R-15

Code: 5G522

I B.Tech. II Semester Supplementary Examinations April 2023
Engineering Graphics-II
(Common to CE & ME)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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		Marks	CO	BL

UNIT–I

1. A Pentagonal pyramid, base 30mm side and axis 60mm long, is lying on one of its triangular faces on the HP with the axis parallel to the VP. A vertical section plane, whose HT bisects the top view of the axis and makes an angle of 30^0 with the reference line cuts the pyramid, removing its top part. Draw the top view, sectional front view, true shape of the section. | 14M | CO1 | L4

OR

2. A cube of 35mm long edges is resting on the HP on one of its faces with a vertical face inclined at 30° to VP. It is cut by a section plane parallel to VP and 9mm away from the axis and further away from the VP. Draw its sectional front view and the top view. | 14M | CO1 | L4

UNIT–II

3. A cylinder of base diameter 50mm and axis length 70mm is resting on HP on its base. A cylindrical hole of 40mm diameter is drilled on the surface of the cylinder. The axis of the hole intersects with the axis of the cylinder at right angles and bisects it. Draw the development of the lateral surface of the cylinder. | 14M | CO2 | L3

OR

4. a) Draw the development of lateral surface of a cone of base diameter 48mm and altitude 50mm. | 7M | CO2 | L3

   b) A Cylinder of 50 mm diameter and axis 75mm is resting on its base on HP. Draw the development of lateral surface of the cylinder. | 7M | CO2 | L3

UNIT–III

5. A vertical cone diameter of base 80mm and axis 100mm long is completely penetrated by a cylinder of 40mm diameter. The axis of the cylinder is parallel to HP and the VP and intersects the axis of the cone at a point 30mm above the base. Draw the projections of the solids showing curves of intersection. | 14M | CO3 | L4

OR

6. A vertical square prism, base 50mm side and axis 90mm is completely penetrated by a horizontal square prism, base 35mm side and axis 90mm, so that their axes bisect. The axis of the horizontal prism is parallel to the V.P., while the faces of the two prisms are equally inclined to the V.P. Draw the projections of the solids showing lines of intersection. | 14M | CO3 | L4

UNIT–IV

7. Draw the isometric view of a square with the side of the base 40mm and length of axis 70mm, when its axis is vertical and horizontal. | 14M | CO4 | L4
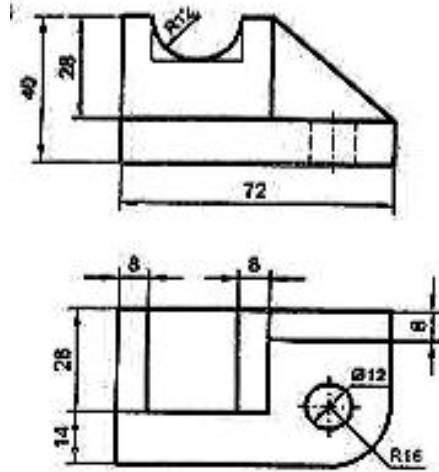
OR

8. A hexagonal pyramid with side of base 30mm and axis 120mm long is resting on its base on HP. An edge of the base is parallel to VP. A horizontal section plane passing through a point to n the axis at a distance of 60mm from the base. Draw the isometric view of the frustum of the pyramid.   14M CO4 L4
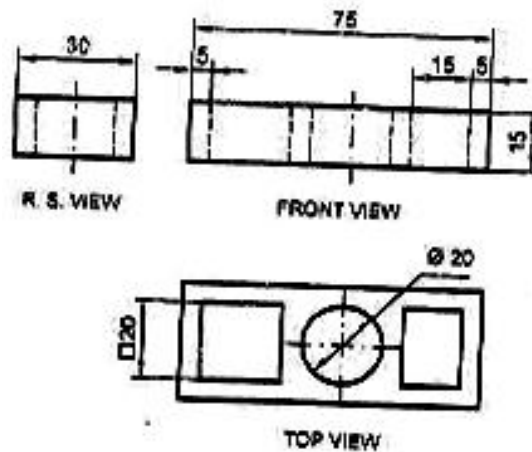
UNIT–V

9. Draw the isometric view of the following figure

14M CO5 L4

OR

10. Draw the isometric view of the following figure

14M CO5 L4

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I B.Tech. II Semester Supplementary Examinations April 2023
Engineering Mechanics - Dynamics
(Common to CE and ME)

Max. Marks: 70   Time: 3 Hours
Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)
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UNIT–I

1. a) A particle moves along a straight line so that its displacement in metre from a fixed point is given by, $s = t^3 + 3t^2 + 4t + 5$. Find :
   (i) Velocity at start and after 4 seconds   (ii) Acceleration at start and after 4 seconds.

   b) A stone dropped into a well is heard to strike the water after 4 seconds. Find the depth of the well, if the velocity of sound is 350 m/sec.

OR

2. Motion of a particle is given by the equation $x = t^3 - 3t^2 - 9t + 12$. Determine the time, position and acceleration of the particle when its velocity becomes zero.

UNIT–II

3. A ceiling fan when switched on attains a maximum angular speed of 1240rpm in 10secomds. Determine (i) the constant angular acceleration and (ii) the number of revolutions made in 10secomds. The regulator of fan is then rotated so that its speed is reduced from 240 rpm to 18 rpm in 5 seconds. Determine the uniform retardation.

OR

4. Two points A and B located 10 cm apart on a rotating disc have velocities respectively 10 m/s and 15 m/s. Determine (i) the angular velocity of the disc, and (ii) the radial distances of points A & B.

UNIT–III

5. a) Explain D' Alembert's principle.

   b) A block of 100 N weight is resting on a rough horizontal table. What force p inclined at 30^0 to the horizontal is required to move the block horizontally with an acceleration of $2m/s^2$? The coefficient of kinetic friction between the contact surfaces is 0.2.

OR

6. Two weights 80 N and 20 N are connected by a thread and move along a rough horizontal plane under the action of force 40 N, applied to the first weight of 80 N as shown below. The co-efficient of friction between the sliding surfaces of the weights and the plane is 0.3. Determine the acceleration of the weights and the tension in the thread using D' Alembert's principle.

UNIT–IV

7. A jet of water impinges on a symmetrically curved vane at its center. The velocity of the jet is 60 m/s and the diameter 120 mm. The jet is deflected through an angle of 120°. Calculate the force on the vane if the vane is fixed. Also determine the force if the vane moves with a velocity of 25 m/s in the direction of the jet.

OR

8. A football of mass 200 gm is at rest. A player kicks the ball which moves with a velocity of 20 m/s at an angle of 30° with respect to ground level. Find the force exerted by the player on the ball if duration of strike is 0.02 seconds.

UNIT–V

9. A right circular cylinder of weight 100 N and radius 20 cm is suspended from a cord that is wound around its circumference. If the cylinder is allowed to fall freely, find the acceleration of its mass center and the tension in the cord.

OR

10. A string is wound several times around a solid cylinder of 2 kg mass. The free end of the string is fixed to the ceiling and the cylinder is released from rest. Determine its velocity after it has fallen through a height of 2 m. also, determine the tension in string,

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Code: 5GC24

I B.Tech. II Semester Supplementary Examinations April 2023
Engineering Mathematics-II
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)
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UNIT–I

1. a) Evaluate $\int_{0}^{5}\int_{0}^{x^2} x\left(x^2 + y^2\right)dy\,dx$ **7M**

    b) Evaluate $\int_{0}^{1}\int_{0}^{\sqrt{1-x^2}}\int_{0}^{\sqrt{1-x^2-y^2}} x\,y\,z\,dx\,dy\,dz$ **7M**

OR

2. a) Show that the area between the parabolas $y^2 = 4\,a\,x$ and $x^2 = 4\,a\,y$ is $\frac{16}{3}a^2$ **7M**

    b) Change the order of integration in $\int_{0}^{1}\int_{0}^{\sqrt{1-x^2}} y^2\,dy\,dx$.   **7M**

UNIT–II

3. a) Write the Laplace Transforms of some standard functions   **6M**

    b) Find the Laplace Transform of $f\left(t\right)=\begin{cases} 2\,,0\leq t \leq 1 \\ 2t\,,t\geq 1 \end{cases}$ **8M**

OR

4. a) Find the Laplace Transform of i) $\cos 2t$ ii) $\sin 2t \sin 3t$ **7M**

    b) Find $L^{-1}\left\{\dfrac{1}{\left(s-1\right)\left(s+3\right)}\right\}$ **7M**

UNIT–III

5. Solve $y'' + 2y' - 3y = \sin t,\ y(0) = 0,\ y'(0) = 0$ Using Laplace Transform   **14M**

OR

6. Solve the differential equation $\dfrac{d^2 x}{dt^2} - 4\dfrac{dx}{dt} - 12x = e^{3t}$

    given that $x(0) = 1, x'(0) = -2$ using Laplace Transform   **14M**

UNIT–IV

7. a) Find $div\,\bar{F}$ and $curl\,\bar{F}$ where $\bar{F} = grad\left(x^3 + y^3 + z^3 - 3\,x\,y\,z\right)$ **7M**

    b) Show that $div\left(grad\ r^n\right) = n\left(n+1\right)r^{n-2}$ **7M**

OR

8. a) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $\left(2, -1,\ 2\right)$ **7M**

    b) Prove that $\nabla r^n = n\,r^{n-2}\bar{r}$ where $\bar{r} = x\,\bar{i} + y\,\bar{j} + z\,\bar{k}$ and $r = \left|\bar{r}\right|$ **7M**

UNIT–V

9. Verify by Gauss Divergence theorem for $\bar{F} = x^3\bar{i} + y^3\,\bar{j} + z^3\,\bar{k}$ taken over the cube bounded by $x = 0, x = a\,;\,y = 0,\ y = a\,;\,z = 0, z = a$ **14M**

OR

10. Verify Green's Theorem in the plane for $\int_{c}\left[\left(3x^2 - 8y^2\right)dx + \left(4y - 6xy\right)dy\right]$ where 'c'

    encloses the region bounded by $y = \sqrt{x}$ and $y = x^2$ **14M**

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I B.Tech. II Semester Supplementary Examinations April 2023
Engineering Physics
(Common to CE, ME & CSE)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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Marks

UNIT–I

1. a) Recite the ruby laser for production of laser   8M
   b) Describe construction of optical fiber   6M

OR

2. a) Discuss the working of He-Ne laser   8M
   b) Summarize the applications of LASER   6M

UNIT–II

3. a) Illustrate the powder method to describe the structure of crystal   6M
   b) What is Unit cell & describe the Seven Crystal Systems.   8M

OR

4. Show that FCC is closely packed than SC and BCC structures   14M

UNIT–III

5. a) Find energy of an electron in second state moving in a box of width 1nm   7M
   b) Describe Fermi-Dirac distribution function   7M

OR

6. Derive Eigen energies of a particle in one dimensional potential box   14M

UNIT–IV

7. a) Explain Hall effect and write its applications   8M
   b) What is photo diode explain it   6M

OR

8. a) Explain the diamagnetic nature of superconductors by Meissner's effect   8M
   b) Mention the applications of superconductors   6M

UNIT–V

9. a) Define magnetic materials write any two examples   4M
   b) Write the properties of dia, para and ferro magnetic materials   10M

OR

10. a) Explain Hysterisis loop of ferromagnet   6M
    b) Derive magnetic moment of magnetic material through origin   8M

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R-15

Code: 5G121

I B.Tech. II Semester Supplementary Examinations April 2023
C Programming and Data Structures
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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Marks

UNIT–I

1. a) What is a pointer? What are the features of pointers? Write a C program to print address of a variable   7M
   b) Write a C program to swap two numbers using pointers.   7M

OR

2. a) Using pointers write a C program which finds the maximum among the list of elements.   7M
   b) Explain in detail about Dynamic Memory allocation with examples 7M

UNIT–II

3. a) Define union. List out the differences between unions and structures 7M
   b) Explain different modes to open a file   7M

OR

4. a) Describe the uses and limitations of getc and putc.   7M
   b) Write a program for sorting given numbers using selection sort technique 7M

UNIT–III

5. Write a 'C' program for implementation of various operations on queue. 14M

OR

6. What is a stack? How it can be represented in "C" using arrays? 14M

UNIT–IV

7. Represent a doubly linked list using an array. Write routines to insert and delete elements for this representation.   14M

OR

8. List the operations that can be performed on single linked list. In how many ways a node can be deleted from single linked list? Explain. 14M

UNIT–V

9. a) Define and describe the terms: Tree, Binary Tree, Complete Binary Tree and Degree of a tree.   8M
   b) Define the following terms of graphs. i) Undirected graph ii) In degree iii) Digraph 6M

OR

10. a) Explain the operations on Binary Tree.   7M
    b) Define graph. Explain About the basic Terminology of graphs. 7M

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