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: 20AC15T

I B.Tech. I Semester Regular Examinations July 2021

Communicative English

(Common to CE, ME, CSE and AI&DS)

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)	Why does William Hazlett ask his son to be courteous and polite to his classmates?	CO1	L2
	b)	What are the types of water bodies and plant life that are talked about in the poem, "The Brook"?	CO1	L2
	c)	How has the prince been trapped in "The Death Trap."?	CO1	L2
	d)	What was the innovative approach of Mohammad Yunus to traditional approach??	CO1	L2
	e)	What do you learn from the life story of Mrinalini Sarabhai?	CO1	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.		What is the author's attitude towards how one should behave with other people? Do you agree with his reasoning? Give reasons for your answer.	12M	CO1	L2
		OR			
3.	a)	**Change the following statements into questions.** i. My grandparents live with my uncle. ii. He had a strange experience yesterday. iii. Her mother has bought a nice gift for her. iv. Jack has bought an interesting book from the library. v. They have accepted the invitation. vi. My neighbour is a kind-hearted lady.	6M	CO3	L4
	b)	**Identify the parts of speech of the underlined words in the following sentences.** i. The car moved <u>slowly</u> around the track ii. He walked <u>quickly</u> through the park iii. He waited <u>anxiously</u> for the game to begin.	6M	CO3	L4
		UNIT–II			
4.		How has the poet described landscape, flowers, plants and colours in the poem? How does it make you feel as a reader? Substantiate your answer with examples from the poem?	12M	CO1	L2
		OR			
5.		**Develop the following hints into a meaningful paragraph:**			
	a)	Devan - clever thief - robs the rich - gives all to the sick and the needy - other thieves jealous - plan to get rid of him - challenge Devan to steal the King's pyjamas - Devan accepts challenge - finds king sleeping - opens a bottle of red ants on the bed - King badly bitten - cries for help - servants rush in pretends to look for ants - Devan removes King's pyjamas – escapes - other thieves dumbfounded - accept Devan their leader	6M	CO4	L3

b) Manager of a firm advertised - night watchman - applicants presented - manager not satisfied - found something wrong with each man - there was Raju - an applicant - sat in a corner - patiently waiting - his turn came - manager found nothing wrong in his appearance - questioned about his health - got the reply - I suffering from sleeplessness - manager happy - appointed him — 6M CO4 L3

UNIT–III

6. What can you make out of the prince's character? What kind of person do you think he is and why do you think he is that way? Use examples from the text to support your answer. — 12M CO1 L3

OR

7. a) **Rearrange each group of jumbled sentences below so as to have well-written paragraphs.** — 7M CO4 L4

i. It is awarded from funds bequeathed by Alfred Nobel, a Swedish inventor and philanthropist.
ii. Nobel's will designated six areas for which prizes could be awarded.
iii. The funds are administered by the Nobel Foundation in Stockholm.
iv. The Nobel Prize is considered one of the most prestigious awards made to people whose work benefits humanity.
v. They are chemistry, physics, physiology or medicine, literature and peace.
vi. Prizes in these seven areas are presented in December every year, in the presence of the King of Sweden, as fitting tribute to Alfred Nobel.
vii. In 1969, economics was added to the list.

b) **Fill in blanks in the sentences below using appropriate form of the verb in brackets.** — 5M CO4 L4

i. Tanya _ _ _ _ _ _ _ _ _ _ _ _ _ _ (speak) German very well.
ii. He _ _ _ __ _ _ _ (prepare) the students for APPSC since January 2014.
iii. He _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ (meet) a lot of people recently.
iv. Did you _ _ _ _ _ _ _ _ _ _ _ _ _ (see) me yesterday in the institution?
v. The children _ _ _ _ _ _ (not/do) their homework, so they were in trouble.

UNIT–IV

8. Describe and discuss Mohammad Yunus's contribution for the upliftment of the economis status of the poor people. — 12M CO2 L4

OR

9. Prepare a narrative essay on the topic, "The proudest moment of your life." — 12M CO4 L4

UNIT–V

10. **Correct the following sentences and rewrite them.** — 12M CO3 L3

i. Vijay's cap was *red in colour.*
ii. Manisha practiced English *on a daily basis.*
iii. The enemy was *surrounded on all sides.*
iv. Are you going for the party?
v. He climbed across the wall and ran until the main road.
vi. The purse is below the pillow.
vii. All applicants must possess an university degree.
viii. In the class, the children were having arithmetic lesson.
ix. After the wedding, there was a eight course meal.
x. The petrol is expensive.
xi. We must try harder to stop these people from destroying the nature.
xii. He had spelt the word with a 's' instead of a 'c'.

OR

11. Narrate the inspiring story of Mrinalini Sarabhai and describe the left by her for future generation. — 12M CO4 L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A311T

I B.Tech. I Semester Regular Examinations July 2021

Engineering Graphics

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

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

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			Marks	CO	Blooms Level
		UNIT–I			
1.		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 arc of circles method. Draw a tangent and normal to the ellipse at a point on it 25 mm above the major axis.	14M	1	L4
		OR			
2.	a)	A ball thrown up in the air reaches a maximum height of 45 mm and travels a horizontal distance of 75 mm. Trace the path of the ball, assuming it to be parabolic.	7M	1	L4
	b)	Construct a hyperbola, when the distance of the focus from the directrix is 65 mm and eccentricity is 3/2.	7M	1	L6
		UNIT–II			
3.		Construct a hypocycloid, given the rolling circle 50 mm diameter and directing circle 175 mm diameter. Draw a tangent to it at a point 50 mm from the center of the directing circle.	14M	2	L6
		OR			
4.	a)	Draw an involute of a circle of 50 mm diameter. Also draw tangent at any point on the curve.	7M	2	L4
	b)	Draw an involute of a square of side 40 mm. Draw tangent and normal at any point on the curve.	7M	2	L4
		UNIT–III			
5.	a)	A point P is 15 mm above H.P and 20 mm infront of the V.P. Another point Q is 25mm behind V.P and 40 mm below H.P. Draw the projections of P and Q keeping the distance between the projectors equal to 90 mm. Draw straight lines joining their (i) Top views and (ii) Front views	7M	3	L4
	b)	A point B is 40mm below H.P, 50mm behind V.P and 30 mm in front of P.P. Draw front view, top view and right side view of the point.	7M	3	L4
		OR			
6.		A line 90 mm long is inclined at 45^0 to the H.P and it top view makes and angle of 60^0 with the V.P. The end A is in H.P and 12 mm infront of the V.P. Draw the projections and find its true inclination with V.P.	14M	3	L4
		UNIT–IV			
7.		Draw the projections of a regular hexagon of 30 mm side having one of its sides in HP and inclined at 60^0 to VP and its surface making an angle of 30^0 to HP.	14M	4	L4
		OR			
8.		PQRS is a rhombus having diagonal PR = 60 mm and QS =40 mm and they are perpendicular to each other. The plane of the rhombus is inclined with H.P, such that its tip view appears to be square. The top view of PR makes 30^0 with the V.P. Draw its projections and determine inclination of the plane with H.P.	14M	4	L4
		UNIT–V			
9.		A line AB of 60 mm length has its end A at 20mm above the H.P and 25 mm infront of V.P. The line is inclined at 30^0 to H.P and 45^0 to V.P. Draw its projections by auxiliary plane method.	14M	5	L4
		OR			
10.		A regular Pentagon of 30 mm side is resting with one base corner on the ground. Its plane is inclined 45^0 to the H.P and perpendicular to the VP. Draw its projections of the plane using auxiliary plane method.	14M	5	L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC14T

I B.Tech. I Semester Regular Examinations July 2021

Engineering Chemistry

(Common to CE & ME)

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)	Define Scale and Sludge formation in boilers	CO1	L1
	b)	What are reference electrodes?	CO2	L1
	c)	Why GCV value is higher than NCV value?	CO3	L1
	d)	Define the term composites	CO4	L1
	e)	What are nanomaterials?	CO5	L1

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)	What is hard water? list any two disadvantages	4M	CO1	L1
	b)	Explain the experimental determination of hardness of water by EDTA method	8M	CO1	L3
		OR			
3.	a)	List specifications for drinking water as per **WHO** standards.	6M	CO1	L4
	b)	Describe the desalination of brackish water by reverse osmosis	6M	CO1	L4
		UNIT–II			
4.	a)	Derive Nernst equation for determination of single electrode potential	6M	CO2	L4
	b)	Explain the construction and working of calomel electrode.	6M	CO2	L3
		OR			
5.	a)	Explain the electrochemical theory of corrosion by taking iron as example	6M	CO2	L3
	b)	Describe various factors affecting the rate of corrosion	6M	CO2	L3
		UNIT–III			
6.	a)	Explain the mechanism of chain growth polymerization by taking an example	6M	CO3	L3
	b)	Distinguish between thermoplastics and thermosetting plastics	6M	CO3	L2
		OR			
7.	a)	Describe the determination of calorific value of a fuel by using bomb calorimeter	6M	CO3	L3
	b)	Write a note on octane and cetane numbers	6M	CO3	L2
		UNIT–IV			
8.	a)	What are composite materials? Describe the classification of composites	6M	CO4	L2
	b)	Illustrate the properties of refractories	6M	CO4	L2
		OR			
9.	a)	Write a note on the classification of lubricants	6M	CO4	L1
	b)	Describe the manufacture of Portland cement	6M	CO4	L2
		UNIT–V			
10.	a)	Describe the synthesis of nanomaterials by Sol-gel method	6M	CO5	L2
	b)	Discuss the characterization of nanomaterials by XRD technique	6M	CO5	L4
		OR			
11.	a)	Write a note on self-healing materials	6M	CO5	L1
	b)	Describe the uses of Smart materials	6M	CO5	L2

*** 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 ***