CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: LINEAR ALGEBRA & CALCULUS
(Common for all Branches)

Date: 20.03.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Show that $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is orthogonal.   2 M

2. Find the value of k such that the rank of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & k & 7 \\ 3 & 6 & 10 \end{bmatrix}$ is 2   2 M

3. Find the Eigen values of $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ 2 M

4. Prove that the Eigen values of an Unitary matrix have absolute value 1   2 M

5. Test the convergence of $\sum_{n=0}^{\infty} \frac{1}{\sqrt{n}}$ 2 M

6. Examine the convergence of $\frac{1}{1.2} - \frac{1}{3.4} + \frac{1}{5.6} - \frac{1}{7.8} + \dots$ 2 M

7. Verify Cauchy's Mean value theorem for $f(x) = e^x$ & $g(x) = e^{-x}$ in [3,7]   2 M

8. Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x}} dx$ 2 M

9. Find $\frac{\partial x}{\partial r}, \frac{\partial x}{\partial \theta}$, where $x = r\cos\theta, y = r\sin\theta$ 2 M

10. Find the stationary points of $x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$ 2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Solve the following system of equations by using Gauss seidel iteration method correct to three decimal places $8x - 3y + 2z = 20, 4x + 11y - z = 33, 6x + 3y + 12z = 35$ 10M

OR

11. B). Find the rank of the matrix $A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -3 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ By reducing into normal form.   10M

(P.T.O..)

12. A). Reduce the Quadratic form $3x^2 + 3y^2 + 3z^2 + 2xy + 2xz - 2yz$ into canonical form by Orthogonal Transformation. 10M

OR

12. B). Diagonalize the matrix A = $\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ and find A^8 10M

13. A). Test the convergence of the series $x^2 + \dfrac{2^2}{3.4}x^4 + \dfrac{2^2.4^2}{3.4.5.6}x^6 + \dfrac{2^2.4^2.6^2}{3.4.5.6.7.8}x^8 + ...$ 10M

OR

13. B). Test whether the following series is absolutely or conditionally convergent 10M

$$\sum_{n=1}^{\infty}(-1)^{n+1}\left(\sqrt{n+1}-\sqrt{n}\right)$$

14. A). If a<b, prove that $\dfrac{b-a}{1+b^2} < Tan^{-1}b - Tan^{-1}a < \dfrac{b-a}{1+a^2}$ and deduce 10M

i. $\dfrac{\pi}{4} + \dfrac{3}{25} < Tan^{-1}\dfrac{4}{3} < \dfrac{\pi}{4} + \dfrac{1}{6}$

ii. $\dfrac{5\pi+4}{20} < Tan^{-1}2 < \dfrac{\pi+2}{4}$

OR

14. B). Prove that $\beta(m,n) = \int_0^\infty \dfrac{x^{m-1}}{(1+x)^{m+n}}dx$ 10M

15. A). Investigate the maxima & minima, if any, of the function f(x) = x^3y^2 (1-x-y). 10M

OR

15. B). Find the points on the sphere $x^2 + y^2 + z^2 = 4$ that are the closest and farthest from the point (5,1,-1). 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: ENGINEERING PHYSICS
(Common for CIVIL & MECH)

Date: 23.03.2023 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	Define Quality factor.	2 M
2.	List the factors that influence the speed of the sound.	2 M
3.	In Newton's rings experiment, what will be the order of the dark ring which will have double the diameter of 10th dark ring?	2 M
4.	Define Rayleigh's criterion for resolution.	2 M
5.	Outline any four applications of lasers.	2 M
6.	Numerical aperture of an optical fiber is 0.5 and core refractive index is 1.48. Find the refractive index of cladding.	2 M
7.	What are dielectrics? Give two examples.	2 M
8.	Interpret the importance of hysteresis curve.	2 M
9.	What are Quantum dots?	2 M
10.	What do you mean by bottom-up approach? Give one example.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Derive differential equation for motion of a damped harmonic oscillator and solve it. Also discuss the light damping case.	10M

OR

11. B).	i) Compare and contrast mechanical and electrical oscillators.	5M
	ii) Explain the formation of standing waves in strings and discuss their wave equation.	5M
12. A).	Explain the interference in thin films in reflected light and obtain the expressions for maxima and minima conditions.	10M

OR

12. B).	Build an expression for Resolving power of grating.	10M
13. A).	Describe the construction and working of Ruby laser with neat diagrams.	10M

OR

13. B).	Examine the function of each part of fiber optic communication system with a neat block diagram.	10M

(P.T.O..)

14. A). Summarize the different types of dielectric polarizations with neat diagrams. 10M

OR

14. B). Classify magnetic materials with examples. 10M

15. A). i) Explain surface-to-volume ratio and quantum confinement at nanoscale. 8M
ii) Give any 4 applications of nano materials. 2M

OR

15. B). Discuss the characterization of nanomaterials by powder XRD method. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: APPLIED PHYSICS
(Common for EEE, CSC, CSM, AID & AIM)

Date: 23.03.2023 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	Differentiate the matter wave and electromagnetic wave.	2 M
2.	Calculate the kinetic energy of an electron of wavelength 1.56 A^0 ?	2 M
3.	Define the terms Hall effect and Hall coefficient	2 M
4.	State and explain the law of mass action in semiconductors.	2 M
5.	Illustrate the working principle of LED.	2 M
6.	Explain the formation of depletion region in P-N junction diode.	2 M
7.	What is stimulated emission?	2 M
8.	On which phenomenon optical fiber works, Explain.	2 M
9.	Give the outline of Piezoelectric effect.	2 M
10.	List the properties of ferro magnetic materials.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A).	Apply Schrodinger's wave equation to determine energy Eigen values and Eigen functions of a particle in one dimensional infinite potential box.	10M

OR

11. B).	Distinguish Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics with suitable examples.	10M

12. A).	Obtain an expression for carrier concentration in N-type semiconductor.	10M

OR

12. B).	Demonstrate Hall effect. Derive an equation for Hall coefficient and mention any three applications of it.	10M

13. A).	What is Zener diode. Explain the break-down mechanisms of Zener diode.	10M

OR

13. B).	Explain construction and working of solar cell and mention any three applications of it.	10M

14. A).	Define Einstein coefficients and obtain relation between Einstein coefficients.	10M

OR

14. B).	What is numerical aperture and acceptance angle? Obtain expression for numerical aperture of an optical fiber in terms of Δ.	10M

(P.T.O..)

15. A). State and explain Local field in dielectrics. Obtain an expression for it.   10M

OR

15. B). What do you understand by hysteresis. Explain the Hysteresis behavior of ferromagnetic   10M
materials based on domain theory.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023

Course Name: ENGLISH

(Common for ECE, CSE, IT & CSD)

Date: 23.03.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1. **Identify the errors in the usage of prepositions in the following sentences and rewrite them.**   2 M
   A). All communities must mingle for one another and become united.
   B). Every Sunday I am occupied with rearranging the furniture.

2. **Convert the following sentences as directed.**   2 M
   A). Hearing a noise, I turned round. (Into Compound sentence)
   B). The children heard the teacher's footsteps and kept silent. (Into Simple sentence)

3. **Fill in the blanks with appropriate articles.**   2 M
   A). The more I think of her, _____ sadder I become.
   B). Tagore is _____ Shakespeare of India.

4. **Identify and give the meaning of the root words.**   2 M
   A) Astronaut B) octopus C) automatic D) credible

5. **Identify the errors in the following sentences.**   2 M
   A). Neither Cricket nor Hockey impress him.
   B). I, who am your teacher, deserves your respect.

6. **Find the meanings of the following underlined prefixes/suffixes.**   2 M
   A) Herbivorous B) geopolitical C) artist D) Movement

7. **Mark the misplaced modifiers and rewrite the sentences after placing the modifiers in the right place.**   2 M
   A). On her way home, Joe found a gold man's watch.
   B). The child ate a cold dish of cereal for breakfast this morning.

8. **Fill in the blanks with antonyms of the words in brackets.**   2 M
   A). Before proceeding with the work, we must have a _____ plan of action.(indefinite)
   B). It would be unfair to _____ the gift.(accept)

9. **Identify and delete the redundant words/phrases from these sentences.**   2 M
   A). As road traffic increases, elevated highways are built to solve the problem of traffic jam.
   B). I await for your decision.

10. **Interpret out what these abbreviations stand for.**   2 M
    A) DNA   B) LPG   C) FYI   D) EU

(P.T.O..)

Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). "Never despise anyone at all" --- Analyze the reason for Hazlitt's advice to his son.   10M

OR

11. B). Why does Hazlitt say that it is a bad habit to speak disrespectfully of others?   10M

12. A). Explain the refrain of the poem "The Brook" by Lord Tennyson.   10M

OR

12. B). What are the various words the poet uses to describe the sound of the brook?   10M

13. A). What is time management? Write short summary "On Saving Time".   10M

OR

13. B). List the principles of good writing.   10M

14. A). Construct an argumentative essay on "Should Indian Industry shift its focus from the   10M
services sector to manufacturing?

OR

14. B). Define an essay and list types of essays with examples.   10M

15. A). Summarize the given text and provide a suitable title.   10M

Dear Children,

India is not just the India is land, mountains and rivers. You and me, all the millions of young and old who are her citizens. The thoughts and actions of the people who have inhabited India for thousands of years have moulded our society. Out of the past grows the present, and what we do today will shape our future. When we build a road or plant a tree or inculcate good habits, it is not for ourselves alone but also for those who will be born in the years to come. The work of building is not easy. We must give it all we have and strain every nerve and muscle. It is only by trying that we learn and by doing that we gather strength. All the world over, progress has been possible because of the hard work and sacrifice of pioneers. These 25 years have laid the foundation of the new modern India. The children of today must continue this work and make our country united and strong-Anything which is easy soon becomes dull. The very hardships we face provide challenge and excitement. The future is calling you. Don't be disheartened by difficulties. You can change the bad, not only by doing big things but by trying your best to do even ordinary things extraordinarily well.

Indira Gandhi

January 16, 1973

OR

15. B). What do you think of the rules George Orwell has given to improve language?   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: ENGINEERING GRAPHICS
(Common for CIVIL & MECH)

Date: 25.03.2023 AN   Time: 3 hours   Max.Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries ONE mark.   10x1=10M

1. An area of 144 sq cm on a map represents an area of 36 sq /an on the field. Find the RF of the   1 M
    scale of the map.

2. What is meant by Epi – Cycloid?   1 M

3. What is the convention of representing first-angle projection method?   1 M

4. A line AB 70 mm long perpendicular to the H.P., 20 mm in front of the V.P. and its one end   1 M
    15 mm above the H.P. Draw its projections.

5. Define projection of solids.   1 M

6. How the true shape of the section is obtained?   1 M

7. What are different methods of development?   1 M

8. What are the methods for determining line of intersection between surfaces of two   1 M
    interpenetrating solids?

9. Differentiate between isometric projection and isometric view.   1 M

10. What are isometric lines?   1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Construct a cure, when the distance of its focus from its directrix is 50 mm and   10M
        eccentricity is 2/3. Also draw a tangent and normal at a distance of 35 mm from the
        directrix.

OR

11. B). A circle of 50 mm diameter rolls along a straight line without slipping. Draw the curve   10M
         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.

12. A). The top view of a 75 mm long line AB measures 65 mrn, while the length of its front view   10M
         is 50 mm. 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 determine its inclinations with the H.P. and the V.P.

OR

12. B). Draw the projections of a regular pentagon of 40 mm side, having its surface inclined at   10M
         30° to the H.P. and a side parallel to the H.P. and inclined at an angle of 60° to the V.P.

(P.T.O..)

13. A). A hexagonal prism with side of base 25mm and 50 mm long is resting on a comer of its base on HP. Draw the projections of the prism when its axis is making 30° with HP and parallel to V.P.   10M

OR

13. B). A cone base 45 mm diameter and axis 45 mm long is resting on the H.P. on its base. It is cut by a section plane, perpendicular to both the H.P. and the V.P. and 6 mm away from the axis. Draw its front view, top view and sectional side view.   10M

14. A). A hexagonal prism of side of base 30 mm and axis 70 mm long is resting on its base on HP. such that a rectangular face is parallel to VP. It is cut by a section plane perpendicular to VP and inclined at 30⁰ to HP. The section plane is passing through the top end of an extreme lateral edge of the prism. Draw the development of the lateral surface of the cut prism.   10M

OR

14. B). A horizontal cylinder of diameter 40 mm penetrates into a vertical cylinder of diameter 60 mm. The axes of the cylinders intersect at right angles. Draw the curves of intersection when the axis of the horizontal cylinder is parallel to the VP.   10M

15. A). Draw the isometric view for the given orthographic views. All dimensions are in mm.   10M
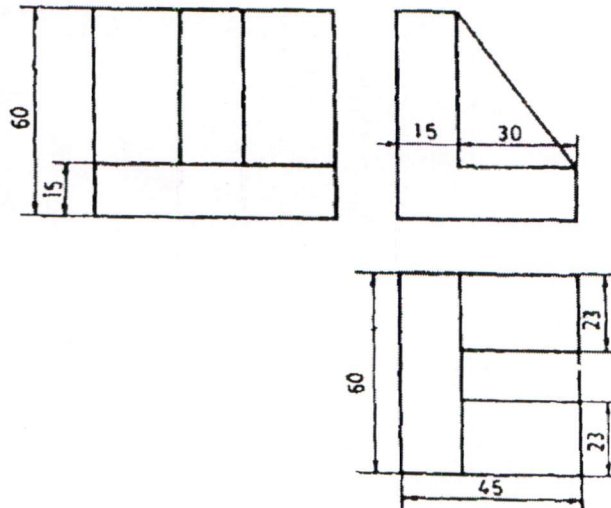
OR

15. B). Draw the orthographic projections for the given isometric projection. All dimensions are in mm.   10M
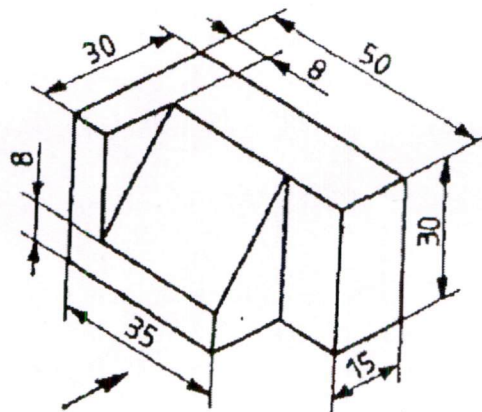
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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: PROGRAMMING FOR PROBLEM SOLVING
(Common for EEE, ECE, CSE, IT, CSC, CSM, CSD, AID & AIM)

Date: 25.03.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1. Draw the flow chart and write a C program to compute simple interest.   2 M
2. State the use of %d and %f, write a *printf* statement in "C" using the above symbols.   2 M
3. Write the syntax for nested if and else-if.   2 M
4. Mention the advantages and disadvantages of arrays.   2 M
5. What is array of strings?   2 M
6. What is recursion?   2 M
7. How can you declare pointer?   2 M
8. Define union, how to represent an Union?   2 M
9. Write about different modes of file operations.   2 M
10. What is sorting and what is the importance of sorting?   2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). i) Discuss primitive data types in terms of memory size, format specifiers and range.   5M
        ii) Explain typical steps for entering, compiling and executing "C" program.   5M

OR

11. B). i) What is an operator and list different categories of "C" operators based on their functionality?   5M
         ii) Write a "C" program to check whether a given integer number is odd or even.   5M

12. A). i) Explain the switch statement with example program.   5M
         ii) Justify the difference between break statement and continue statement.   5M

OR

12. B). How can we declare and initialize 2D array? Explain with example.   10M

13. A). i) Mention the three possibilities of defining a user defined function in "C".   5M
         ii) Write a program in "C" using functions to swap two numbers.   5M

OR

13. B). i) Describe syntax and the different string manipulation library functions with examples.   5M
         ii) Write a "C" program to check whether the given string is palindrome or not.   5M

(P.T.O..)

14. A). Briefly discuss in detail pointer to character strings with an example program. 10M

OR

14. B). i) Write short notes on enumeration data type.

ii) Write a "C" program for illustrating a function returning a structure.

5M

5M

15. A). Explain the command line arguments and write a "C" program to add two numbers using command line argument. 10M

OR

15. B). What is meant by searching? Explain the linear search algorithm with example. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: ENGINEERING MECHANICS
(Common for CIVIL & MECH)

Date: 27.03.2023 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks. 10x2=20M

1. What do you mean by coplanar concurrent force system? 2 M
2. Define the terms: Rigid body and Deformable body. 2 M
3. State the law of friction. 2 M
4. What are the conditions under which the centre of gravity of a body becomes the same as its centroid? 2 M
5. Differentiate between polar moment of inertia and product of inertia. 2 M
6. Define mass moment of inertia and explain the transfer formula for mass moment of inertia. 2 M
7. Discuss the difference between curvilinear and rectilinear motion. 2 M
8. State the principle of impulse-momentum 2 M
9. Define motion. Write different types of motion 2 M
10. How to find the total kinetic energy of the body, it the body has both translation and rotational motion. 2 M

PART-B
Answer the following. Each question carries TEN Marks. 5x10=50M

11.A). The resultant of two concurrent forces is 2500N and the angle between the forces is 90^0. The resultant makes an angle of 46^0 with one of the forces. Find the magnitude of each force. 10M
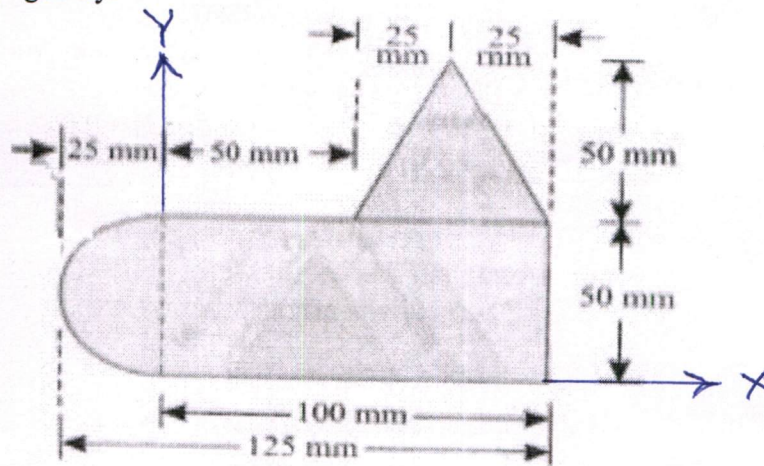
OR

11. B). Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in below Fig. assuming smooth surfaces, determine the reactions induced at the points of support A, B and C. 10M
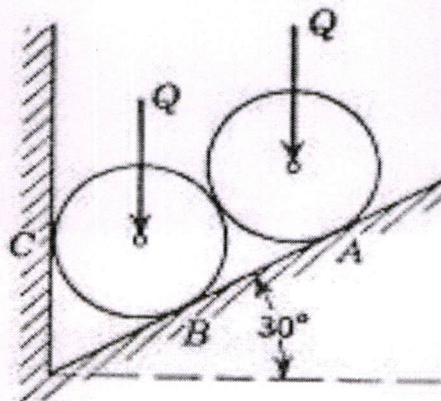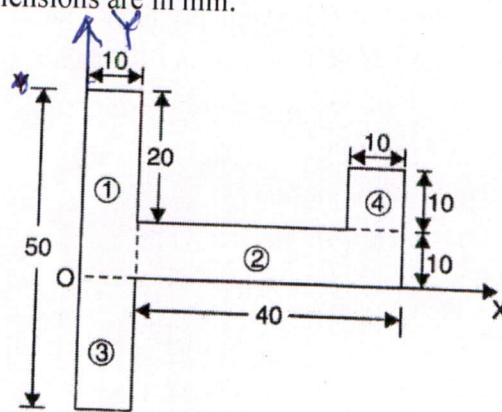

(P.T.O..)

12. A). Uniform lamina shown in below Fig. consists of rectangle, a semi circle and a triangle. 10M
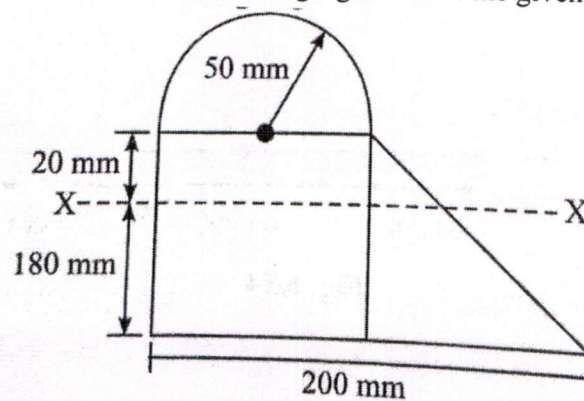Find the center of gravity.

OR

12. B). Locate the Center of gravity of the area as shown in below figure with respect to 10M
coordinate axes. All dimensions are in mm.

13. A). Find the moment of inertia of the following figure about the given XX axes. 10M

OR

13. B). Determine mass moment of inertia of a steel sphere 150mm diameter with respect to 10M
centre of gravity axes. Given density of steel as 7830 kg/m³.

14. A). Derive the Impulse-Momentum equation of a body in motion. 10M

OR

14. B). A body of weight 2000N moves on a level horizontal rough road for a distance of 200m. The resistance of the road is 10N per 1000N weight of the body. Find the work done by the resistance on the body. 10M

15. A). Two blocks of masses M_1 and M_2 are connected by a string as shown in Fig. below Assuming the coefficient of friction between block M_1 and the horizontal surface to be μ, if the system is released from rest, determine the velocity of the block A after it has moved a distance of 1 m, Assume M_1=100kg.and M_2=150kg and μ =0.20. 10M
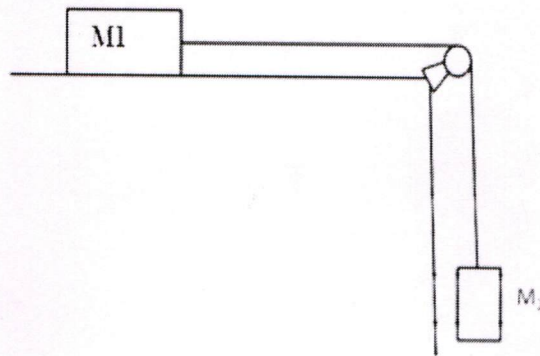
OR

15. B). The 200N(= 20kg) crate (fig.) has a velocity of V_A = 4 m/s when it is at A. Determine its velocity after it slides S = 2m down the plane. The coefficient of Kinetic friction between the crate and the plane is μ_K = 0.2 (Apply work and energy principle). 10M
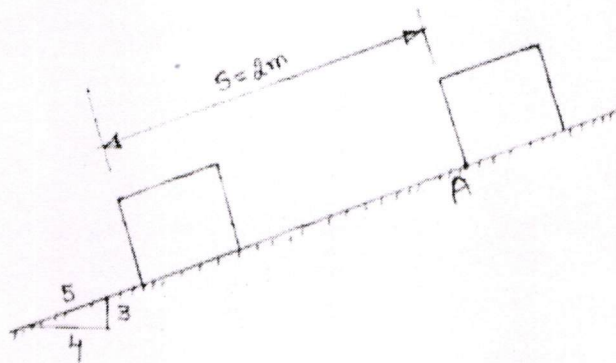
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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: ENGINEERING DRAWING
(Common for EEE, CSC, CSM, AID & AIM)

Date: 27.03.2023 AN　　　　Time: 3 hours　　　　Max.Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries ONE mark.　　　　　　　10x1=10M

1. Draw basic types of lines recommended by BIS.　　　　1 M
2. What is the importance of dimensioning?　　　　1 M
3. Draw the symbolic representation of third angle projections.　　　　1 M
4. What is a multiview projection?　　　　1 M
5. What are pyramids?　　　　1 M
6. Give the example for solid of revolution.　　　　1 M
7. Differentiate a plane and a solid.　　　　1 M
8. What is an isometric projection?　　　　1 M
9. In first angle projection locate the side view.　　　　1 M
10. What are principal planes of projection in orthographic views?　　　　1 M

PART-B
Answer the following. Each question carries TEN Marks.　　　　5x10=50M

11.A). Draw a hyperbola when the distance of its directrix is 50mm and eccentricity is 3/2. Also, Draw a tangent and a normal to the ellipse at a point 70mm away from directrix.　　　10M

OR

11. B). Draw a hypocycloid when the radius of the directing circle is twice the radius of generating circle.Radius of the generating circle is 35mm.　　　10M

12. A). A line CD 80mm long is inclined at an angle of 30^0 to H.P. and 45^0 to V.P. The point C is 20mm above H.P. and 30mm in front of V.P. Draw the projections of the straight line.　　　10M

OR

12. B). A circular plane of 60mm diameter rests on V.P. on a point A on its circumference. Its plane is inclined at 45^0 to V.P. Draw the projections of the plane when the front view of the diameter AB makes 30^0 with H.P.　　　10M

13. A). A cylinder of base diameter 40 mm and axis 50 mm is resting on one of its generators on the V.P. Draw its projections when the axis is inclined at 45° to the H.P.　　　10M

OR

13. B). A square pyramid of 35 mm side and 60 mm height rests on one of its triangular faces on the H.P, such that the base edge is inclined at 40^0 to V.P. Draw the projections of pyramid. When the apex is nearer to the viewer?　　　10M

(P.T.O..)

14. A). A square pyramid of 2cm side and height 60 mm, is placed centrally on the top of a   10M
square prism of 60mm side and height 40mm. Draw the isometric projection of the
combination of solids.

OR

14. B). A hexagonal prism of height 50 mm and side 24 mm is resting on HP, keeping its axis   10M
vertical and one of the edge of the base parallel to VP. Draw isometric view of the solid

15. A). Pictorial view of an object is shown in Fig. 1. Using first angle projection, draw its (a)   10M
front view from the X-direction, (b) top view and (c) right-hand side view. All dimensions
are in mm.

Fig. 1

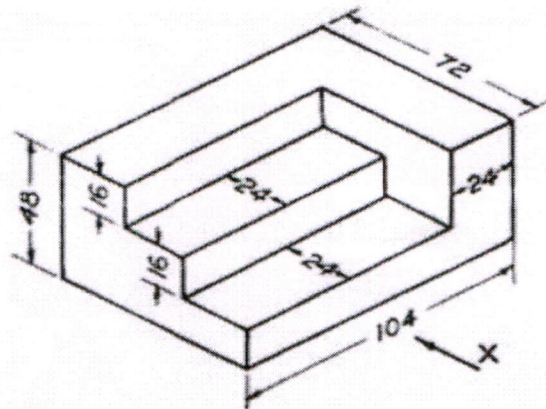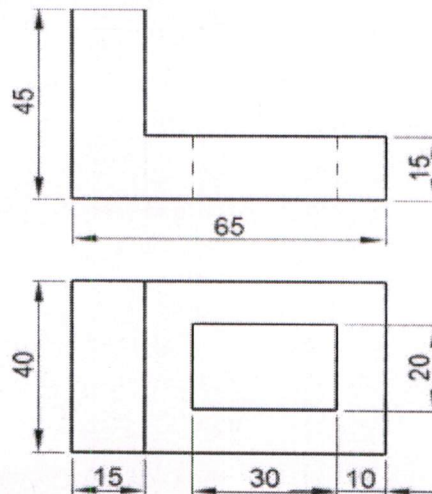**OR**

15. B).   10M

Draw the isometric view of the above component as shown in the figure. All dimensions
are in mm.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech I Semester Supplementary Examinations March-2023
Course Name: ENGINEERING CHEMISTRY
(Common for ECE, CSE, IT & CSD)

Date: 27.03.2023 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	List out any two salient features of crystal field theory.	2 M
2.	Write a note on LCAO.	2 M
3.	Differentiate between primary and secondary batteries.	2 M
4.	Write a note on water line corrosion.	2 M
5.	Give the selection rules involved in UV Spectroscopy.	2 M
6.	Give any four applications of NMR Spectroscopy.	2 M
7.	Write a note on colloidal conditioning.	2 M
8.	What is demineralization of hard water? How are exhausted ionexchange resins regenerated?	2 M
9.	What is meant by optical activity?	2 M
10.	Illustrate any one reaction involving $LiAlH_4$ as reducing agent.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Draw the molecular orbital diagram of O_2, calculate its bond order and predict its magnetic behavior.	10M

OR

11. B).	Discuss the crystal field splitting in tetrahedral complexes	10M
12. A).	What are fuel cells? Describe in detail the working of Methanol-Oxygen fuel cells? Write its applications.	10M

OR

12. B).	Describe the mechanism of electrochemical corrosion	10M
13. A).	Discuss the principle involved in NMR Spectroscopy and write a note on MRI	10M

OR

13. B).	Give the selection rules involved in vibrational and rotational (IR) spectroscopy.	10M
14. A).	With the help of diagram, discuss the steps involved in treatment of potable water.	10M

OR

14. B).	Discuss the water softening by Zeolite process.	10M
15. A).	Define Enantiomers and Diastereomers with suitable examples	10M

OR

15. B).	Discuss the mechanism involved in SN^2 reaction.	10M

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