Hall Ticket Number :										

R-14

Code: 4GC13

B.Tech. I Year Supplementary Examinations October 2020

Engineering Chemistry

(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 hardness of water? Mention its units?
   b) Describe the desalination process by reverse osmosis with a neat sketch.

OR

2. a) Write a note on internal treatment?
   b) What is break point chlorination? State its significance?

UNIT–II

3. What are fuel cells? Describe the working principle of methanol-oxygen fuel cell with reactions.

OR

4. a) What is concentration cell corrosion and galvanic corrosion?
   b) Calculate the standard emf of Ni-Ag cell whose E^0_{Ni} and E^0_{Ag} are -0.25 and +0.83 respectively also write cell representation.

UNIT–III

5. a) Distinguish between thermoplastic and thermosetting polymers.
   b) Write a note on compounding of rubber?

OR

6. a) Describe doped conducting polymers with suitable example.
   b) Write a note on vulcanization of rubber.

UNIT–IV

7. a) Discuss any five characteristics of a good fuel?
   b) Classify the fuels with examples?

OR

8. a) Write a note on production and uses of producer gas, water gas and Bio gas.
   b) Define knocking? Write about octane number?

UNIT–V

9. a) What are lubricants? Write any three properties and applications of lubricants.
   b) What are refractories? Discuss any three properties of refractories?

OR

10. Explain the mechanism of (i) thin film lubrication, (ii) thick film lubrication

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Hall Ticket Number :										

R-14

Code: 4GC12

B.Tech. I Year Supplementary Examinations October 2020

Engineering Physics

(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)	Write short notes on physical optics.	4M
	b)	Explain the Fraunhofer diffraction due to single slit.	10M
		OR	
2.	a)	Describe the He-Ne lasers and its applications.	7M
	b)	Discuss the principle and working of semiconducting laser.	7M

UNIT–II

3.	a)	What are Miller indices? Explain the procedure for finding Miller indices. Give one example	7M
	b)	Draw the planes (211), (100) and and (220)	7M
		OR	
4.		Prove that FCC is more closely packed than BCC and SC.	14M

UNIT–III

5.	a)	State and explain Heisenberg uncertainty principle	7M
	b)	Define de-Broglie dual nature of energy and derive its wavelength	7M
		OR	
6.	a)	Define matter waves and write their properties	7M
	b)	Derive Schrödinger 3-D matter wave equation	7M

UNIT–IV

7.	a)	Write about intrinsic and extrinsic semiconductors.	6M
	b)	Derive the expression to compute the charge carrier concentration in the conduction band of an intrinsic semiconductor.	8M
		OR	
8.	a)	State and explain Hall effect.	5M
	b)	Derive the expression for Hall coefficient and discuss the importance of Hall effect in semiconductors.	9M

UNIT–V

9.	a)	Define superconductivity?	6M
	b)	Describe the effect of magnetic field, heavy current and isotopes on superconductors	8M
		OR	
10.	a)	Describe ac & dc Josephson's effect	5M
	b)	Mention the applications of Josephson's effect	9M

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Hall Ticket Number :										

R-14

Code: 4GC14

B.Tech. I Year Supplementary Examinations October 2020

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) The temperature of the body drops from 100^0c to 75^0c in ten minutes when the surrounding air is at 20^0c temperature. What will be its temperature after half an hour? 7M

   b) Apply the method of variation of parameters to solve $\frac{d^2y}{dx^2} + y = \cos ecx$ 7M

OR

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

   b) Solve $(D^2+4)y = \cos x$ 7M

UNIT–II

3. a) Obtain the maclaurins series expansions of the following function
   (i) e^x (ii) $\sin x$ (iii) $\cosh x$ 7M

   b) If $u = x^2 - 2y,\ v = x + y + z,\ w = x - 2y + 3z$ find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ 7M

OR

4. a) Verify Rolle's theorem for $f(x) = 2x^3 + x^2 - 4x - 2$ in $\left[-\sqrt{3}, \sqrt{3}\right]$ 7M

   b) Find the maximum and minimum value of $x^3 + y^3 - 3axy$ 7M

UNIT–III

5. a) Trace the curve $r = a(1+\cos^{-})$ 7M

   b) Evaluate $\iint (x^2+y^2)dxdy$ in the positive quadrant for which $x + y \le 1$ 7M

OR

6. a) Trace the curve $r = a(1+\cos^{-})$ 7M

   b) Evaluate $\iint (x^2+y^2)dxdy$ in the positive quadrant for which $x + y \le 1$ 7M

UNIT–IV

7. a) Find the Laplace transform of $e^{-3t}(2\cos 5t - 3\sin 5t)$ 7M

   b) Find the inverse Laplace transform of $\log\left(\frac{s+3}{s+4}\right)$ 7M

OR

8. a) Evaluate $L\left\{\frac{1-\cos t}{t}\right\}$ 7M

   b) Using Convolution theorem, find $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$ 7M

UNIT–V

9. a) Find the angles between the surface $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2,-1,2)$ 7M

   b) If $\bar{f} = (5xy - 6x^2)\bar{i} + (2y - 4x)\bar{j}$, evaluate $\int_c \bar{f}.d\bar{r}$ along the curve 'c' in xy-plane $y = x^3$ from (1,1) to (2,8). 7M

OR

10. a) (i) If $\bar{f} = (x+3y)\bar{i} + (y-2z)\bar{j} + (x+pz)\bar{k}$ is solenoidal, find p.
    (ii) Find curl $\bar{f}$ where $\bar{f} = grad(x^3 + y^3 + z^3 - 3xyz)$. 7M

    b) Evaluate by Green's theorem $\int_c (y - \sin x)dx + (\cos x)dy$ where 'c' is the triangle enclosed by the lines $y = 0, x = \frac{\pi}{2}, \pi y = 2x$ 7M

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Hall Ticket Number :										

R-14

Code: 4GC15

B.Tech. I Year Supplementary Examinations October 2020

Mathematical Methods

(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) Find the rank of the matrix by reducing it to the echelon form given

$$A=\begin{bmatrix}0 & 1 & 2 & -2\\ 4 & 0 & 2 & 6\\ 2 & 1 & 3 & 1\end{bmatrix}$$ 7M

b) Find whether the following equations are consistent, if so solve them $x+2y+2z=2,\ 3x-2y-z=5;\ 2x-5y+3z=-4,\ x+4y+6z=0.$ 7M

OR

2. a) Find the rank of the following $\begin{bmatrix}1 & 2 & 3\\ 1 & 4 & 2\\ 2 & 6 & 5\end{bmatrix}$ by reducing it to normal form . 7M

b) If a is an eighen value of A, then a^m is an eighen value of A^m, m being any +ve integer. 7M

UNIT–II

3. a) Every square matrix can be written as a sum of Hermitian and Skew-Hermitian matrices. 7M

b) The Eigen values of a Hermitian matrix are real. 7M

OR

4. Find the Eigen values and Eigen vector for A= $\begin{bmatrix}i & 0 & 0\\ 0 & 0 & i\\ 0 & i & 0\end{bmatrix}$ and show that A is a skew Hermitian matrix. 14M

UNIT–III

5. a) Find a real root of $x^3-5x+3=0$ using bisection method 7M

b) Find out the root of the equation $x^3-x-4=0$ by regula-falsi method . 7M

OR

6. a) Find a real root of the equation $x+\log_{10}x-2=0$ using Newton's Raphson Method. 7M

b) Find the missing terms in the table

x	45	50	55	60	65
y	3.0	-	2.0	-	-2.4

7M

UNIT–IV

7. a) By the method of least squares, find the straight-line that best fit the following data

x	1	2	3	4	5
y	14	27	40	55	68

7M

b) Fit a second degree polynomial to the following table, by the method of least squares

x	10	12	15	23	20
y	14	17	23	25	21

7M

OR

8. Use Runge-Kutta method to evaluate $y(0.1)$ find $y(0.2)$ given that $y'=x+y, y(0)=1$ 14M

UNIT–V

9. Find the Fourier series for the function $f(x)=x^2$ in the interval $(0,2\circledR)$. 14M

OR

10. Solve $y^3\frac{\partial z}{\partial x}+x^2\frac{\partial z}{\partial y}=0$ 14M

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Hall Ticket Number :										

R-14

Code: 4G513

B.Tech. I Year Supplementary Examinations October 2020

Engineering Drawing

(Common to EEE, ECE, 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. Draw an epi-cycloid 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.

OR

2. a) Draw an ellipse having major axis is equal to 100 mm and the minor axis is equal to 70 mm by using concentric circle method.

   b) The foci of an ellipse are 90mm apart and the minor axis is 65mmlong. Draw the ellipse. Draw a tangent to it at a point on it 15mm from major axis.

UNIT–II

3. An 80mm long line PQ is inclined at 30 deg to V.P and is parallel to H.P. The end P of the line is 20mm above the H.P and in front of the V.P, draw the projection of the line.

OR

4. A line AB, 70mm long, has its end A 15mm above HP and 20mm in front of VP. It is inclined at 30° to HP and 45°to VP. Draw its projections

UNIT–III

5. A regular pentagon 50mm side has an edge in the V.P., inclined at 45^0 to H.P. but the surface making an angle of 30^0 with V.P. Draw its projections.

OR

6. Draw the projections of a hexagon of 40mm side with a side parallel to and 20mm above H.P. but inclined at 60^0 to V.P. The surface of the hexagon is inclined at 30^0 to H.P.

UNIT–IV

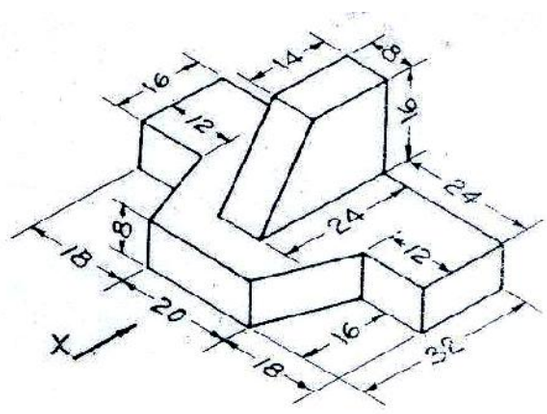
7. Draw the projections of a cone, 50mm base dia and 60mm long axis, having one of its generators in the V.P. inclined at 30^0 to H.P., the apex being in H.P.

OR

8. A cone 40 mm diameter and 50 mm axis is resting on one generator on HP which makes 30^0 inclination Draw its projections?

UNIT–V

9. Draw the following views of the object shown pictorially: (i) Front view.
   (ii) Top view. (iii) Side view.



OR

10. Draw the isometric projection of a hexagonal prism, base 30mm long edges & axis 70mm long, the axis being vertical.

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