Hall Ticket Number :										

R-20

Code: 20AC11T

I B.Tech. I Semester Regular Examinations July 2021

Algebra and Calculus

(Common to All)

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	Blooms Level
1.	**Answer ALL the following short answer questions**	(5 X 2 = 10M)		
	a) Find the eigen values of A= $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$		1	1,2
	b) Find the symmetric matrix corresponding to the quadratic form $x^2 + 6xy + 5y^2$		2	1,2
	c) If x= r cos Θ, y= r sin Θ then find $\frac{\partial(x,y)}{\partial(r,\theta)}$		3	1.2
	d) Find $\int_0^1 \int_0^x xy\,dy\,dx$		4	1,2
	e) Define Gamma function		5	1

PART-B
Answer any *five full* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	Blooms Level
		UNIT–I			
2.	a)	Reduce the matrix $\begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$ to normal form and hence find the rank.	6M	1	1,2
	b)	Show that the equations x + y + z = 6, x + 2y + 3z = 14, x + 4y + 7z = 30 are consistent and solve them.	6M	1	1,2
		OR			
3.		Find the eigen values and the corresponding eigen vectors of A= $\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$	12M	1	1,2
		UNIT–II			
4.		Verify Cayley-Hamilton theorem for the matrix A= $\begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence find A^{-1} and A^4	12M	2	1,2
		OR			

5.		Reduce the quadratic form $3x^2+2y^2+3z^2-2xy-2yz$ to the normal form by orthogonal transformation	12M	2	1,2

UNIT–III

6.	a)	If $x = r\sin^{-}\cos¤, y = r\sin^{-}\sin¤, z = r\cos^{-}$ then show that $\frac{\partial(x,y,z)}{\partial(r,^{-},¤)} = r^2\sin^{-}$	6M	3	1,2
	b)	Find the maximum and minimum values of $xy + \frac{a^3}{x} + \frac{a^3}{y}$	6M	3	1,2

OR

7.		Find the volume of the greatest rectangular parallelepiped that can be inscribed in the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	12M	3	1,2

UNIT–IV

8.	a)	Evaluate $\int_a^{2a} \int_0^{\sqrt{2ax-x^2}} xy\,dy\,dx$	6M	4	1,2
	b)	Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz\,dz\,dy\,dx$	6M	4	1,2

OR

9.		Change the order of integration and evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy\,dx$	12M	4	1,2

UNIT–V

10.	a)	Show that $\Gamma\left(\frac{1}{2}\right) = \sqrt{®}$	6M	5	1,2
	b)	Show that $\int_0^1 x^m (\log x)^n\,dx = \frac{(-1)^n\, n!}{(m+1)^{n+1}}$ where 'n' is a positive integer and $m > -1$	6M	5	1,2

OR

11.	a)	Evaluate $\int_0^1 x^{\frac{3}{2}} (1-x^2)^{\frac{5}{2}}\,dx$	6M	5	1,2
	b)	Evaluate $\int_0^{\frac{\Pi}{2}} \sin^{10^{-}} d^{-}$	6M	5	1,2

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC12T

I B.Tech. I Semester Regular Examinations July 2021

Applied Physics

(Common to EEE & ECE)

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	Blooms Level
1.	**Answer ALL the following short answer questions**	(5 X 2 = 10M)		
	a)	Mention any four applications of interference in Engineering field.	CO1	
	b)	What is Bohr's magneton and give its expression.	CO2	
	c)	State the Gauss theorem for divergence?	CO3	
	d)	Define drift and diffusion currents	CO4	
	e)	Write the applications of nanomaterials.	CO5	

PART-B
Answer any *five full* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	Blooms Level
		UNIT–I			
2.	a)	Explain interference in thin films by reflection of light.	8M	CO1	
	b)	In Newton's rings experiment, if the radius of the 8^{th} and 12^{th} rings are 0.25 mm and 0.3mm respectively, find the wavelength of the light used if the radius of curvature of plano-convex lens is 100cm.	4M	CO1	
		OR			
3.	a)	Explain diffraction grating experiment to determine the wave length of a monochromatic source.	8M	CO1	
	b)	Calculate the thickness of a quarter wave plate for a monochromatic light of wave length 600nm, if the refractive indices of ordinary and extraordinary rays in the medium are 1.5442and 1.5533 respectively	4M	CO1	
		UNIT–II			
4.	a)	Define Ionic polarization and derive an expression for Ionic polarizability	6M	CO2	
	b)	Explain Ferro magnetism through hysteresis with neat figures	6M	CO2	
		OR			
5.	a)	Give the classification of magnetic materials into dia, para and ferro magnetic materials on the basis of magnetic moment	6M	CO2	
	b)	Explain in detail about the different types of polarization mechanisms in dielectrics.	6M	CO2	

UNIT–III

6.	a)	State and explain Poynting theorem	6M	CO3
	b)	Define acceptance angle and numerical aperture. Calculate the acceptance angle and Numerical Aperture of a given optical fiber, if the refractive index of core and cladding are 1.563 & 1.498 respectively.	6M	CO3

OR

7.	a)	Show that the electromagnetic waves for non-conducting media is transverse in nature and have components of E and H in directions perpendicular to the direction of propagation.	6M	CO3
	b)	Discuss the application of optical fibers in Medical field and in industry as a sensor.	6M	CO3

UNIT–IV

8.	a)	Derive an expression for density of holes in an intrinsic semiconductor	6M	CO4
	b)	Give the classification of solids into conductors, semiconductors and insulators on the basis of band theory of solids	6M	CO4

OR

9.	a)	What is Hall effect? Derive an expression for Hall coefficient for n-type semiconductor. Mention its applications.	7M	CO4
	b)	Differentiate direct and indirect band gap semiconductors with examples	5M	CO4

UNIT–V

10.	a)	Explain Meissner effect. Write notes on magnetic levitation	6M	CO5
	b)	Describe the process of “chemical vapour deposition” method of fabrication of nanomaterials.	6M	CO5

OR

11.	a)	Describe BCS theory of superconductivity	6M	CO5
	b)	Discuss any one method to characterization of the nanomaterials	6M	CO5

*** End ***

Hall Ticket Number :										

R-20

Code: 20A411T

I B.Tech. I Semester Regular Examinations July 2021

Basic Electrical and Electronics Engineering

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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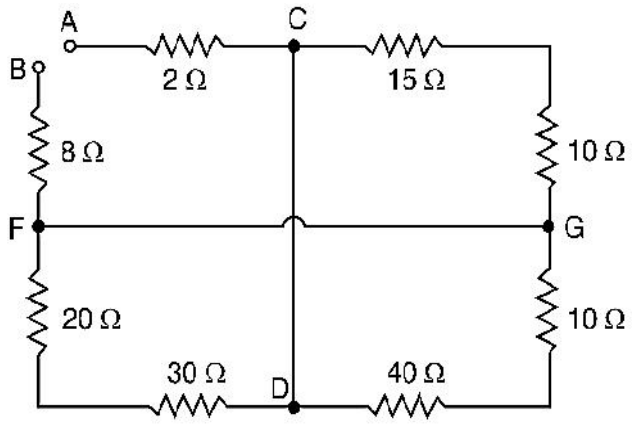
Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

			CO	Blooms Level
1.	**Answer ALL the following short answer questions**	(5 X 2 = 10M)		
	a) What are Active and Passive elements?		CO1	L1, L2
	b) State Kirchhoff's Current law.		CO2	L1, L2
	c) Write one difference between an Intrinsic and Extrinsic semiconductor.		CO3	L1, L2
	d) What is Transformer Utilization factor (TUF)?		CO4	L1, L2
	e) Large signal current gain 'β ' for common emitter configuration, is ___		CO5	L1, L2

PART-B
Answer any *five full* questions by choosing one question from each unit (5 x 12 = 60 Marks)

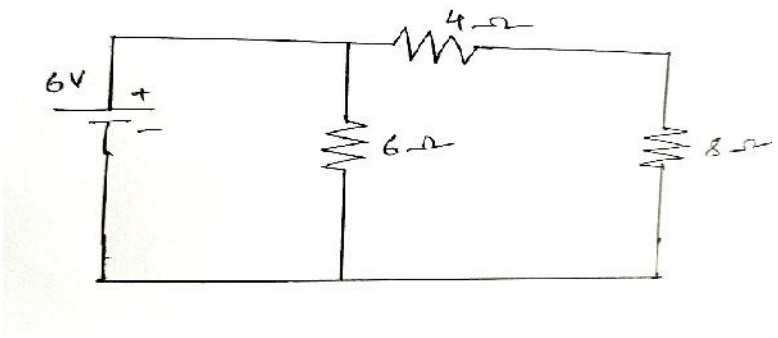
			Marks	CO	Blooms Level
		UNIT–I			
2.	a)	Discuss briefly about Voltage and Current Sources.	6M	CO1	L1, L2
	b)	Write about resistance color coding in detail.	6M	CO1	L1, L2
		OR			
3.		What is a DSO? Elaborate in detail about the construction and working of a DSO.	12M	CO1	L1, L2
		UNIT–II			
4.	a)	Explain briefly about Norton's Theorem.	6M	CO2	L1, L2
	b)	Find R_{AB} in the circuit shown in Figure.			



6M CO2 L1, L3

OR

5. a) State Kirchhoff's Laws. Find the current flowing through the 6 Ohm resistor.



8M CO2 L2, L3

b) Write briefly about Superposition Theorem. 4M CO2 L1, L2

UNIT–III

6. a) Justify how a Zener diode acts as a Voltage Regulator. 6M CO3 L1, L2

b) Discuss the Volt-Ampere characteristics of a P-N Diode under Forward-bias condition. 6M CO3 L1, L2

OR

7. a) Derive the diode current equation for a P-N diode with the help of necessary diagrams. 6M CO3 L1, L2

b) The reverse saturation current applied to a silicon PN diode is 10μA. Calculate the diode current for the forward-bias voltage of 0.6V at 25^0C temperature. Take η=2. 6M CO3 L1, L3

UNIT–IV

8. a) The following parameters are associated with for Half wave rectifiers. Define them.
   i. Ripple factor.
   ii. Efficiency
   iii. Peak Inverse Voltage 6M CO4 L1, L2

b) Briefly differentiate between a Half wave rectifier and Full wave rectifier. 6M CO4 L1, L2

OR

9. A 230V, 60 Hz voltage is applied to the primary of a 5:1 step-down center-tap transformer used in a full wave rectifier having a load of 900 ohms. If the diode resistance and secondary coil resistance together has a resistance of 100ohms. Determine
   a) DC voltage across the load
   b) DC current flowing through the load
   c) DC power delivered to the load
   d) PIV
   e) Ripple voltage and its frequency
   f) Efficiency 12M CO4 L2, L3

UNIT–V

10. Describe in detail about the operation, Input and output characteristics of a transistor in Common Emitter Configuration. 12M CO5 L1, L2

OR

11. a. Draw the symbols for a NPN and PNP transistors.
    b. Explain the construction and operation of n-p-n transistor with neat sketches 4M 8M CO5 L1, L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A312T-C

I B.Tech. I Semester Regular Examinations July 2021

Engineering Drawing

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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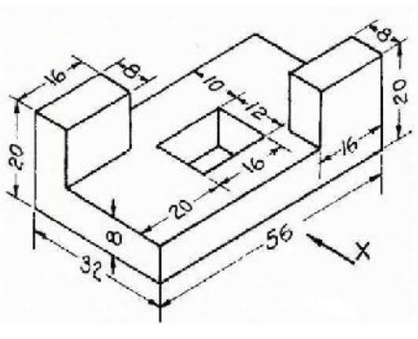
			Marks	CO	Blooms Level
		UNIT–I			
1.		Construct an ellipse, when the distance of the focus from the directrix is equal to 65mm and eccentricity is 2/3. Also draw tangent and normal to the curve at a point 40mm from the directrix.	14M	CO1	
		OR			
2.		Draw a cycloid given the diameter of a rolling circle as d=50mm. Draw a normal and tangent at any point on the curve	14M	CO1	
		UNIT–II			
3.		A point A is 25mm above the H.P & 35mm in front of the V.P. Another point B is 40mm behind the V.P. & 30mm below the H.P. Draw the projections by taking the distance between the projectors as 50mm.	14M	CO2	
		OR			
4.		Line AB is 75 mm long and it is 30^0 & 40^0 Inclined to HP & VP respectively. End A is 12mm above HP and 10 mm in front of VP. Draw its projections and locate HT & VT	14M	CO2	
		UNIT–III			
5.	a)	A circular plate of negligible thickness and 60mm diameter appears as an ellipse in the top view, having its major axis 60mm and minor axis 30mm. Draw its projections and find the inclination of the plate with HP.	8M	CO3	
	b)	A pentagonal plate of side 35mm is placed with its surface vertical and parallel to VP. Draw its projections when one of the sides is perpendicular to HP.	6M	CO3	
		OR			
6.		A regular hexagon of side 35 mm has a corner in the HP. Its surface is inclined at 45º to HP. The top view of the diagonal through the corner in HP makes an angle of 60º with VP. Draw its projections.	14M	CO3	
		UNIT–IV			
7.		Draw the projections of a hexagonal prism of base 25mm side and axis 60mm long, when it is resting on one of its side of the base on HP. The axis of the solid is inclined at 45^0 to the HP	14M	CO4	
		OR			
8.		A cylinder 40 mm diameter and 50 mm axis is resting on one point of a base circle on VP while it's axis makes 45^0 with VP and FV of the axis 35^0 with HP. Draw projections	14M	CO4	
		UNIT–V			
9.		Draw the isometric view of a cone, base 40mm diameter and axis 55mm long. (a) when its axis is vertical and (b) when its axis is horizontal	14M	CO5	
		OR			
10.		Draw the front view, top view, right and left side views of the object shown in figure (All dimensions in mm).	14M	CO5	



*** End ***

Hall Ticket Number :										

R-20

Code: 20A312T-B

I B.Tech. I Semester Regular Examinations July 2021

Engineering Drawing

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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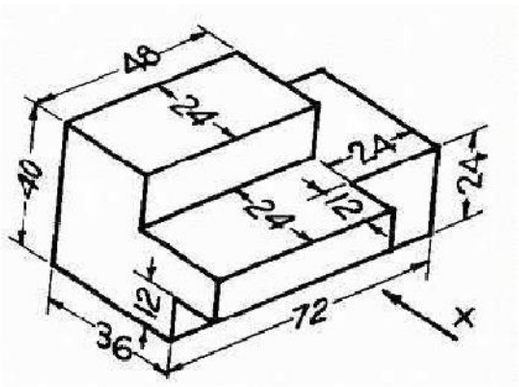
		Marks	CO	Blooms Level
	UNIT–I			
1.	Construct a Hyperbola when the distance between the focus and the directrix is 40mm and the eccentricity is 4/3. Draw a tangent and normal at any point on the hyperbola	14M	CO1	
	OR			
2.	Draw a hypo cycloid of a circle of 40mm diameter which rolls inside another circle of 160mm diameter, for one revolution counter clock wise. Draw a tangent and a normal to it at a point 60mm from the center of the directing circle	14M	CO1	
	UNIT–II			
3.	A point A is 25mm above the H.P & 35mm in front of the V.P. Another point B is 40mm behind the V.P. & 30mm below the H.P. Draw the projections by taking the distance between the projectors as 50mm.	14M	CO2	
	OR			
4.	FV of line AB is 50^0 inclined to xy and measures 55mm long while it's TV is 60^0 inclined to xy line. If end A is 10 mm above HP and 15 mm in front of VP, draw it's projections, find true length, inclinations of line with HP & VP.	14M	CO2	
	UNIT–III			
5.	Draw the projections of a regular hexagon of side 25 mm, having one of its sides on the ground and inclined at 60^0 to VP and its surface making an angle of 45^0 with the ground.	14M	CO3	
	OR			
6.	A regular pentagon of side 40 mm has one side on VP and inclined at 60^0 to HP. The surface makes an angle of 30^0 with VP. Draw its projections.	14M	CO3	
	UNIT–IV			
7.	Draw the projections of a cylinder of base 30mm diameter and axis 50mm long, when it is resting on HP on its base.	14M	CO4	
	OR			
8.	A cone of base 40 mm diameter and axis 50 mm long is resting on of its generator on HP. The top view of the axis of cone makes an angle of 30^0 with VP Draw it's projections.	14M	CO4	
	UNIT–V			
9.	Draw the isometric view of a hexagonal prism, with side of base 25mm and axis 60mm long, The prism is resting on its base on H.P. with an edge of the base parallel to V.P. Use the box method	14M	CO5	
	OR			
10.	Draw the front view, top view, and left side views of the part shown in the figure (dimensions in mm). 	14M	CO5	

*** End ***

Hall Ticket Number :										

R-20

Code: 20A511T

I B.Tech. I Semester Regular Examinations June 2021

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 ALL the following short answer questions** (5 X 2 = 10M)	CO	Blooms Level
a)	Define high level language and low level language	CO1	L2
b)	Define an array. How to store elements in an array?	CO2	L2
c)	Write a program to check whether the string is palindrome or not	CO3	L1
d)	Compare and contrast calloc() and malloc().	CO4	L5
e)	Give various modes of opening a file	CO5	L4

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

			Marks	CO	Blooms Level
		UNIT–I			
2.	a)	Briefly explain about the basic data types that C language supports.	6M	CO1	L5
	b)	What is flow chart? How it is useful in writing the programs? Explain about different symbols in flow chart.	6M	CO1	L1
		OR			
3.	a)	Is there any difference between the pre-decrement and post decrement operators? Explain with suitable examples.	6M	CO1	L2
	b)	Write a pseudo code for swapping two numbers without using any temporary variable.	6M	CO1	L1
		UNIT–II			
4.	a)	Compare the use of if-else construct with that of conditional operator. Explain with examples.	6M	CO2	L5
	b)	Give the control flow diagram of the for loop. How is the execution of 'for' loop proceeds?	6M	CO2	L4
		OR			
5.	a)	Describe about two dimensional arrays, initializing the two dimensional arrays and accessing elements in such arrays.	6M	CO2	L2
	b)	Write a program to find an element present in a given array using Search techniques.	6M	CO2	L1

UNIT–III

6.	a)	Write a C program with recursive function that counts the number of vowels in a string.	6M	CO3	L1
	b)	Describe the concept of functions and the mechanism of a function call. Discuss the advantages of functions	6M	CO3	L2
		OR			
7.	a)	Explain about C Preprocessor with an example.	6M	CO3	L1
	b)	Illustrate the storage classes extern, static and auto with an example	6M	CO3	L4

UNIT–IV

8.	a)	Define a pointer. How to initialize and declare pointer variables? Explain the same with examples	6M	CO4	L2
	b)	Write a recursive program for finding the n th Fibonacci value, using functions.	6M	CO4	L1
		OR			
9.	a)	Differentiate user defined and predefined function. Explain with one example.	6M	CO4	L2
	b)	Explain how to pass one dimensional arrays to functions.	6M	CO4	L4

UNIT–V

10.	a)	Differentiate between structures and unions, and write the syntax for nested structures.	6M	CO5	L2
	b)	What is an enumerated data type? Explain with example.	6M	CO5	L1
		OR			
11.	a)	Write a program to count no of words and lines in a file	6M	CO5	L1
	b)	Describe the process of handling errors during file operations.	6M	CO5	L2

*** End ***