

Code No: 111AB

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech I Year Examinations, December - 2018

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) Examine the consistency of the following system of equations:

$$12x - y - z = 2; \quad x + 2y + z = 2; \quad 4x - 7y - 5z = 2.$$

[2]

- b) Find A^2 using Cayley-Hamilton theorem, given $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$.

[3]

- c) State Lagrange's Mean Value theorem

[2]

- d) Find the stationary points of $x^3 y^2 (1 - x - y)$.

[3]

- e) $\int_0^a \int_0^{\sqrt{a^2 - y^2}} (x^2 + y^2) dx dy$ Transform to polar coordinates.

[2]

- f) Evaluate $\int_0^\infty x^5 e^{-2x} dx$.

[3]

- g) Find the particular integral of $(D^2 + 4)y = 2e^x \sin x$.

[2]

- h) Find e^k .

[3]

- i) Find $L[te^t]$.

[2]

- j) Find $L^{-1} \left[\frac{1}{s(s+a)} \right]$

[3]

PART - B

(50 Marks)

2. Find the matrix which transforms the matrix $A = \begin{bmatrix} 3 & 1 & 4 \\ 2 & 2 & 4 \\ 4 & 1 & 3 \end{bmatrix}$ to diagonal form. [10]

OR

3. Reduce the quadratic form $6x_1^2 + 3x_2^2 + 3x_3^2 - 4x_1x_2 - 2x_2x_3 + 4x_3x_1$ to canonical form. [10]

- 4.a) Verify Rolle's theorem for the function $f(x) = 2x^3 + x^2 - 4x - 2$ in $[-\sqrt{2}, \sqrt{2}]$. Also find the value of C.

- b) Show that the functions $u = x + y - z$, $v = x - y + z$, $w = x^2 + y^2 + z^2 - 2xyz$ are not independent of one another. Also find the relation among them. [5+5]

OR

- 5.a) Verify Cauchy Mean Value theorem for the functions $f(x) = \log x$, $g(x) = \frac{1}{x}$ in $[1, e]$.

- b) Find the stationary value of $f(x, y, z) = x^2 y^3 z^4$ subject to the condition

$$x + y + z = 5.$$

[5+5]

- 6.a) Change the order of integration in the integral and hence evaluate it

$$\int_0^1 \int_{\sqrt{y}}^{2-y} xy \, dx \, dy.$$

- b) Find the area included between the curve $r = a(\sec \theta + \cos \theta)$ and its asymptote.

[5+5]

OR

- 7.a) Derive the relationship between beta and gamma functions

- b) Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} \, dz \, dy \, dx.$

[5+5]

- 8.a) The rate of disintegration of a radioactive substance is proportional at any instant to the amount of substance present. It is found that 0.5% of the substance disappears in 12 years. What percentage will disappear in 1000 years?

- b) Solve the differential equation $y'' + y = -\cot x$ using the method of variation of parameters.

[5+5]

OR

- 9.a) Find the orthogonal trajectories of the confocal conics $\frac{x^2}{a^2} + \frac{y^2}{b^2 + \lambda} = 1$, where λ is the parameter.

- b) Solve the differential equation $(D^2 - 5D + 6)y = xe^x$.

[5+5]

- 10.a) Find the Laplace transform of $t \sin t \cdot e^t$.

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

[5+5]

OR

- 11.a) State convolution theorem of Laplace transform and use it to find the inverse Laplace transform of $\frac{s}{(s^2 + a^2)^2}$.

- b) Solve the equation $x'' + 2x' + 5x = e^{-t} \sin t$ under the conditions $x(0) = 0, x'(0) = 1$.

[5+5]

R09

Code No: 51006

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech I Year Examinations, December - 2018

COMPUTER PROGRAMMING AND DATA STRUCTURES

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

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Define Algorithm? Write an algorithm to check whether a given number is Palindrome or not.
- b) Explain the Computer Languages. [7+8]
- 2.a) Define Control Statement. Explain the Branching Control Statements.
- b) Explain about Operator Precedence and Associativity. [7+8]
- 3.a) Write in detail about the Static Storage Classes in C with an example.
- b) Write a program to perform Matrix Addition. [7+8]
- 4.a) What is Pointer? Write a program to implement pointer to pointer.
- b) List and Explain String Handling Functions in C. [7+8]
- 5.a) Explain Structures with an example.
- b) Write a C program to implement Unions. [7+8]
- 6.a) Write about various file modes.
- b) Explain about the file handling functions. [7+8]
- 7.a) Write a program to Linear Search method.
- b) Explain about Selection Sort with an example. [7+8]
- 8.a) What is Queue and explain the operations of it.
- b) Write a program to implement Stack. [7+8]

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Code No: 131AF

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech 1 Year I Semester Examinations, December - 2018

ENGINEERING GRAPHICS

(Common to ME, MMT, MSNT)

Time : 3 hours

Max Marks: 75

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

- 1.a) Construct a heptagon with a side of 30 mm using general method.
b) Construct a vernier scale of R.F = 1: 2.5 to show decimeters, centimeters and millimeters. The scale should be capable of reading up to 4 decimeters. Mark on your scale the following distances: (i) 3.23 dm and (ii) 3.65 dm. [15]

OR

- 2.a) The actual length of 500 m is represented by a line of 15 cm on a drawing. Construct a vernier scale to read up to 600 m. Mark on it a length of 568 m.
b) The distance between directrix of an ellipse is 170 mm and the distance between its foci is 70mm. Determine its major and minor axes and construct the ellipse using 'arc of circles' method. [7+8]

- 3.a) Draw the projections of the following points, keeping the distance between the projectors as 25 mm on the same reference line:
(i) Point 'A' on HP and 20 mm behind VP.
(ii) Point 'B' 20 mm below HP and 30 mm behind VP.
b) Draw the projections of a 60 mm long straight line, in the following positions.
(i) Perpendicular to the HP, in the VP and its one end in the HP.
(ii) Inclined at 45° to the VP, in the HP and its one end in the VP. [5+10]

OR

4. A line AB measures 100 mm. The projectors through its VT and the end A are 40 mm apart. The point A is 30 mm below the HP and 20 mm behind the VP. The VT is 10mm above the HP. Draw the projections of the line and determine its HT, inclinations with the HP and VP. [15]

5. Draw the projections of a cylinder, base 30 mm diameter and axis 40 mm long, resting with a point of its base circle on HP such that the axis is making an angle of 30° with HP and its top view perpendicular to VP. [15]

OR

6. Draw the projections of a cone, base 75 mm diameter and axis 100 mm long, lying on the ground on one of its generators with the axis parallel to the VP. Assuming the cone to be resting on its base on the ground, draw its projections. [15]

7. A cube of 45 mm side rests with a face on HP such that one of its vertical faces is inclined at 30° to VP. A sectional plane parallel to VP cuts that cube at a distance of 15 mm from the vertical edge nearer to the observer. Draw its top and sectional front views. [15]

OR

8. A cone, base 50 mm diameter and axis 60 mm long, rests with its base on HP. A section plane perpendicular to VP and inclined at 45° to HP bisects the axis of the cone. Draw the development of lateral surface of the remaining portion of the cone. [15]

9. Draw the isometric view for the figure 1 shown below front and top views. All dimensions are in mm. [15]

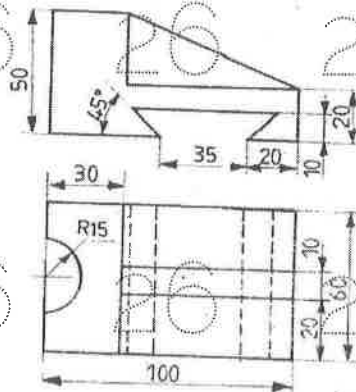


Figure: 1

OR

10. Draw (a) Front View (b) Top View (c) Side View (Figure 2). All dimensions are in mm. [15]

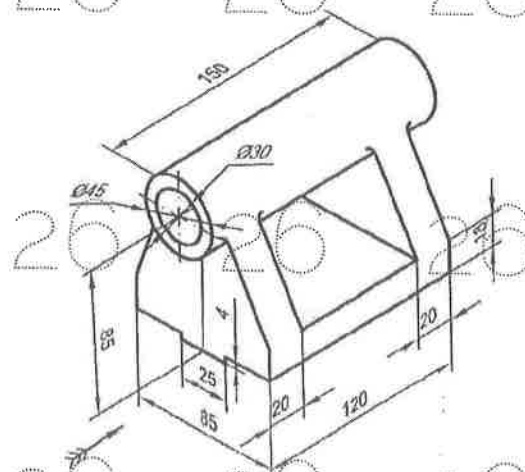


Figure: 2

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Code No:131AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech I Year I Semester Examinations, December - 2018

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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

Time: 3 hours

Max. Marks: 75

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

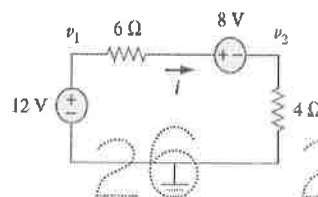
Part A is compulsory which carries 25 marks. Answer all questions in Part A.

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) For the circuit shown in figure 1. Find the relation between
- v_1
- and
- v_2
- . [2]

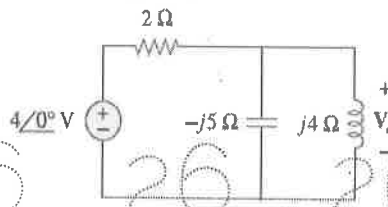
**Figure: 1**

- b) Explain Source transformation with the help of neat diagrams. [3]
 c) Write the statement of Super Position Theorem. [2]
 d) What is Q-Factor and explain its significance? [3]
 e) How does a diode appear as in its forward region of its characteristic? Explain. [2]
 f) How does junction capacitance of a linearly graded junction varies with the applied reverse voltage V_R ? [3]
 g) Differentiate between the terms h_{FE} and h_{fe} . Write the relationship between them. [2]
 h) Draw the h-parameters model of transistor. [3]
 i) Give different regions of operation of JFET. [2]
 j) What is pinch-off voltage? Give its equation. [3]

PART - B

(50 Marks)

- 2.a) Find
- V_o
- in the circuit, shown in figure 2.

**Figure: 2**

- b) Define and give symbols of the following:
 i) Dependent sources
 ii) Independent Sources
 iii) Practical Sources
 iv) Ideal Sources

[6+4]

OR

- 3.a) If $R_{eq}=50\ \Omega$, in the circuit shown in figure 3 find R ?

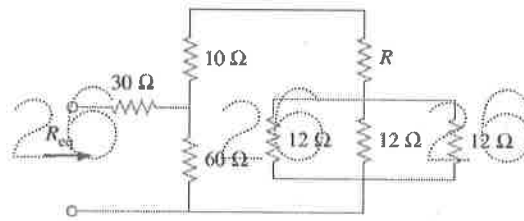


Figure: 3

- b) Calculate V_o and I_o in the circuit shown in figure 4.

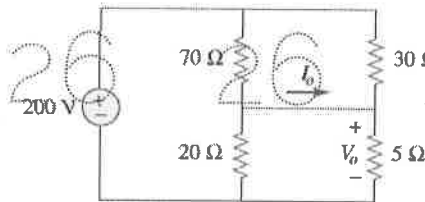


Figure: 4

[5+5]

- 4.a) A parallel Resonant circuit has $R=5K\Omega$, $L=8mH$, and $C=60\mu F$. Determine:
i) Resonant frequency
ii) The band width
iii) The Quality Factor

- b) Solve for ' i ' using Norton's Theorem in the circuit shown in figure 5.

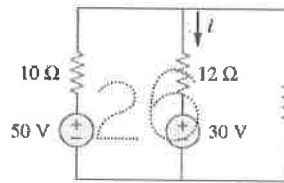


Figure: 5

[5+5]

OR

- 5.a) Find v_o using super position theorem in the circuit shown in figure 6.

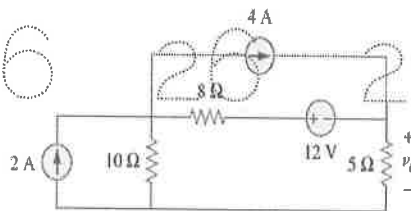


Figure: 6

- b) Find the Maximum power that can be delivered to R in the circuit shown in figure 7.

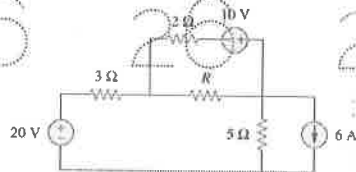


Figure: 7

[5+5]

- 6.a) Compare C, L, L-Section, Π -Section (CLC and CRC) Filters in all respects.
b) Explain the operation of Half wave Rectifier with the help of neat diagrams. [6+4]

- 7.a) Obtain different equivalent Circuits of a PN Junction diode.
b) Explain the VI characteristics of PN Junction diode with neat diagrams and explain. What is Static Resistance and Dynamic Resistance? [5+5]

8. Draw CE Configuration with Voltage – divider bias and then analyze Q - point and stability factors. [10]

9. Illustrate the input and output characteristics of BJT in three configurations. [10]

- 10.a) Compare BJT and JFET devices in all respects.
b) Obtain the expression for the pinch off voltage V_p in case of n-channel JFET. [5+5]

11. Describe the principle of operation and V-I characteristics with the help of energy band diagrams. Highlight negative resistance region on the V-I characteristics. [10]