Hall Ticket Number :										

R-19

Code: 19AC11T

I B.Tech. I Semester Supplementary Examinations August 2021

Algebra and Calculus

(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)

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UNIT–I

1. a) Define the rank of the matrix and find the rank of $\begin{bmatrix} 0 & 1 & -3 & 1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$ by using Echelon form. 7M

b) Investigate the values of ª *and* « so that the equations 2x+3y+5z=9, 7x+3y-2z=8, 2x+3y+ ª z = « , have (i) no solution, (ii) a unique solution and (iii) an infinite number of solutions. 7M

OR

2. Find the Eigen values and Eigen vectors of the matrix $\begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ 14M

UNIT–II

3. If $A = \begin{bmatrix} 2 & 1 & 2 \\ 5 & 3 & 3 \\ -1 & 0 & -2 \end{bmatrix}$, verify Cayley-Hamilton theorem. Hence find A^{-1} and A^4. 14M

OR

4. Reduce the Quadratic form $x^2 + 3y^2 + 3z^2 - 2yz$ to a canonical form by an orthogonal transformation and discuss its nature also find the modal matrix. 14M

UNIT–III

5. a) If $U = \log\left(x^3 + y^3 + z^3 - 3xyz\right)$ prove that $\left(\frac{\partial}{\partial x} + \frac{\partial}{\partial y} + \frac{\partial}{\partial z}\right)^2 U = \frac{-9}{(x+y+z)^2}$ 7M

b) In a plane triangle, find the maximum value of $\cos A \cos B \cos C$ 7M

OR

6. a) If $x + y + z = u, y + z = uv, z = uvw, then\ evaluate \frac{\partial(x, y, z)}{\partial(u, v, w)}$ 7M

b) Find the minimum value of $x^2 + y^2 + z^2$ *given* $x + y + z = 3a.$ 7M

UNIT–IV

7. a) Obtain the Taylor's series expansion of sin2x about $x = \frac{®}{4}$. 7M

b) Trace the curve $x^3 + y^3 = 3axy$. 7M

OR

8. a) Obtain the Maclaurin's series expansion of $\log(1+\sin^2 x)$ up to the term containing x^6. 7M

   b) Trace the curve $r^2 = a^2 \cos 2\theta$. 7M

UNIT–V

9. a) Evaluate the double integral $\iint_R x\,y\,dx\,dy$ where 'R' is the region bounded by the lines $x-axis$, ordinate $x = 2a$ and $x^2 = 4a\,y$ 7M

   b) Show that $\Gamma(n) = \int_0^1 \left(\log\frac{1}{y}\right) dy \quad (n.0)$ 7M

OR

10. a) Evaluate the integral by changing the order of integration $\int_0^{4a}\int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy\,dx$ 7M

    b) Show that $(p,q) = \int_0^\infty \frac{y^{q-1}}{(1+y)^{p+q}} dy = \int_0^1 \frac{x^{p-1}+x^{q-1}}{(1+x)^{p+q}} dx$ 7M

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Hall Ticket Number :										

R-19

Code: 19AC14T

I B.Tech. I Semester Supplementary Examinations August 2021

Engineering Chemistry

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) What is an ion selective electrode (ISE)? Give the classification of ISEs 7M

   b) What are concentration cells? Explain their types with examples 7M

OR

2. a) Derive Nernst equation for a single electrode potential of a cell 7M

   b) Discuss various types of electrodes or half-cells. 7M

UNIT–II

3. a) Mention the components of a lithium-MnO2 cell. Discuss the chemistry of the working of this cell. 7M

   b) List out the important applications of batteries 7M

OR

4. a) Discuss any five characteristics of a battery 7M

   b) Describe the construction and working of a Hydrogen Oxygen fuel cell. 7M

UNIT–III

5. Explain the doping concept of Silicon semiconductor 14M

OR

6. a) Write a short note on physical and chemical properties of Silicon 7M

   b) Explain the synthesis of p-n junction material for photovoltaic cells? 7M

UNIT–IV

7. a) Differentiate between addition and condensation polymerisation with examples. 7M

   b) Write the preparation, properties and applications of Bakelite? 7M

OR

8. What are conducting polymers? Explain the synthesis and applications of poly aniline. 14M

UNIT–V

9. Differentiate between chain growth polymerization and step growth polymerization with suitable examples 14M

OR

10. a) Describe the synthesis and applications of polyacetylene a conducting polymer 7M

    b) Illustrate the mechanism of coordination (stereospecific) polymerization 7M

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Hall Ticket Number :										

R-19

Code: 19A511T

I B.Tech. I Semester Supplementary Examinations August 2021

Problem Solving and 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)

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UNIT–I

1. a) Define Algorithm. Explain the characteristics of algorithm 7M

   b) List and explain briefly about various computer languages 7M

OR

2. a) What is meant by flow chart? Explain the symbols used in flowchart with an example. 7M

   b) Discuss about C data types. 7M

UNIT–II

3. a) What are the different types of arrays in C? Explain with a suitable example. 7M

   b) Write a C program to find the factorial of a given number. 7M

OR

4. a) Explain conditional statements with an example. 7M

   b) Write a c program to print array of elements in ascending order using bubble sort. 7M

UNIT–III

5. a) Define string. Explain declaration of string. Explain any three string handling functions. 6M

   b) What is recursion? Explain with an example 8M

OR

6. Explain the following key words with example. i) auto ii) register iii) static iv) extern. 14M

UNIT–IV

7. a) What is pointer? How to initialize and declare pointer variables? 7M

   b) Explain dynamic memory allocation functions. 7M

OR

8. a) Write a C program to demonstrate array of pointers. 7M

   b) Explain different parameter passing techniques with suitable examples. 7M

UNIT–V

9. Define structure and union. Explain the syntax and accessing elements from structure and union with an example. Write the differences between structures and unions 14M

OR

10. a) Define file. Write a C program to write character to a file and reading character from file. 8M

    b) Give brief description about the various modes of a file. 6M

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