Hall Ticket Number :										

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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Hall Ticket Number :										

R-15

Code: 5G513

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

Engineering Drawing- I

(Information Technology)

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 hexagon of side length 30 mm

   b) Bisect an angle 60^0

OR

2. a) Inscribe a pentagon in a circle of 40 mm diameter

   b) Trisect a right angle

UNIT–II

3. Construct a parabola when the distance from the focus to directrix is 60 mm. also draw a tangent and normal to the curve at a distance of 30 mm from the directrix

OR

4. The length of major axis is 150 mm and minor axis is 100 mm. Draw an ellipse using oblong method.

UNIT–III

5. A circle of 50 mm diameter rolls along a straight line without slipping, Draw the curve traced out by a point P on the circumference, for one complete revolution of the circle. Name the curve. Draw a tangent to the curve at a point on it 40 mm from the line.

OR

6. Construct a hypocycloid, rolling circle 50 mm diameter and directing circle 175 mm diameter. Draw a tangent to it at a point 50 mm from the centre of the directing circle.

UNIT–IV

7. A point P is 20 mm below H.P and lies in the third quadrant. Its shortest distance from XY is 40 mm. Draw its projections.

OR

8. The length of the top views of a line parallel tom the V.P. and inclined at 45^0 to the H.P. is 5 cm. One end of the line is 1.2 cm above the H.P. and 2.5 cm in front of the V.P. Draw the projection of the line

UNIT–V

9. A line PQ 75 mm long has its end P in the V.P. and the end Q in the H.P. The line is inclined at30^0 to the H.P. and at $60^0$to the V.P. draw its projections.

OR

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

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Hall Ticket Number :										

R-15

Code: 5GC14

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

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

OR

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

   b) Find orthogonal trajectories of the family of curves $r^2=a^2\cos 2\theta$ 7M

UNIT–II

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

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

UNIT–III

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

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

OR

6. a) Solve in series the equation $\frac{d^2y}{dx^2}+xy=0$ 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 $U=\log\left(x^3+y^3+z^3-3xyz\right)$ prove that $\left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)^2U=\frac{-9}{(x+y+z)^2}$ 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 $r=a(1+\cos\theta)$ 14M

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Hall Ticket Number :										

R-15

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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Hall Ticket Number :										

R-15

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 $a_1, a_2 \ldots\ldots\ldots a_n$ are the eigen values of a matrix A, then Prove that A^m has the eigen values $a_1^m, a_2^m \ldots\ldots\ldots a_n^m\ (m\, being\ a+ve\, integer)$ 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

UNIT–III

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

UNIT–IV

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

UNIT–V

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

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Hall Ticket Number :										

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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