane inclined at 30° to the axis of the cylinder and passing through a point on the axis at height of 50 mm from the base. Draw the lateral surface of the bottom part. [15]

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9. Draw the isometric projection of a square slab of side of base 60 mm and altitude 40 mm surmounting a hexagonal pyramid of side 30 mm and axis length 50 mm such that the axes of the two solids are collinear and at least one of the edges of the two sides are parallel. [15]

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10. **OR**
A square prism, side of base 50 mm and height 70 mm rests with its base on the ground such that one of its rectangular faces is parallel to and 10 mm behind PP. The station point is 140 mm in front of PP, 80 mm above the ground plane and lies in a central plane which is 45 mm to the right of the center of the prism. Draw the perspective view of the solid. [15]

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R13

Code No: 111AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

**ENGINEERING DRAWING
(Common to CSE, MIE, PTM)**

Time: 3 hours

Max Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Construct a vernier scale to read meters, decimeters and long enough to measure up to 8 m, when 1 m is represented by 20 mm. Find R.F. and show a distance of 5.38 m on it.
- b) The transverse axis of a hyperbola is 70 mm long. Its double ordinate is 80 mm long and the corresponding abscissa is 50 mm. Construct the hyperbola. [8+7]

OR

- 2.a) In a vernier scale the difference between 1VSD and 1MSD was found to be 1 cm. RF is 1:80. The scale is to measure a distance of 10 m. Construct a scale and show on it a length of 3.09m.
- b) Draw two branches of rectangular hyperbola having its vertices 50 mm apart and determine its directrices and foci graphically. [8+7]

3. A line PQ, inclined at 35° to the V.P., has a 50 mm long front view. The end P is 10 mm from both the principal planes while the end Q is 35 mm above the H.P. Draw the projections of the line and determine its true length and inclinations with the principal planes. Also, locate its traces. [15]

OR

4. A composite plate of negligible thickness is made up of a rectangle with sides 50 mm and 40 mm long and a semicircle on its longer side. The plane is situated in the H.P. with one of its shorter side parallel to the V.P. Draw its projections. [15]

5. A pentagonal prism, having a base with a 30 mm side and a 70 mm long axis, is resting on a base in the H.P. with an edge of the base perpendicular to the V.P. It is cut by an A.I.P. in such a way that the true shape of the section is a trapezium with one of its parallel sides of 40 mm length, another side of maximum possible length and 60 mm altitude. Draw the projections and true shape of the section. [15]

OR

6. A hollow cylinder, with a 60 mm outside diameter, a 65 mm axis and 8 mm thickness, is resting on its base on the H.P. An A.I.P. inclined at 30° to the H.P., and passing through a point on the axis 12 mm from its top end, cuts the cylinder. Draw its sectional top view, sectional side view and true shape of the section. [15]

7. A horizontal triangular prism, with 60 mm edges at its base and 80 mm in length, completely penetrates a vertical cylinder 60 mm in diameter and 70 mm in length. Draw three views showing curves of intersection if a rectangular face of the prism is inclined at 45 degrees to the HP and if the two axes bisect each other while the plane containing the two axes is perpendicular to the VP. [15]

OR

8. A cylinder of diameter 50 mm and height 75 mm is resting on the ground on its flat end. It is cut by a sectional plane inclined at 30° to the axis of the cylinder and passing through a point on the axis at height of 50 mm from the base. Draw the lateral surface of the bottom part. [15]

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9. Draw the isometric projection of a square slab of side of base 60 mm and altitude 40 mm surmounting a hexagonal pyramid of side 30 mm and axis length 50 mm such that the axes of the two solids are collinear and at least one of the edges of the two sides are parallel. [15]

26 26 26 26 26 26 26

10. **OR**
A square prism, side of base 50 mm and height 70 mm rests with its base on the ground such that one of its rectangular faces is parallel to and 10 mm behind PP. The station point is 140 mm in front of PP, 80 mm above the ground plane and lies in a central plane which is 45 mm to the right of the center of the prism. Draw the perspective view of the solid. [15]

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R15

Code No: 121AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING
(Common to CSE, MIE, PTM)

Time: 3 hours

Max Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Construct a vernier scale to read meters, decimeters and long enough to measure up to 8 m, when 1 m is represented by 20 mm. Find R.F. and show a distance of 5.38 m on it.
- b) The transverse axis of a hyperbola is 70 mm long. Its double ordinate is 80 mm long and the corresponding abscissa is 50 mm. Construct the hyperbola. [8+7]

OR

- 2.a) In a vernier scale the difference between 1VSD and 1MSD was found to be 1 cm. RF is 1:80. The scale is to measure a distance of 10 m. Construct a scale and show on it a length of 3.09m.
- b) Draw two branches of rectangular hyperbola having its vertices 50 mm apart and determine its directrices and foci graphically. [8+7]
3. A line PQ, inclined at 35° to the V.P., has a 50 mm long front view. The end P is 10 mm from both the principal planes while the end Q is 35 mm above the H.P. Draw the projections of the line and determine its true length and inclinations with the principal planes. Also, locate its traces. [15]

OR

4. A composite plate of negligible thickness is made up of a rectangle with sides 50 mm and 40 mm long and a semicircle on its longer side. The plate is situated in the H.P. with one of its shorter sides parallel to the V.P. Draw its projections. [15]
5. A pentagonal prism, having a base with a 30 mm side and a 70 mm long axis, is resting on a base in the H.P. with an edge of the base perpendicular to the V.P. It is cut by an A.I.P. in such a way that the true shape of the section is a trapezium with one of its parallel sides of 40 mm length, another side of maximum possible length and 60 mm altitude. Draw the projections and true shape of the section. [15]

OR

6. A hollow cylinder, with a 60 mm outside diameter, a 65 mm axis and 8 mm thickness, is resting on its base on the H.P. An A.I.P. inclined at 30° to the H.P., and passing through a point on the axis 12 mm from its top end, cuts the cylinder. Draw its sectional top view, sectional side view and true shape of the section. [15]
7. A horizontal triangular prism, with 60 mm edges at its base and 80 mm in length, completely penetrates a vertical cylinder 60 mm in diameter and 70 mm in length. Draw three views showing curves of intersection if a rectangular face of the prism is inclined at 45 degrees to the HP and if the two axes bisect each other while the plane containing the two axes is perpendicular to the VP. [15]

OR

8. A cylinder of diameter 50 mm and height 75 mm is resting on the ground on its flat end. It is cut by a sectional plane inclined at 30° to the axis of the cylinder and passing through a point on the axis at height of 50 mm from the base. Draw the lateral surface of the bottom part. [15]

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9. Draw the isometric projection of a square slab of side of base 60 mm and altitude 40 mm surmounting a hexagonal pyramid of side 30 mm and axis length 50 mm such that the axes of the two solids are collinear and at least one of the edges of the two sides are parallel. [15]

26 26 26 26 26 26 26 2

10. **OR**
A square prism, side of base 50 mm and height 70 mm rests with its base on the ground such that one of its rectangular faces is parallel to and 10 mm behind PP. The station point is 140 mm in front of PP, 80 mm above the ground plane and lies in a central plane which is 45 mm to the right of the center of the prism. Draw the perspective view of the solid. [15]

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R15

Code No: 121AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May/June - 2017

ENGINEERING DRAWING

(Common to CE, EEE, AE, CEE)

Time: 3 hours

Max Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Construct a vernier scale to read meters, decimeters and long enough to measure up to 8 m, when 1 m is represented by 20 mm. Find R.F. and show a distance of 5.38 m on it.
b) The transverse axis of a hyperbola is 70 mm long. Its double ordinate is 80 mm long and the corresponding abscissa is 50 mm. Construct the hyperbola. [8+7]

OR

- 2.a) In a vernier scale the difference between 1VSD and 1MSD was found to be 1 cm. RF is 1:80. The scale is to measure a distance of 10 m. Construct a scale and show on it a length of 3.09m.
b) Draw two branches of rectangular hyperbola having its vertices 50 mm apart and determine its directrices and foci graphically. [8+7]
3. A line PQ, inclined at 35° to the V.P., has a 50 mm long front view. The end P is 10 mm from both the principal planes while the end Q is 35 mm above the H.P. Draw the projections of the line and determine its true length and inclinations with the principal planes. Also, locate its traces. [15]

OR

4. A composite plate of negligible thickness is made up of a rectangle with sides 50 mm and 40 mm long and a semicircle on its longer side. The plate is situated in the H.P. with one of its shorter side parallel to the V.P. Draw its projections. [15]
5. A pentagonal prism, having a base with a 30 mm side and a 70 mm long axis, is resting on a base in the H.P. with an edge of the base perpendicular to the V.P. It is cut by an A.I.P. in such a way that the true shape of the section is a trapezium with one of its parallel sides of 40 mm length, another side of maximum possible length and 60 mm altitude. Draw the projections and true shape of the section. [15]

OR

6. A hollow cylinder, with a 60 mm outside diameter, a 65 mm axis and 8 mm thickness, is resting on its base on the H.P. An A.I.P. inclined at 30° to the H.P., and passing through a point on the axis 12 mm from its top end, cuts the cylinder. Draw its sectional top view, sectional side view and true shape of the section. [15]
7. A horizontal triangular prism, with 60 mm edges at its base and 80 mm in length, completely penetrates a vertical cylinder 60 mm in diameter and 70 mm in length. Draw three views showing curves of intersection if a rectangular face of the prism is inclined at 45 degrees to the HP and if the two axes bisect each other while the plane containing the two axes is perpendicular to the VP. [15]

OR

8. A cylinder of diameter 50 mm and height 75 mm is resting on the ground on its flat end. It is cut by a sectional plane inclined at 30° to the axis of the cylinder and passing through a point on the axis at height of 50 mm from the base. Draw the lateral surface of the bottom part. [15]

26 26 26 26 26 26 26 2

9. Draw the isometric projection of a square slab of side of base 60 mm and altitude 40 mm surmounting a hexagonal pyramid of side 30 mm and axis length 50 mm such that the axes of the two solids are collinear and at least one of the edges of the two sides are parallel. [15]

26 26 26 26 26 26 26 2

- OR
10. A square prism, side of base 50 mm and height 70 mm rests with its base on the ground such that one of its rectangular faces is parallel to and 10 mm behind PP. The station point is 140 mm in front of PP, 80 mm above the ground plane and lies in a central plane which is 45 mm to the right of the center of the prism. Draw the perspective view of the solid. [15]

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