R-15

Code: 5G522

I B.Tech. II Semester Supplementary Examinations March 2021
Engineering Graphics –II
(Common to CE and ME)

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 hexagonal pyramid, base 25 mm side and axis 50 mm long, has an edge of its base on the ground. Its axis is inclined at 30^0 to the ground and parallels to the V.P. Draw its projections. 14M

OR

2. Draw the projections of a pentagonal prism, base 25 mm side and axis 50 mm long, resting on one of its rectangular faces on the H.P., with the axis inclined at 45^0 to the V.P. 14M

UNIT–II

3. A pentagonal prism, side of base 60 mm and length 90 mm has a rectangular face on the H.P. and the axis parallel to the V.P. It is cut by a vertical section plane, the H.T. of which makes an angle of 45^0 with xy and bisects the axis. Draw the sectional front view, top view and true shape of the section. 14M

OR

4. A cylinder of base diameter 45 and axis length 60 mm is resting on HP on one of its generators with its axis perpendicular to VP. It is cut by a plane inclined 30° to VP and perpendicular to HP 'and is bisecting the axis of the cylinder. Draw its top view, sectional front view and true shape of section. 14M

UNIT–III

5. A hexagonal pyramid with side of base 30 mm and height 75 mm stands with its base on RP and an edge of the base parallel to V.P. It is cut by a plane perpendicular to V. P., inclined at 45° to H.P and passing through the mid-point of the axis. Draw the top view and develop the lateral surface of the truncated pyramid 14M

OR

6. A cylinder of diameter of base 40 mm and height 50 mm is standing on its base on HP. A cutting plane inclined at 45° to the axis of the cylinder passes through the left extreme point of the top base. Develop the lateral surface of the truncated cylinder. 14M

UNIT–IV

7. Draw the isometric view of square prism with a side of base 30mm and axis 50mm long when the axis is (a) vertical and (b) horizontal. 14M

OR

8. A pentagonal pyramid of side of base 30mm and height 70mm is resting with its base on H.P. Draw the isometric drawing of the pyramid. 14M
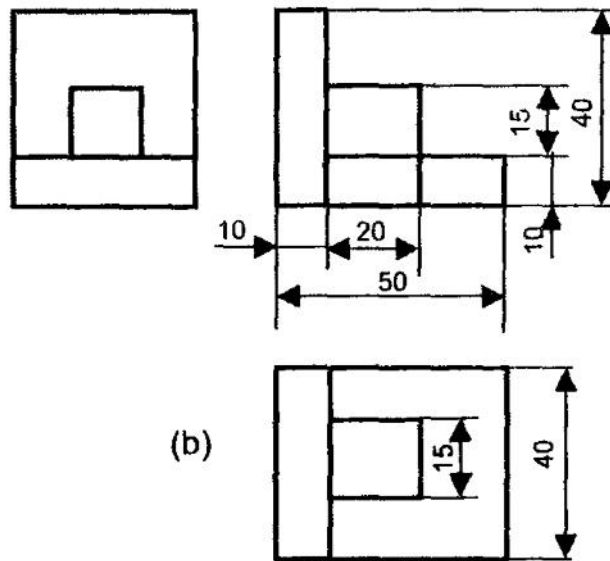
UNIT–V

9. Draw the front view, top view and right side view for the following figure

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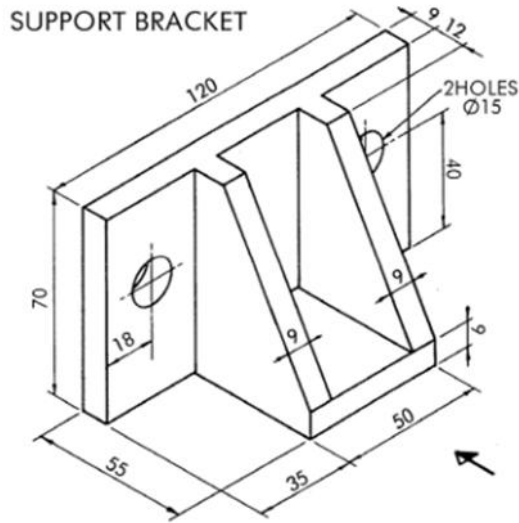
14M

OR

10. Draw the isometric view for the following figure

(b)

14M

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I B.Tech. II Semester Supplementary Examinations March 2021
Engineering Mechanics-Dynamics
(Common to CE & ME)

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. The rectilinear motion of a particle is governed by $a = \frac{-16}{x^3}$, where a is in m/s^2 and x is in meters.

   Given that at time t=1 s, x = 2 m and v=3 m/s,(i)write the equation of motion, (ii) determine the position, velocity and acceleration at t = 4 s.

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. The initial angular velocity of a rotating body is 2 rad/s^2 and initial angular acceleration is zero. The rotation of the body is according to the relation, $\alpha = 3t^2 - 3$. Determine,

   (i)   Angular velocity
   (ii) Angular displacement when t = 5 seconds

   Consider the angular displacement in radians and time in second.

OR

4. What is general plane motion? Explain instantaneous method.

UNIT–III

5. 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.

OR

6. A locomotive of weight W = 600 KN goes around a curve of radius r=300m at a uniform speed of 70kmph. Determine the total lateral (outward) thrust on the rails.

UNIT–IV

7. 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.

OR

8. a) Derive impulse – momentum equation.
   b) Derive work-energy equation.

UNIT–V

9. 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,

OR

10. A constant force of 100 N is applied as shown tangentially on a cylinder at rest, whose mass is 50 kg and radius is 10 cm, for a distance of 5 m. Determine the angular velocity of the cylinder and the velocity of its centre of mass. Assume that there is no slip.

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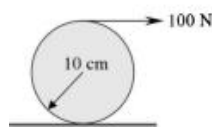
R-15

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations March 2021

Engineering Mathematics-II

(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. Change of order of integration and evaluate $\int\limits_{0}^{\infty}\int\limits_{x}^{\infty}\dfrac{e^{-y}}{y}\,dx\,dy$

OR

2. Evaluate $\int\limits_{0}^{a}\int\limits_{0}^{x}\int\limits_{0}^{x+y} e^{x+y+z}\,dz\,dy\,dx$

UNIT–II

3. Find the Laplace Transform of $\dfrac{\cos 2t - \cos 3t}{t}$

OR

4. State and Prove the convolution Theorem of Laplace Transform

UNIT–III

5. Solve the differential equation $y'' + y = t,\ y(0) = 1,\ y'(0) = 2$ Using Laplace Transform

OR

6. Solve the differential equation $y'' + 3y' + 2y = e^{-t}$ given that $y(0) = 0, y'(0) = 1$ using Laplace Transform

UNIT–IV

7. Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$

OR

8. Prove that $\nabla r^n = n\,r^{n-2}\bar{r}$ where $\bar{r} = x\,\bar{i} + y\,\bar{j} + z\,\bar{k}$ and $r = |\bar{r}|$

UNIT–V

9. Verify Green's Theorem in the plane for $\int\limits_{c}\left[(3x^2 - 8y^2)dx + (4y - 6xy)dy\right]$ where 'c' encloses the region bounded by $y = \sqrt{x}$ and $y = x^2$

OR

10. Verify by Green's Theorem for $\int\limits_{c}\left[(xy + y^2)dx + x^2 dy\right]$ where 'c' is bounded by $y = x$ and $y = x^2$

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R-15

Code: 5GC23

I B.Tech. II Semester Supplementary Examinations March 2021

Engineering Physics

(Common to CE, ME, 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) Describe construction of optical fiber

   b) Write the application of optical fiber in communication system

OR

2. a) Explain conditions of interference by the reflected light due to thin parallel film

   b) Describe the Fraunhofer diffraction grating spectrum

UNIT–II

3. a) Define ultrasonics and write its properties

   b) Describe the production of ultrasonics by Inverse Peizo electric effect

OR

4. a) Deduce Bragg's law equation

   b) Illustrate the powder method to describe the structure of crystal

UNIT–III

5. a) Describe Fermi-Dirac distribution function

   b) Write the sources of electrical resistance

OR

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

UNIT–IV

7. a) Explain Hall effect and write its applications

   b) What is photo diode explain it

OR

8. a) Explain direct and indirect band gap semiconductors

   b) Brief Joshepson's effect with types

UNIT–V

9. a) Define ferromagnet and explain the B-H loop

   b) Explain the production of nano materials by ball milling method

OR

10. a) Brief the basic principles of nano materials

    b) Explain the synthesis of nano materials by sol-gel method

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Code: 5G121

I B.Tech. II Semester Supplementary Examinations March 2021

C Programming and Data Structures

(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 a C program to access elements of an array using pointer.

   b) Explain the concept of pointers to pointers.

OR

2. a) Define pointer and explain about pointer arithmetic.

   b) List the four dynamic memory allocation functions in C and give their syntax with examples.

UNIT–II

3. a) Explain with an example about nested structures.

   b) Explain any four four standard library functions for files in C.

OR

4. a) Give the tracing of selection sort algorithm for the data [5, 1, 7, 8, 2, 3, 4, 6] to be sorted in ascending order.

   b) Differentiate between structure and union.

UNIT–III

5. a) Write a C program to implement operations of a dynamic queue.(Use pointers)

   b) Write a program to implement stack operations using pointers.

OR

6.   Convert the following infix expressions to postfix expressions.

   i) A / B * C - D   ii) (A - B) * (C * D)   iii) A + B + C * D

UNIT–IV

7. a) Explain the advantages and disadvantages of linked lists over arrays.

   b) Write the applications of circular linked list.

OR

8. a) Write a C program for insertion operation in a singly linked list.

   b) Write C functions for deletion operations in doubly linked list.

UNIT–V

9. a) Define the following terms of a graph.

   i) Undirected graph   ii) In degree   iii) Digraph

   b) Explain different types of traversals in a tree.

OR

10. Create a binary search tree by inserting following elements into an empty BST: [6, 4, 5, 3, 10, 8, 11].

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