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R-15

Code: 5G311

I B.Tech. I Semester Supplementary Examinations November 2019

Electronic Devices and Circuits-I

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

- 1. a) Compare the characteristics of Capacitor and Inductors with relevant diagrams. 7M
- b) Interpret the types of Resistors and capacitors with neat diagrams. 7M

OR

- 2. a) Interpret symbolic representations of the following. 8M
 - i) DC voltage source
 - ii) AC voltage source
 - iii) Dependent current source
 - iv) Variable resistor.
- b) Differentiate ideal, practical voltage and current sources. 6M

UNIT-II

- 3. a) State and prove Ohm's law with an example. 6M
- b) What is the concept of super node and super mesh? Explain. 8M

OR

- 4. a) Define and prove Kirchhoff's Current law with an example. 7M
- b) Label and prove Kirchhoff's Voltage law with an example. 7M

UNIT-III

- 5. a) Derive the expression for transition capacitance (C_T) of PN-junction diode. 6M
- b) Discuss about breakdown mechanisms in semiconductor diodes. 8M

OR

- 6. a) Explain about the V-I characteristics of Zener diode. 8M
- b) A Silicon diode has reverse saturation current of $9.2\mu A$ at the room temperature of 270K. Calculate the reverse saturation current at 400K. 6M

UNIT-IV

- 7. a) Define the following terms with expressions 8M
 - i) PIV
 - ii) Average DC voltage
 - iii) RMS Current
 - iv) Ripple factor.
- b) Distinguish between Half wave and full wave rectifier rectifiers. 6M

OR

- 8. With neat sketch, explain the operation of full wave rectifier with Induction filter and derive the expression for ripple factor and efficiency. 14M

UNIT-V

- 9. a) Distinguish between CB, CC and CE configurations of BJT. 7M
- b) Write the applications of BJT. 7M

OR

- 10. a) Explain the input and output characteristics of CC configuration with neat sketches. 8M
- b) Derive the relationship between β_{ac} and β_{dc} . 6M

Code: 5G513

I B.Tech. I Semester Supplementary Examinations November 2019

Engineering Drawing-I
(Common to EEE, ECE, CSE & IT)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Bisect an angle AOB. i). Angle AOB = 73° ii). Angle AOB = 137° . 7M
b) Inscribe a square in a circle of Radius 20 MM. 7M

OR

2. a) Divide a circle of 30 mm radius in to 8 equal parts 7M
b) Construct a hexagon of side length 30 mm 7M

UNIT-II

3. The major axis of an ellipse is 150 mm long and the minor axis is 100 mm long. Find the foci and draw the ellipse by arcs of circles method. Draw a tangent to the ellipse at a point on it 25 mm above the major axis. 14M

OR

4. Draw an ellipse having the major axis of 70 mm and the minor axis of 40 mm by concentric circle method. Draw a tangent to it at any convenient point. 14M

UNIT-III

5. Construct a hypocycloid, rolling circle of 55 mm diameter and directing circle of 125mm diameter. Draw a tangent to it at a point 40 mm from the center of directing circle. 14M

OR

6. Draw an epicycloid if a circle of 40 mm diameter rolls outside another circle of 120mm diameter for one revolution 14M

UNIT-IV

7. a) Draw the projections of the following points on a common reference line. Take 30mm distance between the projections.
i) A, 35mm above the H.P. & 25mm in front of V.P.
ii) B, 40mm below the H.P & 15mm behind the V.P.
iii) C, 50mm above H.P & 25mm behind the V.P
iv) D, 45mm below the H.P & 20mm in front of V.P. 8M
b) Draw the projections of a straight line 70 mm long when it is parallel to both HP and VP. It is 15 mm in front of VP and 40 mm above HP. 6M

OR

8. a) A point 35 mm above XY line is the plane view of two points P & Q the elevation of P is 40 mm above the H.P. While that of the point Q is 45 mm below the H.P. Draw the projections of the points and state their positions with reference to the principal planes on the quadrant in which they lie. 7M
b) A point A is 25 below the HP and lies in the third quadrant. Its shortest distance from XY is 45. Draw its projections. 7M

UNIT-V

9. A line AB, 90 mm long, is inclined at 30° to the H.P. Its end A is 12 mm above the H.P. and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the top view of AB and determine its inclination with the V.P. 14M
OR
10. A line CD of 100 long, is inclined at 45° to HP and 30° to VP. Its end A is on HP and 25 in front of VP. Draw the projections. 14M

Code: 5GC14

I B.Tech. I Semester Supplementary Examinations November 2019

Engineering Mathematics-I

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. Solve $x \frac{dy}{dx} + y = x^3 y^6$ 14M

OR

2. a) Find the Orthogonal trajectories of the family of curves $y = ax$ 7M

b) $\frac{dy}{dx} + xy = e^{-x^2/2}$ 7M

UNIT-II

3. a) Solve $(D^2 + 3D + 2)y = e^x$ 7M

b) Solve $(D^2 + 4)y = \sin x$ 7M

OR

4. Solve $(D^2 + 4D + 3)y = e^{-x} \sin x + xe^{3x}$ 14M

UNIT-III

5. a) Verify Rolle's Theorem for $f(x) = e^x(\sin x - \cos x)$ in $\left(\frac{f}{4}, \frac{5f}{4}\right)$ 7M

b) Expand $\sin x$ in powers of $\left(x - \frac{f}{2}\right)$ 7M

OR

6. a) Test for convergence of the series $\sum \frac{n^3}{3^n}$ 7M

b) Discuss the convergence of the series $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{4}} + \dots$ 7M

UNIT-IV

7. If $u = x^2 - 2y, v = x + y + z, w = x - 2y + 3z$, then find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$ 14M

OR

8. If $u = x^2 - y^2, v = 2xy$ and $x = r \cos \theta, y = r \sin \theta$ then find $\frac{\partial(u, v)}{\partial(r, \theta)}$ 14M

UNIT-V

9. Trace the curve $r = a(1 - \cos \theta)$ 14M

OR

10. Trace the curve $y^2(a - x) = x^2(a + x)$ 14M

Code: 5GC13

I B.Tech. I Semester Supplementary Examinations November 2019

Engineering Physics
(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Derive an expression for acceptance angle of an optical fiber. How it is related to numerical aperture? 8M
- b) Write a note on applications of optical fibers in the field of sensors and medicine. 6M

OR

2. a) Draw the block diagram of fiber optic communication system and explain the function of each block. 8M
- b) What is meant by diffraction of light? Describe the formation of grating spectrum. 6M

UNIT-II

3. a) State and explain miller indices. 10M
- b) Sketch the crystal planes and directions of Miller Indices (110), (101), [200], [211] 4M

OR

4. a) What are the various methods for producing ultrasonics? 7M
- b) Explain the applications of ultrasonics in non-destructive testing materials. 7M

UNIT-III

5. a) Discuss the origin of formation of energy bands 10M
- b) Explain the classification of metals, semiconductors and insulators based on band theory. 4M

OR

6. a) Derive Schrodinger's one dimensional time independent wave equation for a free particle. 9M
- b) Explain the physical significance of wave function. 5M

UNIT-IV

7. a) Write the direct and indirect band gap semiconductors and give their sketches. 7M
- b) Explain the construction and working of light emitting diode (LED) and describe its advantages. 7M

OR

8. Outline the following 14M
- i. Magnetic Susceptibility
 - ii. Magnetic permeability
 - iii. Derive the relation between B,H and M
 - iv. Photodiode

UNIT-V

9. Describe the basic principles of Nano materials causing the change in its properties. 14M

OR

10. a) Describe the differences between type-1 and type-2 superconductors with neat diagrams. 8M
- b) Write a note on flux quantization. 6M

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Code: 5G111

I B.Tech. I Semester Supplementary Examinations November 2019

Problem Solving Techniques and Introduction to C Programming

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

1. a) Give a comparison between system and application softwares with examples. 7M
 b) Write an algorithm to find the greatest number among the three given numbers. 7M

OR

2. a) Discuss about different computer languages with examples. 7M
 b) Describe the process of program development. 7M

UNIT-II

3. a) Describe the structure of a C program with example 7M
 b) What is the purpose of the comma operator? Within which control statement does the comma operator usually appear? 7M

OR

4. Explain with examples the different types of operators used in C. 14M

UNIT-III

5. a) Differentiate between if statement and if-else statement with suitable examples and proper syntax. 7M
 b) Give the control flow diagram of the *for loop*. How is the execution of 'for' loop proceeds? 7M

OR

6. a) Discuss selection statements with suitable examples for each. 7M
 b) Write a C program to check whether a given number is Palindrome or not 7M

UNIT-IV

7. a) Define an array. Write a program to find the largest and smallest element in a given array 7M
 b) Write a 'C' program to read a string from keyboard and print the numbers of uppercase letters, lower case letters, digits, spaces and special characters. 7M

OR

8. a) What is meant by arrays of strings? When it will be used? Explain with a 'C' program. 7M
 b) Write a C program that reads characters from the keyboard and writes them to a disk file until the user types a dollar sign. 7M

UNIT-V

9. a) What is the scope of variables of type extern, auto, register and static? Explain with example. 10M
 b) What is meant by user defined function? Explain with an example C program 4M
10. a) Explain about calling function, called function and actual and formal arguments. 7M
 b) Compare call by value and call by reference and explain using suitable example 7M
