R-15

Code: 5GC12

I B.Tech. I Semester Regular & Supplementary Examinations December 2016

Engineering Chemistry

(Common to CE, ME, CSE and IT)

Max. Marks: 70   Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) What are the water treatments for domestic purpose?   6M

   b) Define alkalinity of water? How alkalinity of water estimated?   8M

OR

2. a) Describe the estimation of dissolved oxygen in water?   6M

   b) Determine the total hardness of a sample of water in ^{0}Fr and ^{0}Clarke which showed the following analysis:- Suspended matter = 100 mg; $Ca(NO_3)_2$ = 16.4 mg/litre; $MgSO_4$ = 24 mg/litre; $MgCl_2$ = 19 mg/litre; NaOH = 40 mg/litre; KOH = 56 mg/litre (At. Masses of Na = 23, Mg = 24, K = 39 and Ca = 40.)   8M

UNIT–II

3. a) Explain the passivity of the metal.   4M

   b) Explain why a pure metal rod half immersed vertically in water, starts corrosion at the bottom.   10M

OR

4. Describe the construction and working of Leclanche cell. Write the different electrode reactions occur at the electrodes.   14M

UNIT–III

5. Write the following in detail
      a) Functionality of polymers.
      b) Compounding of rubber.   14M

OR

6. a) What are plastics? How they are classified?   6M

   b) What is phenol-formaldehyde resine? Write the preparation, properties and applications of it.   8M

UNIT–IV

7. a) What is the main raw material for the metallurgical coke? Describe the manufacture and uses of metallurgical coke?   7M

   b) Discuss the principles involved in the determination of fuel gas analysis?   7M

OR

8. a) Discuss the relative merits of solid, liquid and gases fuels.   7M

   b) Compare the relative merits of the various reforming processes.   7M

UNIT–V

9. a) Explain the reactions in setting and hardening of cement and explain the role of gypsum in cement.   7M

   b) Write the characteristics of a good propellant.   7M

OR

10. What are Lubricants? Explain the properties of Lubricants?   14M

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Code: 5G513-C

I B.Tech. I Semester Regular & Supplementary Examinations December 2016

Engineering Drawing- I

(Computer Science and Engineering)

Max. Marks: 70   Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) Construct a triangle of side length 50 mm

    b)   Construct a hexagon of side length 40 mm

OR

2. a) Divide a line of length 100 mm into 8 equal parts.

    b) Inscribe a pentagon in a circle of 50 mm diameter.

UNIT–II

3. 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 arcs of circles method. Draw a tangent to the ellipse at a point on it 25 mm above the major axis

OR

4. The vertex of a hyperbola is 65 mm from its focus. Draw the curve if the eccentricity is 3/2. Draw a normal and a tangent at a point on the curve, 75 mm from the directrix.

UNIT–III

5. Two points Q and S lie on a straight line through the centre C of a circle of 50 mm diameter, rolling along a fixed straight line. Draw and name the curves traced out by the points Q and S during one revolution of the circle. CQ = 20 mm, CS = 35 mm.

OR

6. A circle of 50 mm diameter rolls on the circumference of another circle of 175 mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. Name the curve. Draw a tangent and a normal to the curve at a pint 125 mm from the centre of the directing circle.

UNIT–IV

7. A point P is 15 mm above the HP and 20 mm in front of the V P. Another point Q is 25 mm behind the V P and 40 mm below the H P. Draw projections of P and Q keeping the distance between their projectors equal to 90 mm. Draw straight lines in their top and front views

OR

8. A 100 mm long line is parallel to and 40 mm above the H.P. Its two ends are 25 mm and 50 mm in front of the V.P. respectively. Draw its projections and find its inclination with the H.P.

UNIT–V

9. A line AB, 50 mm long, has its end 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 its projections.

OR

10. A Line PQ 100 mm long, is inclined at 30^0 to the H.P. and at 45^0 to the V.P. Its mid- point is in the V.P. and 20 mm above the H.P. Draw its projections.

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I B.Tech. I Semester Regular & Supplementary Examinations December 2016
Engineering Mathematics-I
(Common All Branches)

Max. Marks: 70   Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) Solve $3x(1-x^2)y^2\dfrac{dy}{dx}+(2x^2-1)y^3=ax^3$ 7M

 b) Find the Orthogonal trajectory of the family of confocal conics $\dfrac{x^2}{a^2+\}}+\dfrac{y^2}{b^2+\}}=1$, } being the parameter.   7M

OR

2. a) Solve $\cos^2 x\dfrac{dy}{dx}+y=\tan x$ 7M

 b) Find orthogonal trajectories of the family of curves $r^2=a^2\cos 2_{,,}$ 7M

UNIT–II

3. a) Solve $\dfrac{d^2y}{dx^2}-6\dfrac{dy}{dx}+9y=6e^{3x}+7e^{-2x}-\log 2$ 7M

 b) Solve by the method of variation of parameters $\dfrac{d^2y}{dx^2}+y=Co\sec x$ 7M

OR

4. a) Solve $(D^3-D)y=2x+1+4\cos x+2e^x$ 7M

 b) Solve by the method of variation of parameters $y^{11}-6y^1+9y=\dfrac{e^{3x}}{x^2}$ 7M

UNIT–III

5. a) Solve in series the equation $\dfrac{d^2y}{dx^2}+y=0,\quad y(0)=0$ 7M

 b) Prove that if 0 < a < b < 1, $\dfrac{b-a}{1+b^2}\angle\tan^{-1}b-\tan^{-1}a\angle\dfrac{b-a}{1+a^2}$ hence show that $\dfrac{f}{4}+\dfrac{3}{25}\angle\tan^{-1}\dfrac{4}{3}\angle\dfrac{f}{4}+\dfrac{1}{6}$ 7M

OR

6. a) Solve in series the equation $\dfrac{d^2y}{dx^2}+xy=0$ 7M

 b) Using Taylor's series, express the polynomial $2x^3+7x^2+x-6$ in powers of (x-1)   7M

UNIT–IV

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

 b) In a plane triangle, Find the maximum value of cosA cosB cosC.   7M

OR

8. a) If $u=x+y+z,\quad uv=y+z,\quad uvw=z$, show that $\partial(x,y,z)/\partial(u,v,w)=u^2v$ 7M

 b) A rectangular box open at the top is to have volume of 32 cubic ft. Find the dimensions of the box requiring least material for its construction.   7M

UNIT–V

9.   Trace the curve $a^2y^3=x^2(a^2-x^2)$ 14M

OR

10.   Trace the curve $r=a(1+\cos_{,,})$ 14M

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Code: 5GC11

I B.Tech. I Semester Regular & Supplementary Examinations December 2016
English through Literature
(Common All Branches)

Max. Marks: 70   Time: 3 Hours
Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)
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UNIT–I

1. a) The poem "The Road not Taken" is about making choices. Discuss   7M
    b) Why did Mini's father help Cabuliwallah?   7M

OR

2. Briefly discuss the various facets of G.D. Naidu's personality   14M

UNIT–II

3. a) Examine the values reflected by Rudyard Kipling in his poem "If"   7M
    b) What kind of message Mark Twain tries to give through his story "A Dog's Tale"?   7M

OR

4. Estimate Sudha Murthy's contribution to society   14M

UNIT–III

5. a) Appreciate the story "The Gift of Magi"   7M
    b) Interpret the poem "Leisure   7M

OR

6. Discuss Vijaya Bhatkar as the architect of Indian IT industry.   14M

UNIT–IV

7. a) What kind of superstitious beliefs do you find in the poem "Night of the Scorpion"?   7M
    b) Describe the astrologer in "An Astrologer's Day".   7M

OR

8. a) Write a few points about the childhood and early life of Bose.   7M
    b) List out some of the achievements of Bose.   7M

UNIT–V

9. Analyse the character of Natalya in Chekhov's *The Proposal.*   14M

OR

10. Estimate the achievements of Homi Jehangir Baba in the field of science   14M
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Code: 5GC15

I B.Tech. I Semester Regular & Supplementary Examinations December 2016

Mathematical Methods

(Common to CSE and IT)

Max. Marks: 70   Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)

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UNIT–I

1. a) Reduce the matrix to normal form and hence find its rank

$$\begin{bmatrix} 1 & 2 & -1 & 4 \\ 2 & 4 & 3 & 4 \\ 1 & 2 & 3 & 4 \\ -1 & -2 & 6 & -7 \end{bmatrix}$$

8M

   b) Solve $x + 3y - 2z = 0,\ 2x - y + 4z = 0,\ x - 11y + 14z = 0.$ 6M

OR

2. a) Find the values of 'k'for which the system of equations

$$(3k - 8)x + 3y + 3z = 0,\ 3x + (3k - 8)y + 3z = 0,\ 3x + 3y + (3k - 8)z = 0$$ 7M

   has a Non-trival solution.

   b) Test for consistency and solve

   $5x + 3y + 7z = 4,\ 3x + 26y + 2z = 9,\ 7x + 2y + 10z = 5$ 7M

UNIT–II

3. a) Find the Eigen roots and Eigen vectors of the matrix

$$\begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix}$$

8M

   b) If $\lambda_1, \lambda_2 \ldots \ldots \lambda_n$ are the eigen values of a matrix A, then Prove that A^m has the eigen values $\lambda_1^m, \lambda_2^m \ldots \ldots \lambda_n^m\ (m\,being\,a + ve\,\text{int}\,eger)$ 6M

OR

4. a) Verify Cayley-Hamilton theorem for the matrix, and hence find A^{-1}.

$$A = \begin{pmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{pmatrix}$$

7M

   b) Diagonalise the matrix $A = \begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{pmatrix}$.   7M

5. a) Reduce the Quadratic form $2x_1^2 + x_2^2 - 3x_3^2 + 12x_1x_2 - 4x_1x_3 - 8x_2x_3$ to Canonical form .Find its rank and signature. 8M

b) Prove that the matrix A=$\begin{bmatrix} \frac{1}{2}(1+i) & \frac{1}{2}(-1+i) \\ \frac{1}{2}(1+i) & \frac{1}{2}(1-i) \end{bmatrix}$ is Unitary and find A^{-1}. 6M

OR

6. a) Reduce the Quadratic form $3x^2 + 2y^2 + 3z^2 - 2xy - 2yz$ to the normal form by orthogonal transformation. 10M

b) Identify the nature of the quadratic form $x^2 + 4y^2 - z^2 - 4xy + 2xz - 4yz$ 4M

7. a) Find the real root of the equation $x \log_{10}^x = 1.2$ by regula-falsi method, correct to four decimals. 7M

b) Find the real root of equation $xe^x = 2$ by bijection method, correct upto three decimals. 7M

OR

8. a) Find the positive root of $x^4 - x = 10$ correct to three decimal places, using Newton-Raphson method. 7M

b) By using the bisection method ,find an approximate root of the equation $\sin x = \frac{1}{x}$ .carry out computations upto the six stages 7M

9. a) From the following table, estimate the number of students who obtained marks between 40 and 45.

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

8M

b) Find the polynomial $f(x)$ by using Lagranges formula and hence find $f(3)$

x	0	1	2	5
$f(x)$	2	3	12	147

6M

OR

10. a) A curve is passing through the points (0,18) (1,10) (3,-18) and (6,90).Find the slope of the curve at $x = 2$. 7M

b) Evaluate $\int_0^{\frac{f}{2}} e^{\sin x} dx$ by Simpson's 3/8th rule correct upto 4 decimal places. 7M

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R-15

Code: 5G111

I B.Tech. I Semester Regular & Supplementary Examinations December 2016

Problem solving Techniques and Introduction to 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 = 70Marks)

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UNIT–I

1. a) What are the General Problem solving strategies? Discuss.   7M

   b) Define Algorithm? Write an algorithm to read three integers and find the biggest number.   7M

OR

2. Illustrate different phases of Software Development Life Cycle (SDLC) with a neat diagram.   14M

UNIT–II

3. a) Describe the various steps involved in executing a C program.   7M

   b) What is Type Conversion? Illustrate type conversion with suitable example.   7M

OR

4. a) Write and explain the structure of C Program.   6M

   b) What are precedence and associativity of operators? Explain them with an example.   8M

UNIT–III

5. a) Compare While and do.. While statements with suitable example code.   8M

   b) Write a program to display the numbers, 1 to 100 except 29, 77 and 86.   6M

OR

6. a) Discuss in detail about the for Loop statements in C.   7M

   b) Write about the functioning of the jump statements, **break** and **continue** with suitable examples.   7M

UNIT–IV

7. a) What is an Array? Explain how to declare one dimensional array with example.   8M

   b) Write a C program to find the sum of all elements in the array.   6M

OR

8. What are the different String Library functions available in C? Explain them with example.   14M

UNIT–V

9. a) What is a function? What are the advantages of using functions in a program?   8M

   b) Explain in detail about Preprocessor Commands.   6M

OR

10. a) Describe the two parameter passing methods with suitable examples.   7M

    b) What is a recursive function? Write a C program to find the factorial of a given number using recursion.   7M

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