Hall Ticket Number :										

R-15

Code: 5GC12

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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 is meant by sterilization of water? Explain sterilization of water is carried out by using chlorine 7M

   b) Describe the estimation of hardness by EDTA method 7M

OR

2. a) How water gets hardness. Distinguish between hard water and soft water? 7M

   b) How is hardness of water expressed? Explain any one method for the determination of hardness of water. 7M

UNIT–II

3. Describe the factors affecting the rate of corrosion. 14M

OR

4. Explain electroless plating of nickel with relevant equations and mention it's advantages over electroplating. 14M

UNIT–III

5. What are elastomers? Write the processing of raw rubber? Explain the draw backs of raw rubbers. 14M

OR

6. What is Bakelite? Write the preparations, properties and applications of Bakelite in detail. 14M

UNIT–IV

7. a) Illustrate one method of carbonization of coal to yield coke? 7M

   b) Compare the various methods of coke production? 7M

OR

8. a) Discuss the principles involved in the determination of fuel gas analysis? 7M

   b) What is the significance of pre-heating furnace oil before burning? 7M

UNIT–V

9. What is pyrometric cone equivalent? How it is determined for refractories? 14M

OR

10. What is meant by rocket propellant? How is it useful? Distinguish between solid and Liquid rocket propellants. 14M

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Hall Ticket Number :										

R-15

Code: 5GC14

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Engineering Mathematics-I

(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) $(1+y^2)+\left(x-e^{\tan^{-1}y}\right)\frac{dy}{dx}=0$ 7M

   b) The temperature of a body drops from 100^{0}C to 75^{0}C in ten minutes when the temperature of the surrounding air is 20^{0}C. When will be the temperature is 25^{0}C. 7M

OR

2. a) Uranium disintegrates at a rate proportional to the amount present at any instant. If M_1 and M_2 are games of uranium that are present at times T_1 and T_2 respectively, find half life of uranium. 7M

   b) Solve $\frac{dy}{dx}+y\,tanx=y^2\,secx$. 7M

UNIT–II

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

   b) Solve $(D^3-4D^2-D+4)y=e^{3x}cos2x$. 7M

OR

4. a) Solve $(D^2+4D+20)y=23sint-15cost$. 7M

   b) Solve $(D^2-1)y=xsinx+x^2e^x$. 7M

UNIT–III

5. a) Solve in series the equation $(1+x^2)\frac{d^2y}{dx^2}+x\frac{dy}{dx}-y=0$. 7M

   b) Verify Rolle's theorem for the function $f(x)=(x-a)^m(x-b)^n$, where *m* and *n* are positive integers, in [a, b]. 7M

OR

6. a) Find the series solution of the equation $x(1-x)\frac{d^2y}{dx^2}-(1+3x)\frac{dy}{dx}-y=0$. 7M

   b) Obtain the Maclaurin's series expansion of *f(x) = tanx.* 7M

UNIT–IV

7. a) If $x=r\,sin\theta\,cos\phi, y=rsin\theta\,sin\phi, y=rcos\theta,$ then show that

   $\frac{\partial(x,y,z)}{\partial(r,\theta,\phi)}=r^2\,sin\theta$. 7M

   b) Find the maximum and minimum values of

   $f(x,y)=x^3+3xy^2-15x^2-\quad 15y^2+72x.$ 7M

OR

8. a) Find a point on the plane *3x+2y+z-12=0*, which is nearest to the origin. 7M

   b) If $u=\log(x^3+y^3-x^2y-xy^2)$, then show that

   $\frac{\partial^2u}{\partial x^2}+2\frac{\partial^2u}{\partial x\partial y}+\frac{\partial^2u}{\partial y^2}=\quad -\frac{4}{(x+y)^2}$ 7M

UNIT–V

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

OR

10. Trace the curve $r^2=a^2\,Cos\,2\theta$ 14M

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Hall Ticket Number :										

R-15

Code: 5GC15

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Mathematical Methods –I

(Common to CSE & IT)

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 the matrix $A=\begin{bmatrix} 2 & 1 & 3 & 5 \\ 4 & 2 & 1 & 3 \\ 8 & 4 & 7 & 13 \\ 8 & 4 & -3 & -1 \end{bmatrix}$. 7M

   b) Determine the value of ^{a} for which the system of homogeneous linear equations $x-2y+z=0$, $2x-y+3z=0$ and $^{a}x+y-z=0$ has non–trivial solution. 7M

OR

2. a) Solve the equations $x+3y-2z=-7$, $4x+y+3z=5$ and $2x-5y+7z=19$ using Gauss elimination method. 6M

   b) Find the values of a and b for which the system of equations $2x+3y+5z=9$, $7x+3y-2z=8$ and $2x+3y+az=b$ has (i) No solution (ii) Unique solution (iii) Infinitely many solutions. 8M

UNIT–II

3. a) One of the eigen values of the matrix $A=\begin{bmatrix} 4 & 1 \\ 1 & 4 \end{bmatrix}$ is 5. Find the other eigen value and hence, find the eigen values of the matrix $B=A^2+A+I$. 6M

   b) Verify Cayley – Hamilton theorem for the matrix $A=\begin{bmatrix} 3 & 2 & 4 \\ 4 & 3 & 2 \\ 2 & 4 & 3 \end{bmatrix}$ and hence, find A^{-1}. 8M

OR

4. Diagonalize the matrix $A=\begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ -4 & 4 & 3 \end{bmatrix}$ and hence, find A^4. 14M

UNIT–III

5. Reduce the quadratic form $6x^2+3y^2+3z^2-2yz$ to canonical form by an orthogonal transformation. Hence, find its rank, index and signature. 14M

OR

6. a) Find the eigen values and eigen vectors of $A=\begin{bmatrix} 4 & 1-3i \\ 1+3i & 7 \end{bmatrix}$. 6M

b) Express the matrix $A=\begin{bmatrix} i & 2-3i & 4+5i \\ 6+i & 0 & 4-5i \\ -i & 2-i & 2+i \end{bmatrix}$ as the sum of Hermitian and Skew-Hermitian matrix. 8M

UNIT–IV

7. Find the positive root of the equation $x\log_{10} x=1.2$ correct to three decimal places by (i) Newton-Raphson method (ii) Regula-Falsi method. 14M

OR

8. a) Using Bisection method, find the real root of the equation $x^3-4x-9=0$ correct to three decimal places. 7M

b) Using Newton–Raphson method, find the real roof of the equation $\cos x = xe^x$ correct to three decimal places. 7M

UNIT–V

9. a) The table gives the distance in kilometers of the visible horizon for the given heights in meters above the earth's surface:

x (height)	100	150	200	250	300	350	400
d (distance)	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the values of distance d, when $x=218$ meters and $x=360$ meters 8M

b) Apply Lagrange's Interpolation formula, find $f(3)$ from the following data,

X	0	1	2	5
y	2	3	12	147

6M

OR

10. a) The distances (y cm) traversed by a particle at different times(t seconds) are given below:

t	1.0	1.1	1.2	1.3	1.4
y	43.1	47.7	52.1	56.4	60.8

Find the velocity and acceleration of the particle at $t=1.1$ 7M

b) Evaluate the integral $\int_0^1 \frac{x^2}{1+x^3}dx$ using Simpson's rule. Compare the error with exact value. 7M

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Hall Ticket Number :										

R-15

Code: 5G111

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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 = 70 Marks)

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UNIT–I

1 a) What is Programming Language? Explain about Computer Programming Languages with example. 7M

b) Explain different phases in Software Development method. 7M

OR

2. a) Define flowchart. Draw flowchart to find biggest of three numbers 7M

b) Define algorithm. Write an algorithm to find roots of a quadratic equation. 7M

UNIT–II

3. a) Describe the various steps involved in executing a C program 6M

b) Define operator. Describe different types of operators used in c language with example. 8M

OR

4. a) Describe the structure of c program with suitable example. 8M

b) Explain typedef AND enumerated type with suitable example. 6M

UNIT–III

5. a) Write a program to display the even numbers between 1 and 100 6M

b) Explain break, continue and goto statements with suitable example. 8M

OR

6. Write a c program to print the following pattern using while, do-while and for loop.

```
1
1  2
1  2  3
1  2  3  4
```

14M

UNIT–IV

7. a) Write a c program for sorting the elements of an array in ascending order. 8M

b) Define string. Explain declaration and initialization of string variables. 6M

OR

8. a) What is an array? How one-dimensional arrays are declared and initialized. Give suitable example. 6M

b) Explain String handling functions with suitable example programs. 8M

UNIT–V

9. a) What is function? Describe different categories of functions with suitable example programs. 9M

b) Explain in detail about Preprocessor Commands. 5M

OR

10. a) Explain the scope, visibility and lifetime of variables with suitable examples. 8M

b) Describe the two parameter passing methods with suitable examples 6M

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Hall Ticket Number :										

R-15

Code: 5G513

I B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Engineering Drawing-I

(Common to EEE, ECE, CSE and IT)

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) Divide a straight line of 125 mm into a 9 equal parts.
   b) Inscribe a regular pentagon of side length equal to 30 mm in a circle.

OR

2. a) Draw a tangent from any point outside the circle with suitable radius
   b) Construct a hexagon, given the length of the side is equal to 25 mm

UNIT–II

3. a) A cricket ball thrown reaches a maximum height of 9 m and falls on the ground at a distance of25 m from the point of projection. Draw the path of the ball. What is the angle of projection?
   b) Construct an ellipse when a pair of conjugate diameters AB and CD are equal to 120 mm and 50 mm respectively. The angle between the conjugate diameters is *60°.*

OR

4. a) Draw a parabola with the distance of the focus from the directrix at 50mm using Eccentricity method
   b) Two fixed point A and B are 120 mm apart. Trace the locus of a point moving in such a way that the difference of its distances from the fixed points is 80 mm. Name the curve after plotting it.

UNIT–III

5. a) A circular wheel of diameter 100 mm rolls over a straight surface without slipping. Draw the curve traced by a point P for one revolution of the wheel. Assume that the critical position of the point P is at the top of the vertical centre line of the wheel. Name the curve.
   b) Draw a hypocycloid of a circle of 40 mm diameter which rolls inside another circle of 200 mm diameter for one revolution. Draw a tangent and normal at any point on it

OR

6. a) Draw an epicycloid of rolling circle of diameter 40 mm which rolls outside another circle (base circle) of 150 mm diameter for one revolution. Draw a tangent and normal at any point on the curve.
   b) Construct a conic when the distance of its focus from its directrix is equal to 50 mm and its eccentricity is 2/3.Name the curve, mark its major axis and minor axis. Draw a tangent at any point, P on the curve.

UNIT–IV

7. a) Draw the projections of points for the following cases
   (i) A point P is lying at 30 mm behind VP and 60 mm below HP
   (ii) Point Q, 20 mm above HP, 25 mm in front of VP;
   (iii) Point R, on HP, 25 mm behind VP;
   (iv) Point S, on VP, 30 mm above HP;

   b) Draw the projections of a straight line 70 mm long when it is parallel to both HP and VP. It is 15 mm in front of VP and 40 mm above HP.

OR

8. a) The length of the front view of a line CD which is parallel to HP and inclined 30° to VP, is 50 nun. The end C of the line is 15 mm in front of VP and 25 mm above HP. Draw the projections of the line and find its true length

   b) A line EF 60 mm long is parallel to VP and inclined 30° to HP. The end E is 10 mm above HP and 20 mm in front of VP. Draw the projections of the line

UNIT–IV

9. a) Draw the projections of a point A which is at 40 mm above HP and 25 mm in front of VP.

   b) A line of length 70 mm is parallel and 20 mm in front of VP. It is also inclined at 45° to HP and one end is on it. Draw its projections

OR

10. a) A line AB, 90 mm long, is inclined at 300 to the H.P. Its end A is 12 mm above the H.P. and 20 mm in front of the V.P. Its front view measures 65 mm. Draw the top view of AB and determine its inclination with the V.P.

    b) A line AB of 70 mm long, has its end A at 10 mm above H.P and 15 mm in front of V.P. Its front view and top view measure 50 mm and 60 mm respectively. Draw the projections of the line and determine its inclinations with H.P. and v.P.

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