Hall Ticket Number :										

R-15

Code: 5G121

I B.Tech. II Semester Supplementary Examinations October 2020

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) What is a pointer? Explain in detail about pointer arithmetic.
   b) Write a program to read and display array elements using pointers

OR

2. a) What is the use of command line arguments
   b) Write a program using pointers to compute the sum of all elements in an array.

UNIT–II

3. a) Define Structures. Explain with an example how structure members are initialized and accessed
   b) Explain different modes to open a file

OR

4. a) Write a C Program to sort the given array in descending order using Bubble Sort.
   b) Write a C program to find the given element using linear searching.

UNIT–III

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

OR

6. a) What is Data Structure? Explain in detail about different type of data structures.
   b) Write the steps for evaluating postfix expression

UNIT–IV

7. What is a Singly Linked List.? Explain different operations of a singly linked list with suitable examples.

OR

8. What is a Circular Linked List.? Explain different operations of a Circular linked list with suitable examples.

UNIT–V

9. Define binary search tree. Explain with example insertion of an element in the binary search tree.

OR

10. a) Define the following terms of graphs. i) Undirected graph ii) In degree iii) Digraph
    b) Define and write applications of graphs.

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Hall Ticket Number :										

R-15

Code: 5G522

I B.Tech. II Semester Supplementary Examinations October 2020

Engineering Graphics-II

(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. A pentagonal pyramid 30 mm side of base and axis 75mm long is resting on one of its base corner on H.P. Draw its projections, when its axis is inclined at 45^0 to H.P and 30^0 to V.P.

OR

2. A cone of base 80 mm diameter and height 100 mm is lying with one of its generators on H.P. Draw its projections when the axis appears to be inclined to the reference line at an angle of 40^0 in the top view.

UNIT–II

3. A pentagonal prism, side of base 50 mm and length 100 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 30^0 with xy and bisects the axis. Draw the sectional front view, top view and true shape of the section.

OR

4. A cone, diameter of base 45 mm and axis 60 mm is resting on its base on the HP. It is cut by a section plane perpendicular to the VP and inclined at 800 to the HP. The section plane passes through the apex. Draw the sectional top view and also obtain the true shape of the cut section.

UNIT–III

5. A square prism of base 50 mm side and height 125 mm stands on the ground with its side of base inclined at an angle of 30^0 to VP. It is penetrated by a cylinder of diameter 50 mm and axis 125 mm long. The axis of the cylinder is parallel to both HP and VP and bisects the axis of the prism. Draw the projection showing fully the curves of intersection.

OR

6. A cube of 50 mm long edges is resting on the H.P. with a vertical face inclined at 30^0 to the V.P. It is cut by a section plane, perpendicular to the V.P. inclined at 30^0 to the H.P. and passing through a point on the axis, 38 mm above the H.P. Draw the sectional top view, true shape of the section and development of the surface of the remaining portion of the cube.

UNIT–IV

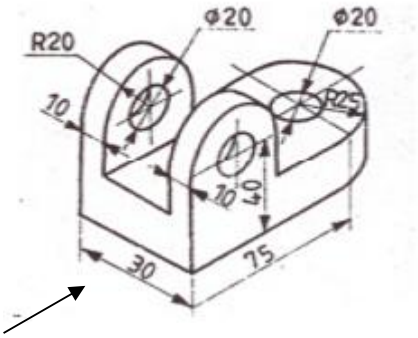
7. Draw the isometric projection of a sphere of radius 25 mm resting centrally on the top of a square prism of side 60 mm and height 25 mm. The sides of the square are equally inclined to V.P.

OR

8. The frustum of a hexagonal pyramid side of top and bottom 25 mm and 40 mm respectively, with axis 50 mm height rests on its base in H.P. Its axis is parallel to V.P. Draw its isometric view.

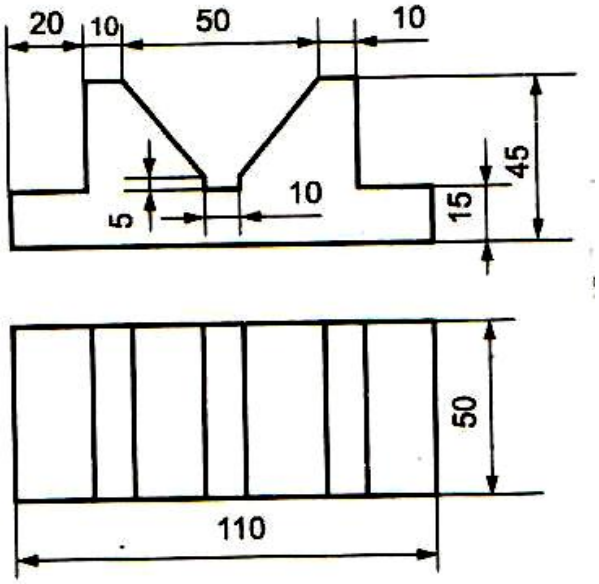
UNIT–V

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



OR

10. Draw the isometric view of the following figure



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Hall Ticket Number :										

R-15

Code: 5G521

I B.Tech. II Semester Supplementary Examinations October 2020

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. Three marks A, B, and C at a distance of 100m each are made along a straight road. A car starting from rest and with acceleration passes mark-A and takes 10sec to reach B and further 8sec to reach the mark C. Calculate i). The magnitude of acceleration of car ii). The velocity of the car at A iii). Velocity of car at B iv). The distance of the mark A from starting point. 14M

OR

2. A projectile is aimed at a mark on the horizontal plane through the point of projection and falls 12m short when angle of projection is 15^0 while it overshoots the mark by 24m when same angle is 45^0. Find the angle of projection to hit the mark. Assume no air resistance. Take the velocity of projection same in all cases. 14M

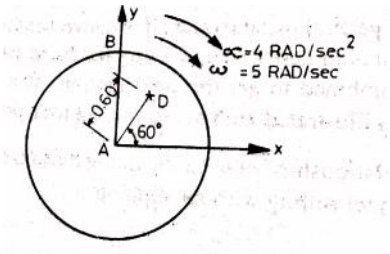
UNIT–II

3. a) The angle of rotation of a body is given by the equation $\theta = t^3 - 4t^2 + 10t + 5$ where θ is expressed in radians and t in seconds. Determine i). Angular velocity ii). Angular acceleration of the body when t=0s, and t=5s. 6M

   b) Derive the equations of motion of a body moving along a circular path with uniform angular acceleration. 8M

OR

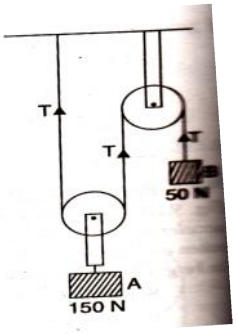
4. A wheel of radius 1m rolls freely with an angular velocity of 5rad/s and with an angular acceleration of 4rad/s^2, both clockwise as shown in figure. Determine the velocity and acceleration at points B and D.



14M

UNIT–III

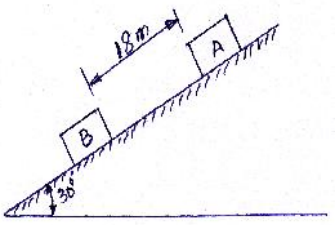
5. Determine the tensions in the strings and accelerations of blocks A and B weighing 150N and 50N connected by a string and a frictionless and weightless pulley as shown in figure.



14M

OR

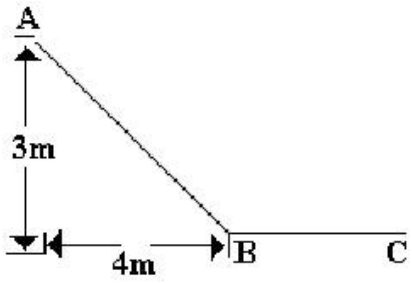
6. Two blocks A and B released from rest on a 30^0 incline, when they are 18m apart. The coefficient of friction under the upper block-A is 0.2 and that under the lower block is 0.4. In what time block-A reaches the block-B? After they touch and move as a single unit, what will be the contact force between them? Weights of the block-A and block-B are 100N and 80N respectively.



14M

UNIT–IV

7. A block starts from rest from 'A'. If the coefficient of friction between all surfaces of contact is 0.3, find the distance of point at which the block stop on the horizontal plane. Assume the magnitude of velocity at the end of slope is same as that at the beginning of the horizontal plane.



14M

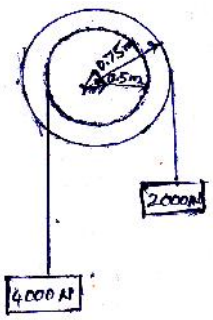
OR

8. a) A cricket ball of 150g mass moving at 25 m/s is hit by a cricketer and the ball leaves the bat with a velocity of 35 m/s at an angle of 30^0 to the initial direction. Determine the average force of impulse exerted by the bat on the ball if the contact duration is $1/100^{th}$ of a second. 7M

b) A jet of water issued from a nozzle strikes at the center of a smooth curved vane. The water after striking the vane leaves tangential to the vane at the exit. If the jet diameter is 4mm, the velocity of the jet is 10m/s and after striking, it gets deflected through 120^0, determine the force exerted by the jet of water on the vane. 7M

UNIT–V

9. The composite pulley shown in figure weighs 800N and has a radius of gyration of 0.6m. The 2000N and 4000N blocks are attached to the pulley by inextensible strings as shown in figure. Neglecting weight of the strings, determine the tension in the strings and angular acceleration of the pulley.



14M

OR

10. A constant force of 100N is applied tangentially on a cylinder at rest, whose mass is 50kg and radius is 10cm, for a distance of 5m. Determine the angular velocity of its centre of mass. Assume that there is no slip. 14M

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Hall Ticket Number :										

R-15

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations October 2020

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. 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. Evaluate the integral by changing the order of integration $\int_0^a \int_{\frac{x^2}{a}}^{2a-x} x\, y^2 dy\, dx$ 14M

UNIT–II

3. Find the Laplace Transform of i) $\mathrm{Cos}\, 2t$ ii) $\sin 2t \sin 3t$ 14M

OR

4. a) Write the Laplace Transforms of some standard functions 7M

   b) Find the Laplace Transform of $f(t)=\begin{cases} 2\ , 0 \le t \le 1 \\ 2t\ , t \ge 1 \end{cases}$ 7M

UNIT–III

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

OR

6. Solve $y''+2y'+5y=e^{-t}, y(0)=0,\ y'(0)=1$ Using Laplace Transform Technique 14M

UNIT–IV

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

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

UNIT–V

9. Evaluate by stoke's theorem for a vector field $\bar{F}=(2x-y)\,\bar{i}-yz^2\,\bar{j}-y^2z\,\bar{k}$ over the upper half surface of $x^2+y^2+z^2=1$ bounded by projection on xy-plane. 14M

OR

10. 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

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Hall Ticket Number :										

R-15

Code: 5GC23

I B.Tech. II Semester Supplementary Examinations October 2020

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) Explain about various types of optical fibres.
   b) Discuss the principle and working of semiconducting laser.

OR

2. Answer any two of the following.
   a. Fraunhofer diffraction.
   b. Einstein's coefficients.
   c. Acceptance angle.

UNIT–II

3. Describe with suitable diagram the powder method for determination of crystal structure.

OR

4. Distinguish between schottky and Fresnel defects in ionic crystals.

UNIT–III

5. a) What is conductivity and derive expression for it
   b) Write a note on sources of electrical resistance of metal

OR

6. a) Distinguish between matter wave and electromagnetic wave
   b) Describe draw backs of classical free electron model and write postulates of quantum free electron model

UNIT–IV

7. a) Explain the constructions and working of light emitting diode (LED).
   b) Discuss advantages and applications of LED.

OR

8. a) What is Bohr magnetron?
   b) With suitable expressions explain the origin of permanent magnetic moment of magnetic materials.

UNIT–V

9. a) Distinguish the soft and hard magnetic materials.
   b) A magnetic material has a magnetization of 3300 A/m and flux density of 0.0044Wb/m^2. Compute the magnetizing force and the relative permeability of the material.

OR

10. a) Explain the construction and working of Ball mill method to prepare nanoparticles.
    b) Write the properties of nanomaterials

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