

Code No: 131AF

R16**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year I Semester Examinations, May – 2018****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 a hypocycloid for a rolling circle of diameter 75 mm and a base circle of 250 mm diameter. Draw a tangent and a normal at any point on the curve.
b) A cricket ball thrown reaches a maximum height of 9 m and falls on the ground at a distance of 25 m from the point of projection. Draw the path of the ball. What is the angle of projection? [7+8]

OR

- 2.a) A plot of ground is in the shape of a rectangle of size 100×60 m. Inscribe an elliptical lawn in it.
b) The major and minor axes of an ellipse are 80 mm and 50 mm respectively. Construct the curve. [7+8]

3. The top view and front view of a line AB are 70 mm and 80 mm respectively. The end A is 18 mm above HP and 22 mm in front of VP. The end B is in the 3rd quadrant. Draw the projections, if the line is 100 mm long. Also find its inclinations with the principal planes. [15]

OR

4. A square lamina ABCD of 40 mm side rests on the corner C such that the diagonal AC appears to be at 45° to the VP. The two sides BC and CD containing the corner C make equal inclinations with the HP. The surface of the lamina makes 30° with the HP. Draw its top and front views. [15]

5. A pentagonal pyramid of 25 mm side of base and 50 mm axis length rests on HP on one of its slant edges. Draw its projections when the axis is inclined to VP at 45° . [15]

OR

6. One of the body diagonals of a cube of 40 mm edge is parallel to HP and inclined at 60° to VP. Draw the projections of the cube. [15]

7. A pentagon prism of 25 mm base edges and 50 mm long, resting on its base with an edge of base at 45° to the VP. The prism is cut by a section plane V.T. inclined at 30° to the HP and passes through a point 25 mm from the base along its axis. Develop its lateral surface of the truncated prism. [15]

OR

8. A cone of diameter 60 mm and height 80 mm is cut by a section plane such that the plane passes through the mid-point of the axis and tangential to the base circle. Draw the development of the lateral surface of the bottom portion of the cone. [15]

9. Figure 1 shows two views of an object. Draw the isometric view of the object. All dimensions are in mm. [15]

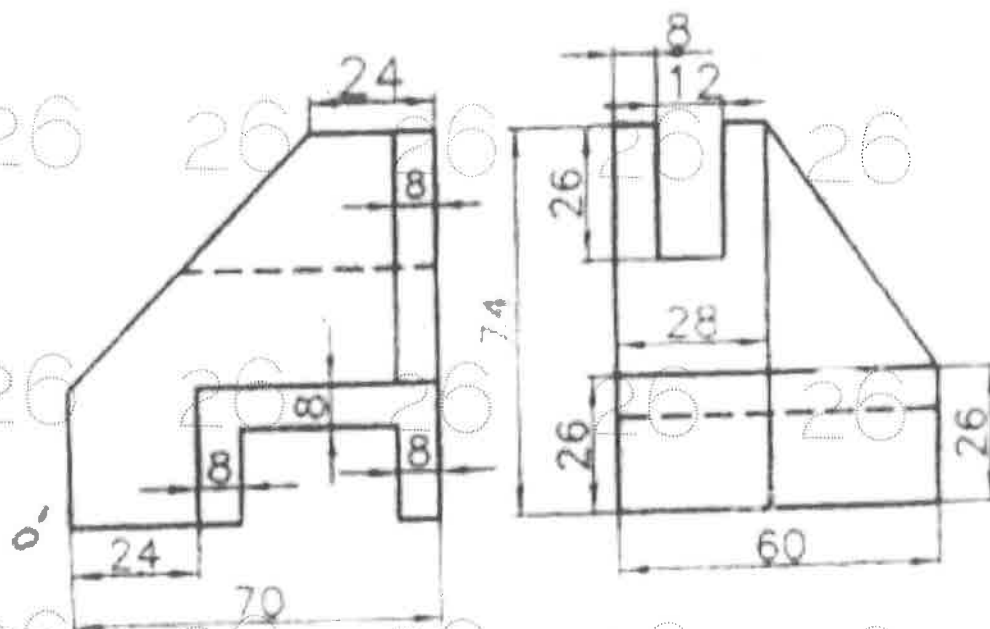


Figure: 1
OR

10. Draw the front view, top view and side view of the object whose isometric view is shown in the Figure 2 below (All dimensions are in mm). [15]

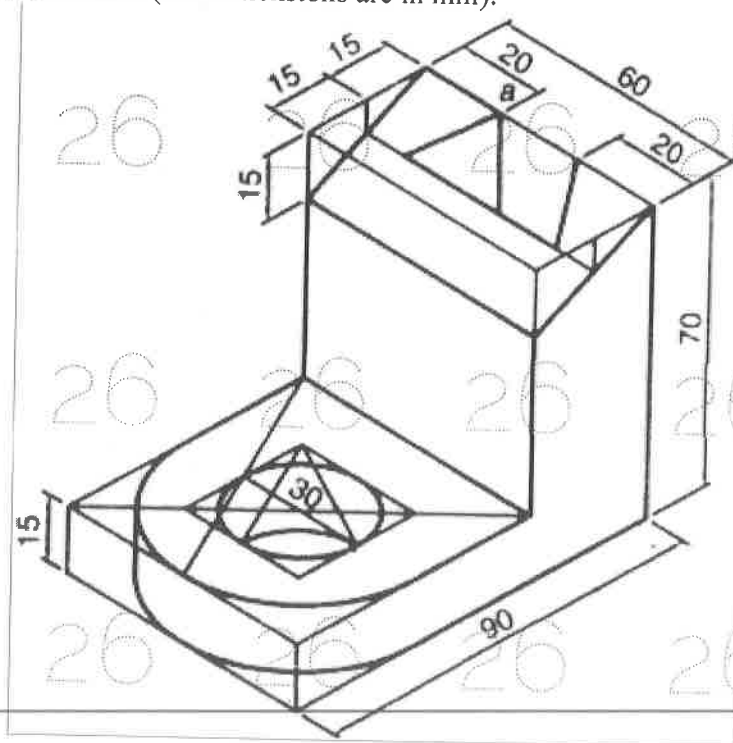


Figure: 2

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Code No: 131AK

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, May - 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) Define dependent sources. [2]
- b) The essential component of a toaster is an electrical element (a resistor) that converts electrical energy to heat energy. How much current is drawn by a toaster with resistance 15Ω at 110 V ? [3]
- c) What is the condition for maximum power transfer in ac circuits? [2]
- d) Derive the expression for resonant frequency. [3]
- e) Define reverse break down voltage of a diode. [2]
- f) Derive an expression for the average output voltage of a full wave rectifier. [3]
- g) Draw the high frequency model of a transistor. [2]
- h) In a BJT, the emitter current is 12 mA and the emitter current is 1.02 times the collector current. Find the base current. [3]
- i) Why FET is called unipolar device? [2]
- j) What are the special features of FET? [3]

PART-B

(50 Marks)

- 2.a) Differentiate between active and passive elements.
- b) Obtain the equivalent resistance for the circuit in figure 1 and use it to find current i . [4+6]

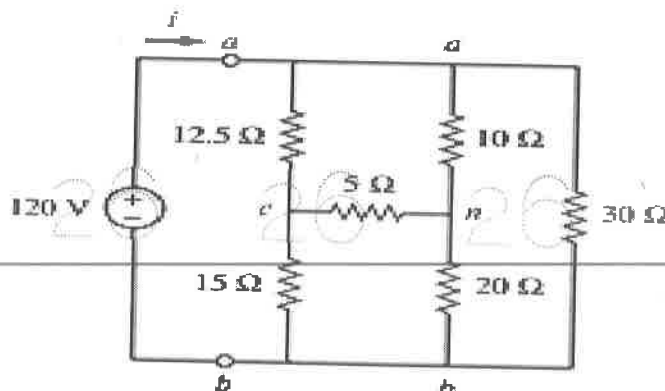


Figure: 1

OR

- 3.a) Define impedance, susceptance and admittance with examples.
 b) Using mesh analysis, find I_o in the circuit shown in figure 2.

[4+6]

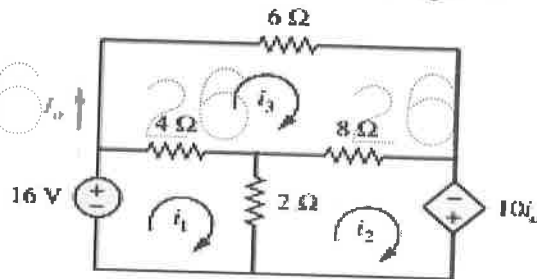


Figure: 2

- 4.a) The Q factor of a RLC series circuit is 5 at a resonance frequency of 1 KHz. Assuming the power dissipation of 250W, when the current drawn is 1A, find the circuit parameters.
 b) Using superposition, find V_o in the circuit shown in figure 3.

[5+5]

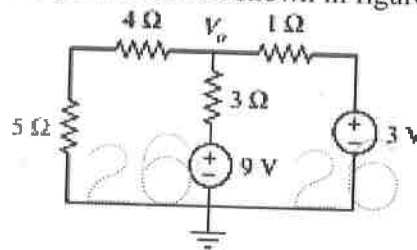


Figure: 3

OR

- 5.a) A $5 \mu\text{F}$ condenser is connected in series with a coil having inductance of 50mH. Determine the frequency of resonance, the resistance of the coil if a 50V source causing a current of 10mA is connected. What is the Q factor of the coil?
 b) Use Norton's theorem to find V_o in the circuit shown in figure 4.

[4+6]

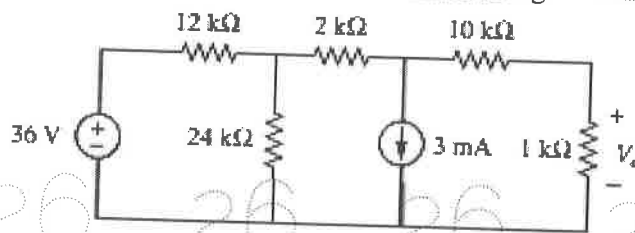


Figure: 4

- 6.a) Draw the V – I characteristics of a silicon diode, write an expression for diode current and discuss how cut in voltage changes with temperature.
 b) Draw the circuits of a full wave rectifier using 2-diodes and 4-diodes. Discuss the relative merits and demerits.

[5+5]

OR

- 7.a) Define diffusion capacitance in a P-N junction diode and discuss its dependence on diode biasing.
 b) Derive expressions for ripple factor and efficiency of rectification for a full wave rectifier.

[5+5]

- 8.a) Derive expressions for voltage gain, input-resistance and current gain for an emitter follower.
- b) In the Silicon Transistor circuit shown in figure 5, find the maximum base resistance R_B to drive the Transistor into saturation. [5+5]

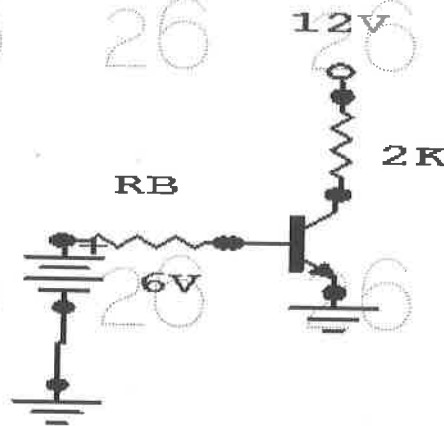


Figure: 5

OR

- 9.a) Discuss the need for biasing a transistor. Briefly explain about self biasing.
- b) Explain how h-parameters can be determined from the static input and output characteristics. [5+5]

- 10.a) Discuss the characteristic differences between a BJT and a FET. Draw a diagram depicting the structure of a N-channel FET and identify the various terminals and the biasing voltages.

- b) Explain how the pinch off voltage can be modified without changing the physical structure of a JFET. [5+5]

OR

- 11.a) Explain the operation of a FET with a neat diagram and V-I characteristics.

- b) An N-channel JFET has a pinch voltage of $-4.5V$ and $I_{DSS} = 9mA$ at what value of V_{GS} will I_{DS} equal to $3mA$? What is its g_m at this I_{DS} . [5+5]

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Code No: 121AB

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May - 2018

MATHEMATICS - I

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

- 1.a) If A and B are square symmetric matrices of same order then prove that $AB + BA$ is symmetric. (25 Marks) [2]
- b) If one of Eigen vectors of $\begin{bmatrix} 2 & 2 & 0 \\ 2 & 5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ is $\begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}$, then find the corresponding Eigen value. [3]
- c) Find the value of c in Roll's theorem for $f(x) = \sin x$ in $(0, \pi)$. [2]
- d) Find the stationary points of the following functions $x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$. [3]
- e) Evaluate $\int_0^{\infty} x^2 e^{-x^4} dx$ [2]
- f) Evaluate $\int_0^2 \int_0^{x^2} y dx dy$ [3]
- g) Solve the differential equation $(D^2 - 4D + 13)y = 0$ [2]
- h) Evaluate $\frac{1}{D^2 - 1}(x^2 + x)$. [3]
- i) Find $L[te^t]$ [2]
- j) Find $f(t)$, if $L[f(t)] = \frac{1}{(s-1)^2}$. Hence find $L^{-1}\left[\frac{1}{s(s-1)^2}\right]$ using any theorem of Laplace transforms. [3]

PART-B

(50 Marks)

- 2.a) Test for the consistency and hence solve the system.
 $x + y + z = 6, x - y + 2z = 5, 3x + y + z = 8, 2x - 2y + 3z = 7$
- b) If $\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_n$ the Eigen values of a non singular matrix A of order 'n' then prove that the Eigen values of A^{-1} are $\frac{1}{\lambda_1}, \frac{1}{\lambda_2}, \frac{1}{\lambda_3}, \dots, \frac{1}{\lambda_n}$ [5+5]

OR

26 3. Reduce the quadratic form $6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4xz$ by orthogonal reduction to the canonical form. [10]

4.a) Verify Lagrange's mean value theorem for $f(x) = \log_e x$ in $[1, e]$.

b) Find the maximum and minimum values of $xy + \frac{a^3}{x} + \frac{a^3}{y}$. [5+5]

26 26 26 26 OR 26 26 26 26
5. If $x + y = 2e^\theta \cos \phi$, $x - y = 2ie^\theta \sin \phi$, find $\frac{\partial(x, y)}{\partial(\theta, \phi)}$ and verify that $JJ^1 = 1$ [10]

6.a) Evaluate $\int_0^a x^4 \sqrt{a^2 - x^2} dx$

26 26 26 26 b) Change the order of integration and evaluate $\int_0^a \int_{x^2/a}^{2a-x} xy^2 dy dx$. [5+5]
OR

7.a) Prove that $\int_0^1 (1-x^n)^{1/n} dx = \frac{1}{n} \left(\Gamma\left(\frac{1}{n}\right) \right)^2$
 $2\Gamma\left(\frac{2}{n}\right)$

26 26 26 26 b) Evaluate $\int_0^a \int_0^{\sqrt{a^2 - y^2}} (x^2 + y^2) dx dy$ by changing into polar coordinates. [5+5]

8.a) Find the orthogonal Trajectory of the family of $ay^2 = x^3$.

26 b) Solve the differential equation $(D^2 + 9)y = \cos 3x + \sin 2x$. [5+5]
OR

9.a) If a population is increasing exponentially at the rate of 2% per year. What will be the percentage increase over a period of 10 years?

b) Solve by the method of variation of Parameters $\frac{d^2 y}{dx^2} + y = \sec x$ [5+5]

26 10.a) Evaluate $\int_0^\infty \frac{\sin t}{t} dt$ 26 26 26 26

b) Find the inverse Laplace transform of $\log\left(\frac{s+1}{s-1}\right)$ [5+5]

OR

11. Solve the differential equation $(D^2 + D)y = t^2 + 2t$, using Laplace transform given that

26 $y(0) = 4$, $\frac{dy(0)}{dt} = 2$. [10]

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Code No: 111AB

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May - 2018

MATHEMATICS - I

(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, MCT, ETM, 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) If A and B are square symmetric matrices of same order then prove that $AB + BA$ is symmetric. [2]

b) If one of Eigen vectors of $\begin{bmatrix} 2 & 2 & 0 \\ 2 & 5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ is $\begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}$, then find the corresponding Eigen value.

c) Find the value of c in Roll's theorem for $f(x) = \sin x$ in $(0, \pi)$. [3]

d) Find the stationary points of the following functions $x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$. [2]

e) Evaluate $\int_0^{\infty} x^2 e^{-x^4} dx$. [3]

f) Evaluate $\int_0^2 \int_0^{x^2} y dx dy$. [2]

g) Solve the differential equation $(D^2 - 4D + 13)y = 0$. [3]

h) Evaluate $\frac{1}{D^2 - 1}(x^2 + x)$. [2]

i) Find $L[te^t]$. [3]

j) Find $f(t)$, if $L[f(t)] = \frac{1}{(s-1)^2}$. Hence find $L^{-1}\left[\frac{1}{s(s-1)^2}\right]$ using any theorem of Laplace transforms. [2]

PART-B

(50 Marks)

2.a) Test for the consistency and hence solve the system.

$$x + y + z = 6, x - y + 2z = 5, 3x + y + z = 8, 2x - 2y + 3z = 7$$

b) If $\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_n$ the Eigen values of a non singular matrix A of order 'n' then prove

that the Eigen values of A^{-1} are $\frac{1}{\lambda_1}, \frac{1}{\lambda_2}, \frac{1}{\lambda_3}, \dots, \frac{1}{\lambda_n}$ [5+5]

OR

3. Reduce the quadratic form $6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4xz$ by orthogonal reduction to the canonical form. [10]

4.a) Verify Lagrange's mean value theorem for $f(x) = \log_e x$ in $[1, e]$.

b) Find the maximum and minimum values of $xy + \frac{a^3}{x} + \frac{a^3}{y}$. [5+5]

5. If $x + y = 2e^\theta \cos \phi$, $x - y = 2ie^\theta \sin \phi$, find $\frac{\partial(x, y)}{\partial(\theta, \phi)}$ and verify that $JJ^1 = 1$ [10]

6.a) Evaluate $\int_0^a x^4 \sqrt{a^2 - x^2} dx$

b) Change the order of integration and evaluate $\int_0^a \int_{x^2/a}^{2a-x} xy^2 dy dx$. [5+5]

OR

7.a) Prove that $\int_0^1 (1-x^n)^{1/n} dx = \frac{1}{n} \left(\Gamma\left(\frac{1}{n}\right) \right)^2$
 $2\Gamma\left(\frac{2}{n}\right)$

b) Evaluate $\int_0^a \int_0^{\sqrt{a^2 - y^2}} (x^2 + y^2) dx dy$ by changing into polar coordinates. [5+5]

8.a) Find the orthogonal Trajectory of the family of $ay^2 = x^3$.

b) Solve the differential equation $(D^2 + 9)y = \cos 3x + \sin 2x$ [5+5]

OR

9.a) If a population is increasing exponentially at the rate of 2% per year. What will be the percentage increase over a period of 10 years?

b) Solve by the method of variation of Parameters $\frac{d^2 y}{dx^2} + y = \sec x$ [5+5]

10.a) Evaluate $\int_0^\infty \frac{\sin t}{t} dt$

b) Find the inverse Laplace transform of $\log\left(\frac{s+1}{s-1}\right)$ [5+5]

OR

11. Solve the differential equation $(D^2 + D)y = t^2 + 2t$, using Laplace transform given that $y(0) = 4$, $\frac{dy(0)}{dt} = 2$. [10]

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Code No: 51006

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, May - 2018

COMPUTER PROGRAMMING AND DATA STRUCTURES

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

Time: 3 hours

Max. Marks: 75

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

- 1.a) Explain the symbols of Flow chart.
b) Differentiate between compiler and interpreter. [7+8]
- 2.a) Write a program to calculate the sum of cubes of first n numbers.
b) Explain the different types of data types used in C. [7+8]
- 3.a) Explain about the towers of Hanoi problem with an example.
b) Write a program to merge two integer arrays. Also display the merged array in reverse order. [7+8]
- 4.a) Explain the command line arguments with an example.
b) Write a program to copy a characters of a string from mth position in another string. [7+8]
- 5.a) Explain about the enumerated datatypes used in C with an example.
b) Write a program to calculate the area of one of the geometric figure-circle, rectangle or a triangle. Write a function to calculate the area. The function must receive one parameter which is a structure that contains the type of figure and the size of the components needed to calculate the area must be a part of a union. Note that a circle requires just one component, rectangle requires two components and a triangle requires the size of three components to calculate the area. [7+8]
- 6.a) Write a program to read the contents from the file called adc.txt, counts the no.of characters, no.of lines and no.of white spaces and output the same.
b) Explain the following file operations along with syntax and examples:
i) fopen()
ii) fclose()
iii) fscanf()
iv) fprintf()
v) fgets() [7+8]
- 7.a) Sort the following list of elements by using a Quick sort
35, 40, 45, 50, 60, 30, 25, 20, 15.
b) Explain the binary search with an example. [7+8]
- 8.a) Explain the operations of singly linked list with an example.
b) Write a program to input two stacks and compare their contents. [7+8]

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