Code No: **R231103** **R23** **SET - 1**

I B. Tech I Semester Regular Examinations, January-2024
CHEMISTRY
(Common to EEE, CSE)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from **Each Unit** in **Part-B***

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PART –A (20 Marks)

1. a) What is the Significance of Ψ and Ψ^2? [2M]
b) What are the Bonding and Anti-Bonding molecular orbitals? [2M]
c) Write any two applications of Semiconductors. [2M]
d) How Super Conductors are classified? [2M]
e) What is electrochemical cell? Give an example. [2M]
f) Distinguish between Primary and Secondary batteries. [2M]
g) What is functionality of monomers? [2M]
h) Mention two important applications of Conducting Polymers. [2M]
i) What is Electromagnetic spectrum? [2M]
j) Define the role of monochromator. [2M]

PART – B (50 MARKS)

UNIT-I

2. a) Write Schrodinger wave equation and explain its significance in Quantum mechanics [5M]
b) Draw the molecular orbital diagram of O_2. Explain the magnetic nature and bond order. [5M]

(OR)

3 a) Discuss particle in one dimensional box with suitable example [5M]
b) Draw the π-molecular orbitals of butadiene. [5M]

UNIT-II

4. a) Explain basic principle of Semiconducting materials. [5M]
b) Write an account on Carbon Nano tubes? [5M]

(OR)

5. a) What are Super capacitors? How are they classified? [5M]
b) Discuss the advancement of nanotechnology in nano medicine. [5M]

UNIT-III

6. a) Derive Nernst equation. What is Calomel electrode? [5M]
b) Describe the construction and working of Hydrogen-Oxygen fuel cell. [5M]

(OR)

7. a) What are Secondary cells? Describe the construction of lithium ion batteries. [5M]
b) Discuss principle involved in Conductometric titrations. [5M]

UNIT-IV

8. a) Distinguish between addition and condensation polymerization process. [5M]
b) Write about mechanism of cationic addition polymerization. [5M]

(OR)

9. a) Describe the preparation, properties and applications of Bakelite. [5M]
b) Explain about Biodegradable polymers with suitable examples. [5M]
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UNIT-V

10. a) State Beer-Lambert's law. Explain how this law can be used to determine the concentration of coloured solutions. [5M]

    b) Explain about High Pressure Liquid Chromatography. [5M]

(OR)

11. a) Write the basic principle involved in IR Spectroscopy. [4M]

    b) Write about fundamental modes of vibration in IR spectroscopy. [6M]

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Code No: **R231103** **R23** **SET - 2**

I B. Tech I Semester Regular Examinations, January-2024
CHEMISTRY

(Common to EEE, CSE)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (20 Marks)

1.	a)	Define the linear combination of atomic orbitals.	[2M]
	b)	Define non-bonding orbital.	[2M]
	c)	What is Semi-Conductor? Give suitable example.	[2M]
	d)	What are nanoparticles? Give two examples?	[2M]
	e)	Define electrode potential.	[2M]
	f)	What is significance of electrochemical series?	[2M]
	g)	What is addition polymerization? Give suitable example.	[2M]
	h)	Write two important applications of Biodegradable polymers?	[2M]
	i)	Write combined form of Lamberts-Beers law.	[2M]
	j)	What is reference electrode? Give one example.	[2M]

PART – B (50 MARKS)

UNIT-I

2.	a)	Discuss about significance of Ψ and Ψ^2.	[5M]
	b)	Draw the π-molecular orbitals of benzene.	[5M]

(OR)

3	a)	Explain bonding in homo and heteronuclear diatomic molecules using MO Theory.	[5M]
	b)	Draw the molecular orbital diagram of CO. Explain the magnetic nature and bond order.	[5M]

UNIT-II

4.	a)	Mention few important applications of Super conductors.	[5M]
	b)	What are Nano particles? Write applications of Fullerene.	[5M]

(OR)

5.	a)	Explain basic principle of Super capacitor materials.	[5M]
	b)	Give an account of Graphine nanoparticles.	[5M]

UNIT-III

6.	a)	Describe the working principle and applications of Lithium-ion batteries.	[5M]
	b)	Explain the advantages of fuel cells over electrochemical cells.	[5M]

(OR)

7.	a)	Write the Nernst equation for electrode potential. Discuss briefly Potentiometric sensors.	[6M]
	b)	What are the limitations of Conductometric titrations?	[4M]
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Code No: **R231103**

R23

SET - 2

UNIT-IV

8. a) Distinguish between thermoplastics and thermosetting plastics. [5M]

   b) Write about Preparation, properties and applications of i) Teflon and ii) Nylon-6,6. [5M]

(OR)

9. a) What are conducting polymers? How are they classified? Write important engineering applications. [5M]

   b) Explain coordination polymerization process with suitable examples. [5M]

UNIT-V

10. a) Explain Electronic transition occur in UV-Visible spectroscopy. [4M]

    b) Write about important applications of IR spectroscopy. [6M]

(OR)

11. a) Explain the principle and instrumentation of UV-Visible spectroscopy with neat diagram. [5M]

    b) Discuss selection rules for IR spectroscopy. [5M]

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Code No: **R231103** **R23** **SET - 3**

I B. Tech I Semester Regular Examinations, January-2024
CHEMISTRY
(Common to EEE, CSE)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (20 Marks)

1.	a)	What are the molecular orbitals?	[2M]
	b)	Define the bond order.	[2M]
	c)	What type of magnetism is developed in a superconductor when its temperature is lowered below its critical temperature?	[2M]
	d)	Write a note on super capacitor.	[2M]
	e)	What are redox titrations? Give one example.	[2M]
	f)	What is a fuel cell? Give an example.	[2M]
	g)	What is monomer? Give any two examples.	[2M]
	h)	What are the applications of Bakelite?	[2M]
	i)	What is chromatogram?	[2M]
	j)	Write two deviations of Lamberts-Beers law.	[2M]

PART – B (50 MARKS)

UNIT-I

2.	a)	Explain about Liner combination of Atomic Orbitals.	[5M]
	b)	Discuss about Schrodinger wave equation.	[5M]
		(OR)	
3	a)	Discuss Salient features of Molecular Orbital Theory.	[5M]
	b)	Draw the energy level diagram of Oxygen molecule and calculate the bond order.	[5M]

UNIT-II

4.	a)	What are the important engineering applications of semi conducting materials?	[5M]
	b)	Write about classifications of Nanoparticles.	[5M]
		(OR)	
5.	a)	Explain the basic concepts and applications of Super conductors with examples.	[5M]
	b)	Write properties and applications of carbon Nano tubes.	[5M]

UNIT-III

6.	a)	What is meant by electrochemical sensors? Explain Amperometric sensors.	[5M]
	b)	What is primary cell? Explain construction and applications of Zinc-Air battery.	[5M]
		(OR)	
7.	a)	Discuss about Acid- Base titrations using conducto-meter.	[5M]
	b)	Explain PEMFC fuel cell with neat sketch.	[5M]
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UNIT-IV

8. a) Write the preparation, properties and applications of Buna-S and Buna-N rubbers. [5M]

   b) Write Preparation, properties and applications of PVC. [5M]

(OR)

9. a) Distinguish between chain growth and step growth polymerization process with suitable examples. [5M]

   b) Explain preparation, properties and applications of PGA and PLA. [5M]

UNIT-V

10. a) Draw the block diagram of Infrared Spectrometer and explain the functions of various components. [6M]

    b) Write about basic principle involved in Chromatography. [4M]

(OR)

11. a) Explain absorption shifts in UV-Visible spectroscopy. [4M]

    b) Discuss important applications of UV-Visible Spectroscopy. [6M]

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Code No: **R231103** **R23** **SET - 4**

I B. Tech I Semester Regular Examinations, January-2024
CHEMISTRY
(Common to EEE, CSE)

Time: 3 hours | Max. Marks: 70

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*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (20 Marks)

1. a) Define the terms Wavelength, Frequency and Velocity. [2M]
   b) Write wave and particle dual nature of an electron. [2M]
   c) What is Super Capacitor? Give suitable example. [2M]
   d) How does Conductivity of a Super Conductor vary with temperature? [2M]
   e) What is primary battery? Give an example. [2M]
   f) What is meant by standard electrode potential? How can it be measured? [2M]
   g) What are conducting polymers? [2M]
   h) Write the preparation of Nylon - 6,6. [2M]
   i) Define the term Retention time. [2M]
   j) How can the fingerprint region be used to identify a compound? [2M]

PART – B (50 MARKS)

UNIT-I

2. a) Discuss about combinations of Atomic Orbitals. [5M]
   b) Write Schrodinger Wave equation in cartesian coordinate and explain the terms. [5M]

(OR)

3 a) What are the differences between bonding and anti-bonding molecular orbitals? [5M]
   b) Discuss MO energy level diagram of O_2 and CO. [5M]

UNIT-II

4. a) Explain doping in semi-conductors. [5M]
   b) What is the effect of nanotechnology on food science? [5M]

(OR)

5. a) Distinguish between superconductor and perfect conductor and explain. [5M]
   b) Discuss the properties and important applications of nanoparticles. [5M]

UNIT-III

6. a) Explain about potentiometric titrations. [5M]
   b) What is meant by electrochemical sensors? Explain Glucose potentiometric sensors. [5M]

(OR)

7. a) What is meant by conductivity cell? Explain acid base titrations with the help of Conducto-meter. [5M]
   b) With neat sketch explain about Polymer Electrolyte Membrane Fuel cells. [5M]
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UNIT-IV

8. a) Write a note on i) Teflon ii) PVC iii) PLA [5M]

   b) How polyaniline act as conducting polymer? Explain its mechanism of conduction. [5M]

(OR)

9. a) Define polymerization process. Explain mechanism of free radicle addition polymerization. [5M]

   b) Write about mechanism of conduction and applications of polyacetylene and polyaniline. [5M]

UNIT-V

10. a) Discuss briefly components of an HPLC instrument. [5M]

    b) Write a note on Instrumentation and various spectroscopies used for instrumental methods. [5M]

(OR)

11. a) Explain basic principle of UV-Visible spectroscopy. [5M]

    b) Discuss important biological applications of IR spectroscopy. [5M]

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Code No: **R231110** **R23** **SET - 1**

I B. Tech I Semester Regular Examinations, January-2024

ENGINEERING GRAPHICS

(Common to CE, ME, ECE, IT, AME, Mining, Robotics, Agri E, ECE-Allied, CSE-Allied)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from **Each Unit** in **Part-B***

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UNIT– I

1. a) Construct a plain scale of R.F.1:50,000 to show kilometres and hectometres and long enough to measure up to 7 kilometres. Measure a distance of 54 hectometres on your scale. [7M]

   b) Construct an ellipse, with distance of the focus from the directrix as 50mm and eccentricity as 2/3. Also draw normal and tangent to the curve at a point 40mm from the directrix. [7M]

(OR)

2. a) Construct a scale to be used with a map, the scale of which is 1cm = 500m. The maximum length to be read is 5km. Mark on the scale, a distance of 3.85km. [7M]

   b) Draw a parabola if the base is 70mm and the tangents at the base ends make 60^0 to the base. [7M]

UNIT– II

3. a) The front view of a line makes an angle of 30^0 with xy. The HT of the line is 45mm behind VP, while its VT is 25mm above HP. One end of the line is 10mm below HP and the other end is 90mm behind VP. Draw the projections of the line and determine (i) its true length and (ii) its inclination with HP and VP. [7M]

   b) A square plane ABCD of side 30mm, is parallel to HP and 20mm away from it. Draw the projections of the plane, when (i) two of its sides are parallel to VP and (ii) and one of its side is inclined at 30^0 to VP. [7M]

(OR)

4. a) A line PQ 75mm long, has its end P in the VP and the end Q in the HP. The line is inclined at 30^0 to the HP and at 60^0 to the VP. Draw its projections. [7M]

   b) An equilateral triangular plane ABC of side 40mm, has its plane parallel to VP and 20mm away from it. Draw the projections of the plane when one of its sides is (i) perpendicular to HP (ii) parallel to HP and (iii) inclined to HP at an angle of 45^0. [7M]

UNIT - III

5. A square prism base 25mm side and axis 50mm long stands with one of its base edges on HP such that the axis is inclined at 30^0 to HP and 45^0 to VP. Draw the projection. [14M]

6. A square pyramid base 35mm side and axis 80mm long has a triangular face in the HP and the vertical plane containing the axis makes an angle of 45^0 with the VP. Draw its projections. [14M]
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Code No: **R231110** **R23** **SET - 1**

UNIT – IV

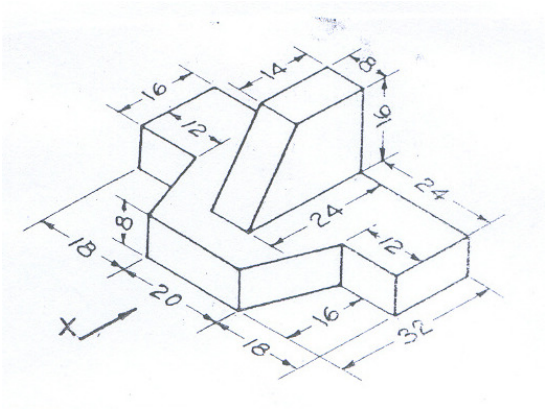
7. A cylinder of 50mm diameter and axis 70mm long, lies on HP on one of its generators such that, the axis is inclined at 45^0 to VP. A section plane parallel to VP passes through the farthest point of the visible base from the observer. Draw the projections of the cut solid. [14M]

(OR)

8. A square prism of side of base 40mm and axis 80mm long, is resting on its base on HP such that, a rectangular face of it is parallel to VP. Draw the development of the prism. [14M]

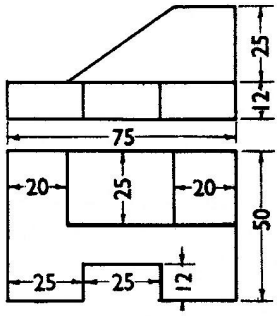
UNIT - V

9. Draw three views of the blocks shown pictorially in figure according to first angle projection [14M]



(OR)

10. Draw the isometric projections of the object shown in fig [14M]



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Code No: **R231110** **R23** **SET - 2**

I B. Tech I Semester Regular Examinations, January-2024
ENGINEERING GRAPHICS

(Common to CE, ME, ECE, IT, AME, Mining, Robotics, Agri E, ECE-Allied, CSE-Allied)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from **Each Unit** in **Part-B***

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UNIT - I

1. a) A rectangular plot of land of area 0.45 hectare is represented on a map by a similar rectangle of 5 sq. cm. Calculate the scale factor of the map. Also, construct a scale to read upto a single meter and long enough to measure 600m. Mark on it a distance of 375m. [7M]

   b) Construct an ellipse when the major axis is 120mm and the distance between the foci is 108mm. Determine the length of the minor axis. Find the foci, also draw a pair of tangents from a point outside the ellipse [7M]

(OR)

2. a) Construct a scale of 1/60 to read meters and decimeters and long enough to measure upto 6m. Mark on it a distance of 5.4m. [7M]

   b) Construct a hyperbola, with the distance between the focus and the directrix as 50mm and eccentricity as 3/2. Also, draw normal and tangent to the curve at a point 40mm from the directrix. [7M]

UNIT - II

3. a) The projectors through the HT and VT of a line are 100mm apart while those through its ends are 65mm apart. An end of the line is 15mm above the HP. The HT 40mm in front of the VP and the VT is 75mm above the HP. Draw the front view and top view of the line and find its true length. Also the inclinations the line makes with the reference planes. [7M]

   b) Draw the projections of a regular pentagon of 25mm side, with its surface making an angle of 45^0 with HP. One of the sides of the pentagon is parallel to HP and 15mm away from it. [7M]

(OR)

4. a) A line AB, which is inclined at 30^0 to HP, has its ends A and B, at 25mm and 60mm in front of VP respectively. The length of the top view is 65mm and its VT is 15mm above HP. Draw the projections of the line and locate its HT. [7M]

   b) Draw the projections of a circle of 5cm diameter, having its plane vertical and inclined at 30^0 to the VP. Its center is 3cm above the HP and 2cm in front of the VP. [7M]

UNIT - III

5. A hexagonal pyramid of a base edge 20mm and altitude 50mm rests on one of its base edges on the HP such that the slant face (triangular surface) containing the resting edge is perpendicular to the HP. The resting edge is inclined at 45^0 to the VP. Draw the projections of the pyramid. [14M]

(OR)

6. A pentagonal pyramid of base edge 25mm and altitude 55mm rests on one of its edges of the base on HP, such that this edge is inclined at 40^0 to VP and the slant face of the pyramid containing that edge is perpendicular to HP. Draw the projections of the solid. [14M]
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Code No: **R231110** **R23** **SET - 2**

UNIT – IV

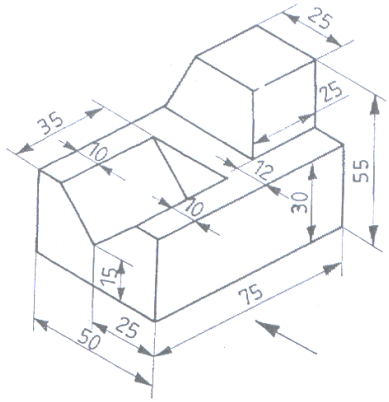
7. A hexagonal prism of side of base 30mm and length of axis 75mm, is resting on a corner of its base on HP, with the longer edge containing that corner, inclined to HP at 30^0. It is cut by a section plane parallel to HP and passing through the mid-point of the axis. Draw the front and sectional top views of the solid. [14M]

(OR)

8. A hexagonal prism of side of base 20mm and length of axis 50mm is kept on the ground on its base such that two opposite sides of the base are parallel to the VP. It is cut by an AIP inclined at 45^0 to the HP and passing through one of the top corners of the prism. Draw the development of the cut prism. [14M]

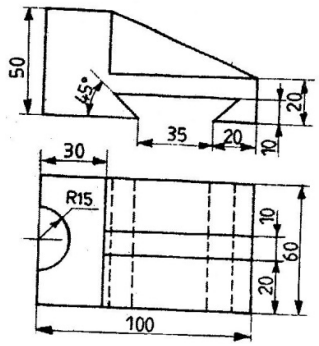
UNIT - V

9. Draw three views of the blocks shown pictorially in figure according to first angle projection [14M]



(OR)

10 Draw the isometric projections of the object shown in fig [14M]



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Code No: **R231110** **R23** **SET - 3**

I B. Tech I Semester Regular Examinations, January-2024
ENGINEERING GRAPHICS

(Common to CE, ME, ECE, IT, AME, Mining, Robotics, Agri E, ECE-Allied, CSE-Allied)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from **Each Unit** in **Part-B***

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UNIT - I

1. a) The height of an ancient tower, Qutub Minar, is 79 yards and 1 foot. If the height is represented by a 29 ¾ inch long line on the drawing , find R.F. Draw a diagonal scale of this RF long enough to show 15 yards 2 feet and 3 inches [7M]

   b) Construct a parabola with the distance of the focus from the directrix as 50mm. Also, draw normal and tangent to the curve, at a point 40mm from the directrix. [7M]

(OR)

2. a) A regular plot of 100 square kilometers is represented on a certain map by a similar rectangular area of 4 square centimeters. Draw a scale to show kilometers and mark a distance of 43 kilometers on it. [7M]

   b) Construct a hyperbola when the distance between the focus and directrix is 40mm and eccentricity is 4/3. Draw a tangent and normal at any point on the hyperbola. [7M]

UNIT - II

3. a) The mid point of a straight line AB is 60mm above HP and 50mm in front of VP. The line measures 80mm long and inclined at 30^0 to HP and 45^0 to VP. Draw its projections. [7M]

   b) A rectangle ABCD of size 30 mm x 20 mm is inclined to the HP at 30^0. Its shorter side AB is parallel to the HP and inclined at 45^0 to the VP. Draw the projections of the rectangle. [7M]

(OR)

4. a) A line of 100mm long, makes an angle of 35^0 with HP and 45^0 with VP. Its mid point is 20mm above HP and 15mm in front of VP. Draw the projections of the line. [7M]

   b) A regular pentagon ABCDE of side 30mm has one of its edges parallel to the VP and inclined at 30^0 to the HP. The pentagon is inclined at 45^0 to the VP. Draw the projections [7M]

UNIT - III

5. Draw the projections of a cone, base 30mm diameter and axis 50mm long , resting on HP on a point of its base circle with (a) the axis making an angle of 45^0 with HP and its top view making an angle of 30^0 with VP. [14M]

(OR)

6. Draw the projections of a cube of 30mm long edges resting on the HP on one of its corners with a solid diagonal perpendicular to the VP. [14M]
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UNIT – IV

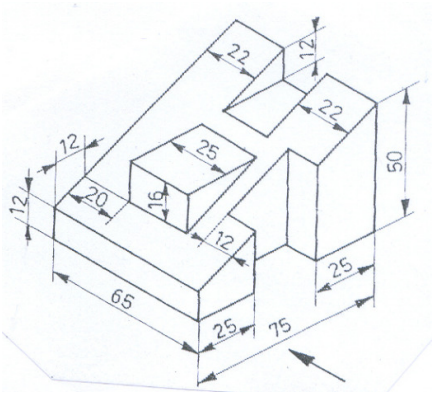
7. A pentagonal pyramid with edge of base 25mm and axis 65mm long is resting on HP on its base with an edge nearer to the observer, parallel to VP. It is cut by a section plane, inclined at 60^0 to VP and at a distance of 6mm form the axis. Draw the projections and obtain the true shape of the section. [14M]

(OR)

8. A cylinder of diameter of base 40mm and axis 55mm long is resting on its base on HP. It is cut by a section plane, perpendicular to VP and inclined at 45^0 to HP. The section plane is passing through the top end of an extreme generator of the cylinder. Draw the development of the lateral surface of the cut cylinder. [14M]

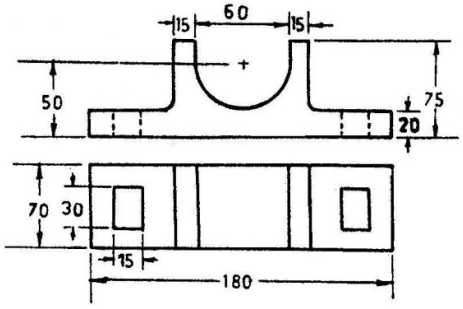
UNIT - V

9. Draw three views of the blocks shown pictorially in figure according to first angle projection. [14M]



(OR)

10 Draw the isometric projections of the object shown in fig [14M]



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Code No: **R231110** **R23** **SET - 4**

I B. Tech I Semester Regular Examinations, January-2024
ENGINEERING GRAPHICS
(Common to CE, ME, ECE, IT, AME, Mining, Robotics, Agri E, ECE-Allied, CSE-Allied)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from **Each Unit** in **Part-B***

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UNIT - I

1. a) A tunnel on the Konkan Railway route has a size of 640 m x 10m x 10m. It is represented on a model by the volume of 27cm^3. Find RF. Devise a diagonal scale of this RF to read up to 300 meters. Show the distances of 299meters, 171 meters and 9 meters on it. [7M]

   b) Construct a parabola with base 60mm and length of the axis 40mm. Draw a tangent to the curve at a point 20mm from the base. Also, locate the focus and directrix to the parabola. [7M]

(OR)

2. a) Construct a scale to measure km, 1/8 of a km and 1/40 of a km, in which 1 km is represented by 4 cm. Mark on this scale, a distance of 3.575 km. [7M]

   b) A fountain jet discharges water from ground level at an inclination of 50^0 to the ground. The jet travels a horizontal distance of 9m from the point of discharge and falls on the ground. Trace the path of the jet. [7M]

UNIT - II

3. a) A line AB of 100mm length is inclined at an angle of 30^0 to HP and 45^0 to VP. The point A is 15mm above HP and 20mm in front of VP. Draw the projections of the line. [7M]

   b) Draw the projections of a circle of 50mm diameter resting in the HP on a point A on the circumference, its plane inclined at 45^0 to the HP and the top view of the diameter AB making 30^{0}angle with the VP. [7M]

(OR)

4. a) A line CD, 90mm long, measures 72mm in front view and 65mm in top view. Draw the two views of the line if it fully lies in the first quadrant. Find the true inclinations of the line. Point C lies at a distance 20mm from the reference planes. [7M]

   b) Draw the projections of a circle of 55 mm diameter resting in the VP on a point A on the circumference, its plane inclined at 45^0 to the VP and the diameter AB making 30^{0}angle with the HP. [7M]

UNIT - III

5. A regular pentagonal pyramid, base 30mm side and height 75mm rests on one edge of its base on the ground so that the highest point in the base is 30mm above the ground. Draw its projections when the axis is parallel to the VP. Draw another front view on a reference line inclined at 30^0 to the edge on which it is resting so that the base is visible. [14M]

(OR)

6. A cylinder of 30 mm base diameter and 60 mm axis rests on HP with a point of its base such that the axis is inclined at 30^0 to HP and its axis of the plane inclined at 40^0 to xy. Draw its projections. [14M]

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Code No: **R231110** **R23** **SET - 4**

UNIT – IV

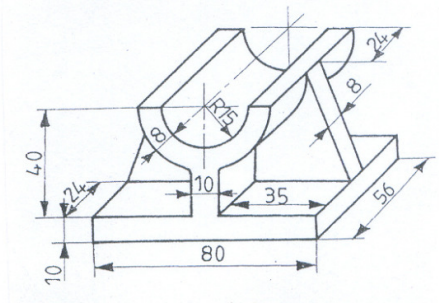
7. A cube of side 50mm, is resting on HP on one of its faces, with a vertical face inclined at 30^0 to VP. It is cut by a section plane inclined at 45^0 to HP and passing through the axis at 8mm from the top surface. Draw the projections of the solid and also show the true shape of the section. [14M]

(OR)

8. A cube of 40mm edge stands on one of its faces on HP with a vertical face making 45^0 to VP. A horizontal hole of 30mm diameter is drilled centrally through the cube such that the hole passes through the opposite vertical edges of the cube. Obtain the development of the lateral surface of the cube with the hole. [14M]

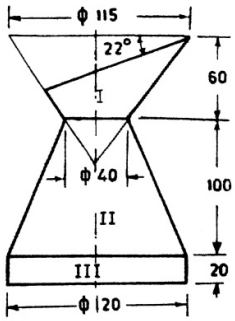
UNIT - V

9. Draw three views of the blocks shown pictorially in figure according to first angle projection [14M]



(OR)

10 Draw the isometric projections of the object shown in fig [14M]



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Code No: **R201117**

R20

SET - 1

I B. Tech I Semester Supplementary Examinations, Jan/Feb- 2024

APPLIED PHYSICS

(Common to CSE, CSE-CS&T, IT , CSE-CS, CSE-IOT&CS Incl BCT, CSE-CS & BS, CSE-IOT,CS,IOT)

Time: 3 hours Max. Marks: 70

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks

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UNIT-I

1. a) Why Newton's rings are circular in shape? Explain. Newton's Rings are formed with red light of wavelength 670nm. The radius of the twentieth ring is found to be 1.1×10^{-2} m. Find the radius of curvature of the lens and the radius of the thirtieth ring. [7M]

   b) Discuss the Fraunhofer diffraction phenomena when a plane wave falls on a single slit and derive expression for the bright and dark fringes. [7M]

(OR)

2. a) Explain with necessary theory how wavelength of spectral line is determined using plane diffraction grating. [7M]

   b) Discuss the way of producing polarized light by reflection and refraction with suitable ray diagrams. [7M]

UNIT-II

3. a) Derive the relation between the probabilities of stimulated absorption, spontaneous emission, and stimulated emission in terms of Einstein's coefficients. [7M]

   b) Explain the characteristics of a laser beam. Write their applications in medical science. [7M]

(OR)

4. a) What are optical fibers? Explain their structure with a diagram. A silica optical fiber has a core of refractive index of 1.563 and cladding refractive index of 1.498. Determine acceptance angle and numerical aperture. [7M]

   b) Describe the basic elements of a fiber optics communication system with block diagram. [7M]

UNIT-III

5. a) Solve the Schrodinger wave equation for a particle in a one dimensional box. [7M]

   b) Write postulates of quantum free electron theory. Derive an expression of electrical conductivity based on this theory. [7M]

(OR)

6. a) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. [7M]

   b) What is effective mass? Derive an expression for effective mass of an electron. [7M]

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Code No: **R201117** **R20** **SET - 1**

UNIT-IV

7. a) What is an electronic polarization? Obtain an expression for electronic polarizability. [7M]

   b) Obtain an expression for ionic polarizability. The relative permittivity of Sulphur is 4. Calculate its atomic polarizability. Given that Sulphur is in cubic form and has a density of 2.08 x 10^3 kg/m^3 and atomic weight of 32. [7M]

(OR)

8. a) Discuss the properties and effect of external field on various magnetic materials. [7M]

   b) Derive an expression for magnetic moment interims orbital and spin angular momentum. [7M]

UNIT-V

9. a) Discuss the dependence of Fermi energy level on temperature in the case of extrinsic and intrinsic semiconductors with neat plots. [7M]

   b) What is the Hall effect? Derive the expression for Hall coefficient. [7M]

(OR)

10. a) Write a short note on High T_C superconductors. [7M]

    b) Superconducting Tin has a critical temperature of 3.7K at magnetic field and a critical field of 0.0306 T. Find the critical field at 3K. [7M]

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Code No: **R161107** **R16** **SET - 1**

I B. Tech I Semester Supplementary Examinations, Jan/Feb-2024
COMPUTER PROGRAMMING

(Common to ECE, Aero E, Auto E, Bio-Tech, Chem E, CE, CSE, IT, EIE, EEE, ME, Metal E, Min E, P Chem E, PE, E Com E)

Time: 3 hours Max. Marks: 70

*Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)*
*2. Answering the question in **Part-A** is Compulsory*
*3. Answer any **FOUR** Questions from **Part-B***

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PART –A (14 Marks)

1. a) What is the difference between procedural programming and object-oriented programming? [2M]
   b) What is the need for conversion of data type in computer programming? [2M]
   c) What is the significance of break and continue in loops? [2M]
   d) Differentiate between *p++ and p++. [2M]
   e) Is it necessary to count NULL character while declaring a string? Justify your answer. [2M]
   f) Which arithmetic operation is not allowed on pointers in C? [2M]
   g) What is the main difference between calloc () and malloc ()? [2M]

PART –B (56 Marks)

2. a) What is programming language? Explain different types of programming languages. [7M]
   b) Discuss various phases of Software Development process. [7M]

3. a) What are relational operators in C programming? What is the result of a relational operator and explain the usage of relational operators with a sample C program. [7M]
   b) What is the output of the following C code? Give Explanation. [7M]

```
#include<stdio.h>
int main()
{
int x;
x= 9<5+3 && 7;
printf("%d", x);
return 0;
}
```

4. a) What is the difference between break statement and continue statement when they occur in a loop? Explain with a suitable C program. [7M]
   b) Write a C Program to check whether a triangle is equilateral or not. Explain the programming constructs used in this program. [7M]

5. a) What is significance of storage class? Illustrate each storage class with example. [7M]
   b) What is the main use of function pointer in C? How do you declare a function pointer? Explain. [7M]

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6. a) What are multidimensional arrays in C? Where are multidimensional arrays used? How does memory allocation take place for a multidimensional array in C. [7M]

   b) Define Two string str1 and str2, copy the contents of str1 to str2.With and Without string handling functions. [7M]

7. a) What is the effect of dangling pointer in program run time behavior? Explain. [7M]

   b) Differentiate between array of structures and array of pointers to structures with suitable diagrams. [7M]

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