R-17

Code: 7GC12

I B.Tech. I Semester Supplementary Examinations February 2022
Engineering Chemistry
(Common to CE, ME & CSE)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
****

Marks

UNIT–I

1. a) Explain the process of a phosphate, carbonate and sodium aluminate conditioning of boiler feed water   7M
   b) Give detailed procedure for the determination of dissolved oxygen in water.   7M

OR

2. a) With the help of neat diagram, describe the reverse osmosis method for the desalination of brackish water.   7M
   b) What is hardness of water? How do you classify and express hardness?   7M

UNIT–II

3. a) Write a note on the mechanism of hydrogen evolution type of wet corrosion.   7M
   b) Explain rusting of iron with the help of electrochemical theory of corrosion   7M

OR

4. a) On what factors does the conductance of a solution depend? How would you proceed to determine the conductivity of a solution?   7M
   b) Explain passivity of metals. How it affects rate of corrosion   7M

UNIT–III

5. a) What is vulcanization of rubber? Explain why natural rubber needs vulcanization. How is it carried out?   7M
   b) Write a note on the classification of polymers with examples   7M

OR

6. a) Write the characteristics of co-polymerization   7M
   b) Write a note on polydispersive index   7M

UNIT–IV

7. a) Write short note on octane number and cetane number.   7M
   b) Compare the liquid fuels with gaseous fuels.   7M

OR

8. a) With a neat diagram describe the Orsat's gas analysis method. What are the special precautions to be taken in the measurement?   7M
   b) Describe the determination of calorific value of a solid fuel using bomb calorimeter. 7M

UNIT–V

9. a) Describe the analysis of cement   7M
   b) Write a note on the classification of refractories with examples.   7M

OR

10. a) Define refractory? Discuss the criteria of good refractory materials   7M
    b) Explain the hardening and setting of cement using the chemical equations   7M

***

R-17

Code: 7GC14

I B.Tech. I Semester Supplementary Examinations February 2022
Engineering Mathematics-I
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
****

Marks

UNIT–I

1. a) Define the rank of the matrix. Find the rank of the matrix

   $A= \begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix}$

   7M

   b) Find the values of ' k ' for which the system of equations
   (3k-8)x +3y +3z = 0, 3x+ (3k-8)y + 3z = 0, 3x +3y +(3k-8)z = 0 has a
   non-trivial solution.

   7M

OR

2. a) Find the eigen values and eigen vectors of

   $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$

   7M

   b) Test for consistency and solve 5x+3y+7z=4, 3x+26y+2z=9,
   7x+2y+10z=5

   7M

UNIT–II

3. a) Show that the matrix $\begin{bmatrix} i & 0 & 0 \\ 0 & 0 & i \\ 0 & i & 0 \end{bmatrix}$ is Skew-Hermitian and hence find

   eigen values

   7M

   b) Reduce the quadratic form $10x^2 + 2y^2 + 5z^2 - 4yz - 10zx + 5xy$
   to the canonical form by linear transformation.

   7M

OR

4. a) Diagonalize the matrix $A= \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$

   7M

   b) Find the Eigen values and Eigen vectors $A = \begin{bmatrix} 4 & 1-3i \\ 1+3i & 7 \end{bmatrix}$

   7M

UNIT–III

5. a) Solve $x\dfrac{dy}{dx} + y = x^3 y^6$ — 7M

   b) Prove that the system of parabolas $y^2 = 4a(x+a)$ is self orthogonal. — 7M

OR

6. a) A body is kept in air with temperature 25^0c cools from 140^0c to 80^0c in 20 minutes. Find the when the body cools down to 35^0c — 7M

   b) Find the orthogonal Trajectories of the family of curves $r^n = a^n \cos n_{''}$ — 7M

UNIT–IV

7. a) Solve $\dfrac{d^3 y}{dx^3} - y = e^x + \sin 3x + 2$ — 7M

   b) Solve $(D^2 + 1)y = \sin x \sin 2x + e^x x^2$ — 7M

OR

8. a) Solve $(D+2)(D-1)^2 y = e^{-2x} + 2\sinh x$ — 7M

   b) Solve $\dfrac{d^2 y}{dx^2} - 3\dfrac{dy}{dx} + 2y = x e^{3x} + \sin 2x$ — 7M

UNIT–V

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

   b) Verify lagrange's mean value theorem for $f(x) = (x-1)(x-2)(x-3)$ in $[0, 4]$ — 7M

OR

10. a) Let $r^2 = x^2 + y^2 + z^2$ and $V = r^m$ then prove that $V_{xx} + V_{yy} + V_{zz} = m(m+1)r^{m-2}$ — 7M

   b) Find the maxima and minima of $z = x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$ — 7M

***

I B.Tech. I Semester Supplementary Examinations February 2022
Problem Solving Techniques and C Programming
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
****

Marks

UNIT–I

1. a) What is a flow chart? How it is different from an Algorithm   7M
   b) Illustrate different phases of Software Development Life Cycle (SDLC) with a neat diagram.   7M

OR

2. a) What is Programming Language? What is the generation of programming Language? Describe it briefly.   7M
   b) Give short notes on computer environments.   7M

UNIT–II

3. a) What is a variable? What are the rules for declaring variables? Give examples of valid and invalid variables   7M
   b) Describe Structure of C program with an example.   7M

OR

4. a) Explain about the basic data types in C language with examples   7M
   b) Explain with examples, any two types of operators in c programming language.   7M

UNIT–III

5. a) Explain for loop and nested for loop in c programming language.   7M
   b) Write a program to print sum of odd numbers between 1 and 100 using for loops.   7M

OR

6. a) Explain with examples, if…else and nested if….else statements.   7M
   b) Write a program to find the largest among three numbers.   7M

UNIT–IV

7. a) How single dimensional arrays and multidimensional arrays are declared and initialized? Explain with suitable examples.   7M
   b) How to declare and initialization of strings? Explain them with examples.   7M

OR

8. a) Explain any five string handling functions with suitable examples,   7M
   b) Write a C program for addition of two matrices.   7M

UNIT–V

9. a) Discuss in details about local variables and global variables with respect to their scope and extent.   7M
   b) Explain about the actual arguments and formal argument in functions. What is the difference between these arguments?   7M

OR

10. a) What are the different ways of passing parameters to the function? Explain.   7M
    b) Write a c program to find the factorial of a number using recursive function.   7M

***

Code: 7G513

I B.Tech. I Semester Supplementary Examinations February 2022
Basic Engineering Drawing
(Computer Science and Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
****

Marks

UNIT–I

1. Construct a regular Hexagon and pentagon by General Method,
    given the length of its side 50mm   14M

OR

2. The major and minor axes of an ellipse are 120mm and 80mm. Draw
    an ellipse by Arcs of circles method   14M

UNIT–II

3. The top view of a 75mm long line AB measures 65mm, while the
    length of its front view is 50mm. It's one end A is in H.P. and 12mm in
    front of the V.P. Draw the projections of AB and determine its
    inclinations with the H.P. and the V.P.   14M

OR

4. A line AB, 50mm long, has its ends A in both the H.P and the V.P. It
    is inclined at 30^0 to the H.P and at 45^0 to the V.P. Draw the
    projections   14M

UNIT–III

5. A semi circular plate of 80 mm diameter has its straight edge in the
    VP & inclined at 45^0 to the HP. The surface of the plate makes an
    angle of 30^0 with the VP. Draw its projections.   14M

OR

6. A circular plate of diameter 50mm is resting on HP on a point on the
    circumference with its surface inclined at 45^0 to HP and perpendicular
    to VP. Draw its projections   14M

UNIT–IV

7. a) A pentagonal pyramid of side 30mm and axis length 50mm long is
       resting on H.P. on its base with a side perpendicular to the V.P. Draw
       its projections   7M

b) A hexagonal prism of side length 30mm is resting on V.P. on its base with a side perpendicular to the H.P. Draw its projections   7M
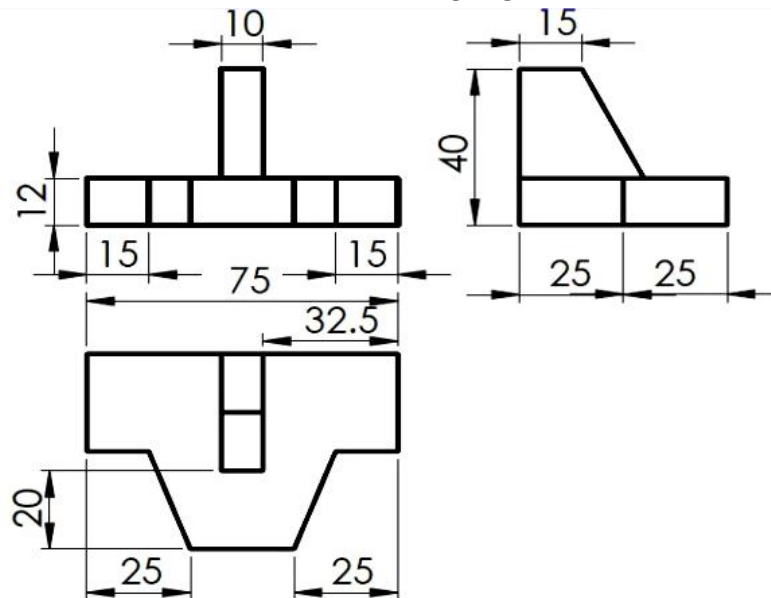
OR

8. A square prism, base 40mm side and height 65mm has its axis inclined at 45^0 to the HP and has an edge of its base, on the HP and inclined at 30^0 to the VP. Draw its Projections   14M

UNIT–V

9. Draw the isometric projection of a circular plane of diameter 50mm when the plane is   Horizontal   14M

OR

10. Draw the isometric view of the following figure.

       14M

***