Hall Ticket Number :										

R-20

Code: 20A411T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

Basic Electrical and Electronics Engineering

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two mark.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

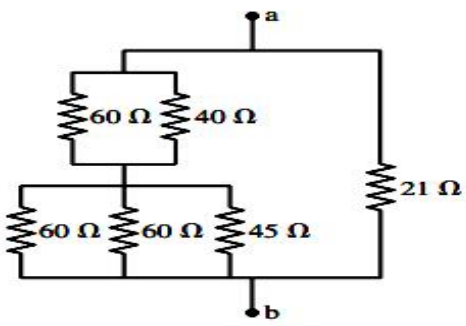
(Compulsory question)

		CO	BL
1.	Answer ALL the following short answer questions (5 X 2 = 10M)		
a)	Define Conductance and mention the unit of conductance.	1	L1
b)	Write the Statement of Norton's Theorem.	2	L1
c)	What are the Types of Semiconductor diodes?	3	L1
d)	Write the differences between Half wave rectifier and Full wave rectifier?	4	L1
e)	Sketch the symbols of n-p-n and p-n-p transistors	5	L4

PART-B

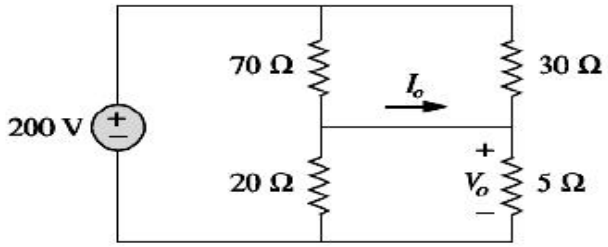
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT–I			
2.	a)	Differentiate between Active and Passive elements.	6M	1	L2
	b)	Describe the construction and operation of Function Generator with neat diagram.	6M	1	L2
		OR			
3.	a)	Define and give the symbols of the following i) Dependent Sources ii) Independent Sources iii) Ideal Sources	6M	1	L1
	b)	Define Inductance and derive the Energy stored in the Inductor.	6M	1	L1
		UNIT–II			
4.	a)	Find the Equivalent Resistance between terminal a and b of the circuit shown in below.			



6M 2 L3

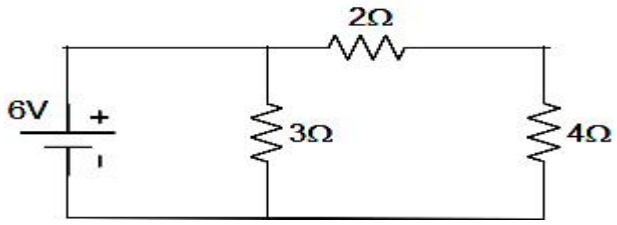
b) Calculate V_0 and I_0 in the following circuit.



6M 2 L3

OR

5. a) State Kirchhoff Laws .Find the current flowing through the 3Ω resistor in the following circuit.



6M 2 L3

b) State and Explain Maximum Power Transfer theorem. 6M 2 L1

UNIT–III

6. a) Explain the VI characteristics of PN Junction diode with neat diagrams and explain. What is Static Resistance and Dynamic Resistance? 8M 3 L2

b) What is Static Resistance and Dynamic Resistance? 4M 3 L1

OR

7. a) Obtain different equivalent Circuits of a PN Junction diode. 4M 3 L3

b) Define Diffusion Capacitance of a P-N junction diode. Obtain the expression for the same. 8M 3 L1

UNIT–IV

8. a) Derive expressions for ripple factor and efficiency of rectification for a full wave rectifier. 6M 4 L6

b) Explain the operation of Half wave Rectifier with Capacitor filter. 6M 4 L2

OR

9. a) A Half wave rectifier has a load Resistance of 4KΩ.If the diode and secondary of the Transformer have a total resistance of 800 Ω and the input voltage has an ac signal of 220 V (Peak value).Determine i) Peak, average and R.M.S value of the current flowing ii) DC Power output iii) AC power input iv) rectification efficiency v) ripple factor. 8M 4 L3

b) Draw the circuit diagram of Full wave Bridge rectifier circuit and explain the operation. 4M 4 L1, L2

UNIT–V

10. a) Outline the input-output characteristics of a transistor in CE configuration. 6M 5 L2

b) Define the following terms
(i) Base width modulation (ii) Emitter Efficiency (iii) Active Region 6M 5 L2

OR

11. a) Sketch typical CB input characteristic curves for an NPN Transistor. Label all variables. 6M 5 L4

b) Explain the construction and operation of n-p-n transistor with neat sketches 6M 5 L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A312T-A

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

Engineering Drawing

(Common to CE, ECE)

Max. Marks: 70 Time: 3 Hours

Answer *five full* questions by choosing one question from each unit (5 x 14 = 70 Marks)

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		Marks	CO	BL
	UNIT–I			
1.	Construct an ellipse, when the distance of the focus from the directrix is equal to 65mm and eccentricity is 2/3. Also draw tangent and normal to the curve at a point 40mm from the directrix.	14M	CO1	L1, L2
	OR			
2.	Draw a hypocycloid of a circle of diameter 50 mm, which rolls inside a circle of dia180mm for one revolution. Also, draw a tangent and a normal to the hypocycloid at a point 50 mm from the center of the directing circle.	14M	CO1	L1, L2
	UNIT–II			
3.	A 50 mm long line AB is perpendicular to the V.P and 40 mm above the H.P. one end of the line is 10 mm in front of the V.P. Draw its projections and locate the traces.	14M	CO2	L1, L2, L4
	OR			
4.	Line AB, 65mm long has its end A 20mm above H.P. and 25mm in front of VP. The end B is 40mm above H.P. and 65mm in front of V.P. Draw the projections of AB and show its inclination with H.P. and V.P.	14M	CO2	L1, L2, L4
	UNIT–III			
5.	A rectangle ABCD of 50×30 mm side has a corner on the H.P. and 20 mm in front of the V.P. The resting corner containing longest edge of the rectangle is inclined at 30^o to H.P and parallels to V.P. Draw its projections.	14M	CO3	L2, L3
	OR			
6.	A pentagonal plane of side 30 mm rests on an edge in the V.P. with its surface perpendicular to the H.P. The plane is inclined at 30^0 to V.P. Draw the projections of the plane.	14M	CO3	L2, L3

UNIT–IV

7.	A hexagonal pyramid of base edge 30 mm and axis 60 mm, has a triangular face on the ground and the axis parallel to the V.P. Draw its projections.	14M	CO4	L2, L4

OR

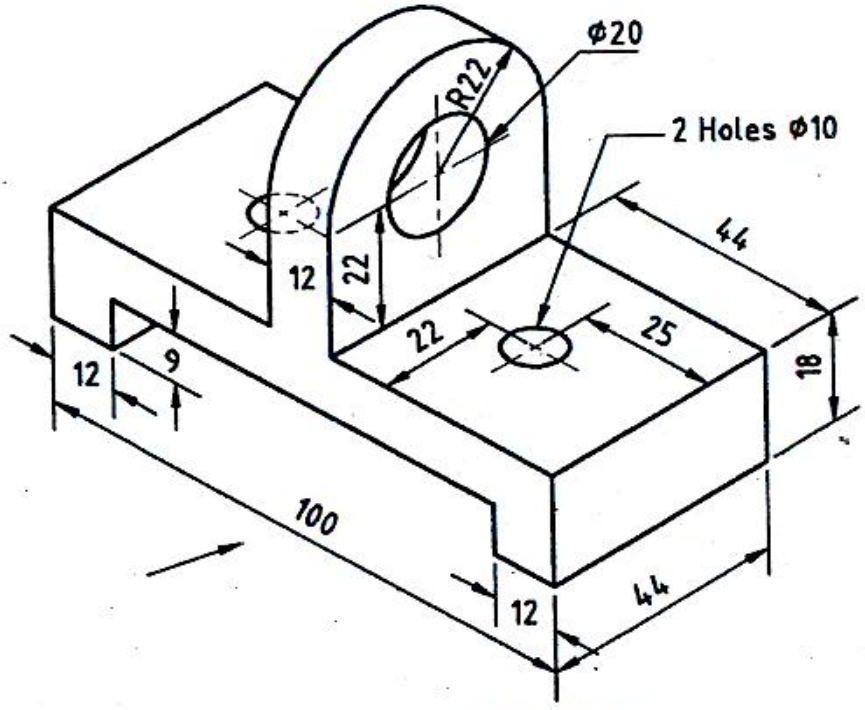
8.	Draw the projections of a cylinder of 40 mm diameter and axis 60 mm long when it is lying on H.P. on a point on its circumference with its axis inclined at 45^0 to H.P. and parallel to V.P.	14M	CO4	L2, L4

UNIT–V

9.	Draw the isometric view of a hexagonal prism, with side of base 25 mm and axis 60 mm long. The prism is resting on its base on H.P., with an edge of the base parallel to V.P.	14M	CO5	L2, L3

OR

10.	Draw Front, top, and right-side views respectively of the given object.	14M	CO5	L2, L3



ISOMETRIC VIEW

*** End ***

Hall Ticket Number :										

R-20

Code: 20A312T-B

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

Engineering Drawing

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *five full* questions by choosing one question from each unit (5 x 14 = 70 Marks)

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		Marks	CO	BL
	UNIT–I			
1.	The major and minor axes of an ellipse are 100 mm and 70 mm. Draw an ellipse by using concentric circles method. Also draw normal and tangent to the curve at any point P on the curve.	14M	CO1	L1
	OR			
2.	A circle of 50 mm diameter rolls along a straight line without slipping. Draw the curve traced out by a point P on the circumference, for one complete revolution of the circle. Name the curve. Draw a tangent to the curve at a point on it 40 mm from the line.	14M	CO1	L2
	UNIT–II			
3.	A line PQ 75 mm long has its end P in the V.P. and the end Q in the H.P. The line is inclined at 30^0 the H.P. and at 60^0 to the V.P. Draw its projections.	14M	CO2	L1
	OR			
4.	A line AB, 90 mm long, is inclined at 45^0 to the HP and its top view makes an angle of 60^0 with the VP. The end A is in the HP and 12 mm in front of the VP. Draw its front view and find its true inclination with the VP.	14M	CO2	L2
	UNIT–III			
5.	Draw the projections of a regular hexagon of 25 mm side, having one of its sides in the H.P. and inclined at 60 degrees to the V.P., and its surface making an angle of 45 degrees with the H.P.	14M	CO3	L2
	OR			
6.	A semi-circular lamina of 60mm diameter has its straight edge in VP and inclined at an angle of 45^0 to HP. The surface of the lamina makes an angle of 30^0 with VP. Draw the projections	14M	CO3	L3

UNIT–IV

7. A Square prism, base 40 mm side and height 65 mm, has its axis inclined at $45^0$to the H.P. and has an edge of its base on H.P and inclined at $30^0$to the V.P. Draw its projections. 14M CO4 L2

OR

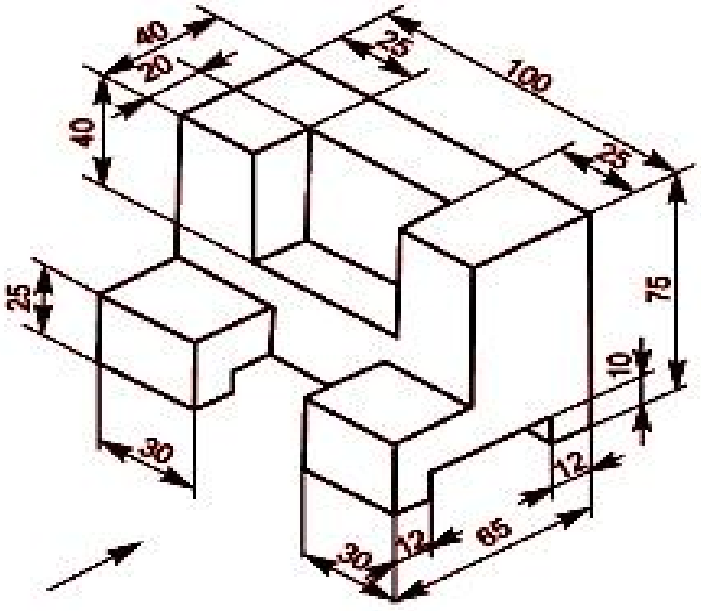
8. Draw the projections of a cone, base 45 mm diameter and axis 60 mm long, when it is resting on the ground on a point of its base circle with the axis making an angle $30^0$with the H.P and $45^0$to the V.P 14M CO4 L3

UNIT–V

9. Draw the isometric projection of a pentagonal prism, with side of base 35 mm and length of axis 65 mm, when its axis is (i) parallel to vertical and (ii) parallel to horizontal. 14M CO5 L2

OR

10. Draw the (i) front view, (ii) top view and (iii) side view of the fallowing object.



14M CO5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A511T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

Problem Solving through C Programming

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer the following (5 X 2 = 10M)	**CO**	**BL**
a) Differentiate an algorithm and a flowchart.	CO1	L2
b) Differentiate do-while and while statements.	CO2	L2
c) Describe the scope of variables in C program.	CO3	L2
d) Define predefined functions realloc() and free()	CO4	L2
e) Illustrate the use of enumerated data type in C programming.	CO5	L3

PART-B

Answer five questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT–I			
2.	a)	Illustrate the use of ternary or conditional operator to find the maximum of three given integers	6M	1	L4
	b)	Describe the concept of Associativity and Precedence of operators.	6M	1	L2
		OR			
3.		Explain the structure of a C program	12M	1	L2
		UNIT–II			
4.	a)	Develop a C program for Binary search.	6M	2	L4
	b)	Apply bubble sort on the following list of elements 30, 60, 80, 10, 50, 90, 70, 20	6M	2	L3
		OR			
5.	a)	Model a C program for matrix multiplication	8M	2	L3
	b)	Discuss the loop control statements in C programming.	4M	2	L2

UNIT–III

6.	a)	Differentiate call by value and call by reference with example.	8M	3	L3
	b)	Illustrate the concept of recursion.	4M	3	L3

OR

7.	a)	Discuss the preprocessor directives.	8M	3	L2
	b)	Develop a C program to find the LCM of two integers.	4M	3	L5

UNIT–IV

8.	a)	Define a pointer and list the advantages and disadvantages of pointers.	6M	4	L3
	b)	Differentiate malloc() and calloc() with examples	6M	4	L2

OR

9.	a)	Develop a c program to swap two integer variables using swap function.	6M	4	L6
	b)	Illustrate the concept of pointer arithmetic.	6M	4	L4

UNIT–V

10.	a)	Differentiate structure and union with examples.	4M	5	L3
	b)	Develop a c program to display the content of unformatted text file.	8M	5	L5

OR

11.	a)	Outline the concept of self-referential structures.	6M	5	L3
	b)	Demonstrate the passing of structures to functions as parameters.	6M	5	L3

*****END*****

Hall Ticket Number :										

R-20

Code: 20AC11T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

Algebra and Calculus

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ALL the following short answer questions (5 X 2 = 10M)		
a)	Define the rank of the matrix.	1	2
b)	State Caley Hamilton Theorem.	2	2
c)	Expand $\cos x$ using by Maclaurin's series.	3	2
d)	Evaluate $\int_0^2 \int_1^3 \int_1^2 xy^2 z \, dzdydx$	4	3
e)	Find the value of β(1,1/2)	5	3

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2. a)	Reduce the following matrix into the matrix $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ Echelon form and hence find its rank	6M	1	3
b)	Test for consistency and solve 5x+3y+7z=4 3x+26y+2z=9 7x+2y+10z=5	6M	1	3
	OR			
3.	Find the eigenvalues and eigenvectors of matrix $\begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$	12M	1	3

UNIT–II

4. Verify Cayley–Hamilton theorem for the matrix A and find its inverse. $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ 12M 2 3

OR

5. Reduce the quadratic form $2e_{x^1x^2} + 2e_{x^1x^3} - 2e_{x^2x^3}$ to a canonical form by an orthogonal reduction and discuss its nature. Also, find the modal matrix. 12M 2 3

UNIT–III

6. If $x = u(1 - v)$, $y = uv$ then prove that $J J' = 1$ where $J = \frac{\partial(x,y)}{\partial(u,v)}$ & $J' = \frac{\partial(u,v)}{\partial(x,y)}$ 12M 3 3

OR

7. Examine the following function for extreme values: $f(x,y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$ 12M 3 3

UNIT–IV

8. Change the order of integration in $I = \int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dydx$ and hence evaluate 12M 4 3

OR

9. Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz \, dxdydz$ 12M 4 3

UNIT–V

10. Show that $\beta(p,q) = \int_0^\infty \frac{y^{q-1}}{(1+y)^{p+q}} dy = \int_0^1 \left[\frac{x^{p-1} + x^{q-1}}{(1+x)^{p+q}}\right] dx$ 12M 5 3

OR

11. Prove that (i) $\beta(m, 1/2) = 2^{2m-1}\beta(m,m)$ (ii) $\Gamma(m)\Gamma(m+1/2) = \frac{\sqrt{\pi}}{2^{2m-1}}\Gamma(2m)$ 12M 5 3

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC12T

I B.Tech. I Semester Regular & Supplementary Examinations February 2023

Applied Physics

(Common to EEE, ECE and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1.	Answer ALL the following short answer questions (5 X 2 = 10M)		CO	BL
a)	List any two conditions for sustained interference pattern.		CO1	L1
b)	Name the various types of dielectric polarization.		CO2	L1
c)	Define critical angle and total internal reflection.		CO3	L1
d)	Name the semiconductor with majority charge carriers as holes.		CO4	L1
e)	Define superconductivity.		CO5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT–I			
2.	a)	Determine the wavelength of a monochromatic light source by forming the Newton rings.	8M	CO1	L3
	b)	In Newton ring's experiment the diameters of 4^{th} and 12^{th} dark rings are 0.400cm and 0.700cm respectively. Evaluate the diameter of 20^{th} dark ring.	4M	CO1	L5
		OR			
3.	a)	Explain polarization of light by double refraction with a neat ray diagram.	8M	CO1	L2
	b)	Decide the number of lines per cm in a diffraction grating if a green line of mercury of wavelength 5460A^o is seen in first order spectrum at an angle $19^o8'$. The grating is receiving light at normal incidence.	4M	CO1	L5
		UNIT–II			
4.	a)	Determine the expression for electronic polarizability.	8M	CO2	L3
	b)	Define dielectric susceptibility and dielectric constant.	4M	CO2	L1

OR

5.	a)	Illustrate the hysteresis loop exhibited by ferromagnetic materials and explain coercivity and retentivity.	8M	CO2	L4
	b)	Differentiate between soft and hard magnetic materials.	4M	CO2	L2

UNIT–III

6.	a)	State Gauss divergence theorem and Stoke's theorem.	4M	CO3	L3
	b)	Derive the differential forms of any two Maxwell's equations.	8M	CO3	L2

OR

7.	a)	Deduce an expression for numerical aperture of an optical fiber.	8M	CO3	L3
	b)	Describe fiber optics sensors.	4M	CO3	L2

UNIT–IV

8.		Develop an expression for density of electrons in conduction band of an intrinsic semiconductor.	12M	CO4	L5

OR

9.	a)	Distinguish between direct and indirect band gap semiconductors.	8M	CO4	L4
	b)	Show the applications of semiconductors.	4M	CO4	L3

UNIT–V

10.	a)	Explain any two properties of superconductors.	4M	CO5	L2
	b)	Analyze DC and AC Josephson effects.	8M	CO5	L4

OR

11.	a)	Explain any two general properties of nano materials.	4M	CO5	L2
	b)	Discuss the ball milling method to synthesize nanomaterials with a neat diagram	8M	CO5	L2

*** End ***