Hall Ticket Number :										

R-17

Code: 7G121

I B.Tech. II Semester Regular Examinations May 2018

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) Define pointer and explain about pointer arithmetic. 7M
   b) List the four dynamic memory allocation functions in C and give their syntax with examples. 7M

OR

2. a) What are the features and uses of pointers? 7M
   b) Write a C program to add two numbers using command line arguments. 7M

UNIT–II

3. a) Differentiate between structure and union. 6M
   b) Give the tracing of quick sort algorithm for the data [1, 2, 3, 4, 5, 6, 7, 8] to be sorted in ascending order. Discuss its time complexity. 8M

OR

4. a) Write a program in C to copy the contents of one file to another. 7M
   b) Write an iterative algorithm for binary search and discuss its time complexity. 7M

UNIT–III

5. a) Convert the following infix expressions to postfix expressions.
   i) A + B * C + D ii) (A + B) * (C + D) iii) A + B + C + D 6M
   b) Write a program in C to implement operations on queue.(Use pointers) 8M

OR

6. a) Write an algorithm to evaluate a postfix expression. 8M
   b) Give the advantages and disadvantages of recursion. 6M

UNIT–IV

7. a) Write a C program for insertion operation in a singly linked list. 7M
   b) Write C functions for insertion and deletion operations in doubly linked list. 7M

OR

8. a) Write a recursive program to reverse the given singly linked list. 8M
   b) Give the applications of circular linked list. 6M

UNIT–V

9. a) Define binary search tree. Write a C function to insert a new node in a binary search tree. 8M
   b) Give the applications of graphs. 6M

OR

10. a) Write a C function to search a given key in a given binary search tree. 8M
    b) Define the following regarding graphs.
    i) Undirected graph ii) In degree iii) Digraph 6M

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Hall Ticket Number :										

R-17

Code: 7G521-B

I B.Tech. II Semester Regular Examinations May 2018

Engineering Graphics–II

(Mechanical Engineering)

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. Draw the projections of a cone, with a 50 mm base diameter and a 70 mm long axis that is resting on a point of its base circle on the ground such that its axis is inclined at 30^0 to the H.P. and the top view of the axis is inclined at 45^0 to the V.P.

OR

2. A hexagonal prism, base 40 mm side and height 40 mm has a hole of 40 mm diameter drilled centrally through its ends. Draw its projections when it is resting on one of its corners on the ground with its axis inclined at 60^0 to the ground and two of its faces parallel to the V.P.

UNIT–II

3. A cube of side 40 mm is resting on ground on one of its faces. All the vertical faces of the cube are equally inclined to VP. It is cut by a section plane perpendicular to VP and inclined to HP, so that the true shape of the section is a regular hexagon. Draw the projections, sectional top view and true shape of the section.

OR

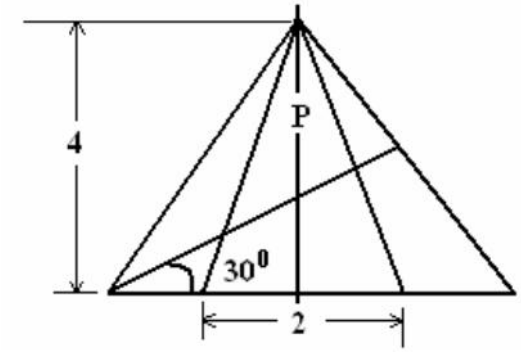
4. A pentagonal pyramid with a 55 mm base and a 90 mm slant height, has its base on the HP with a side of base perpendicular to the VP. It is cut by a section plane whose VT is inclined at 60° to XY and intersecting the axis at 40 mm from its base. Draw the Front View, Sectional Top View, Sectional Side View, and the true shape of the section.

UNIT–III

5. A vertical cylinder of 60 mm diameter is penetrated by a horizontal cylinder of the diameter 40mm. The axis of horizontal cylinder is parallel to both H.P and V.P and is bisecting the axis of the vertical cylinder. Draw the projections showing the lines of intersection

OR

6. Draw the development of the lateral surface of the part P of the hexagonal pyramid, two sides of the base parallel to the V.P as shown in figure. All dimensions are in cm.



UNIT–IV

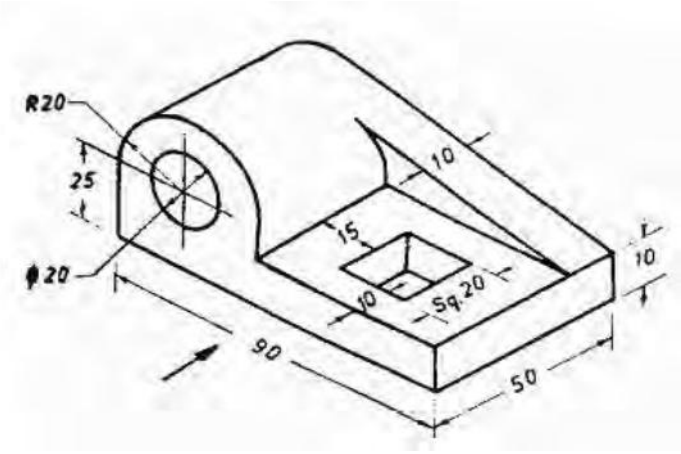
7. Draw the isometric view of a square prism with the side of the base 40mm and length of the axis 70mm. when its axis is
   i) vertical ii) horizontal.

OR

8. Draw the isometric projection of a pentagonal pyramid, with side of base 25mm and axis 60mm long. The pyramid is resting on its base on HP, with an edge of the base parallel to the VP.

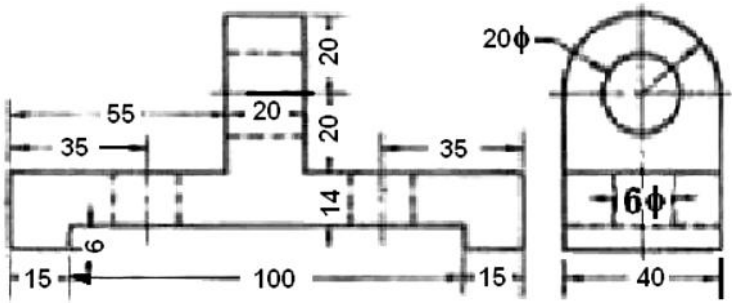
UNIT–V

9. Draw the following views of the object given in figure. All dimensions are in mm.
   (a) Front View
   (b) Top View and
   (c) Side View from the right.



OR

10. Draw the isometric view of the object whose orthographic projections are shown in figure. All dimensions are in mm.



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Hall Ticket Number :										

R-17

Code: 7G522

I B.Tech. II Semester Regular Examinations May 2018

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. a) Derive the equations of rectilinear motion of a particle moving with constant acceleration. 7M

   b) A stone is dropped into a well and falls vertically with constant acceleration g=9.81 m / s^2. The sound of impact of the stone is on the bottom of the well is heard 6.5 sec after it is dropped. If the velocity of sound is 336.33 m / s, how deep is the well ? 7M

OR

2. a) Define normal and tangential components of accelerations. Write the equations. 4M

   b) The pilot of an airplane A flying horizontally with constant speed *v* = 450 kmph at an elevation h = 600 m above a level plain wishes to bomb a target B on the ground (Figure.1). At what angle **θ** below the horizontal should he see the target at the instant of releasing the bomb in order to score a hit?

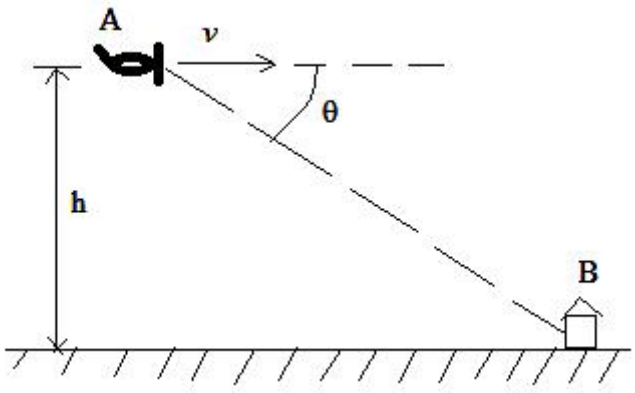

Figure.1 10M

UNIT–II

3. a) Explain about kinematics of rotation of a rigid body. 7M

   b) The armature of an electric motor has angular speed N = 1800 rpm at the instant when the power is cut off. If it comes to rest in 6 seconds,

      (i) Calculate the angular deceleration α assuming that it is constant.

      (ii) How many complete revolutions does the armature make during this period? 7M

OR

4. a) What is instantaneous center of rotation of a rigid body making plane motion? Explain with an example. 7M

   b) A locomotive runs along a straight level track with constant acceleration a=0.2g. Find the total acceleration of a point at the top of the rim of a driver wheel of radius r = 1 m when the speed of the locomotive is 25 kmph. 7M

UNIT–III

5. a) Explain Virtual work principle and D'Alembert's principle with an example. 7M

   b) A police investigation of tire marks shows that a car travelling along a straight level street had skidded for a total distance of 40 m after the brakes were applied. The coefficient of friction between tires and pavement is estimated to be μ = 0.6. What was the probable speed of the car when the brakes were applied? Assume constant deceleration for the car. 7M

OR

6. a) Two weights P and Q are connected by the arrangement shown in Figure.2. Neglecting friction and the inertia of the pulleys and cord, find the acceleration 'a' of the weight Q. Also find the tension in the cord. Assume that P = 40 KN and Q=30 KN.

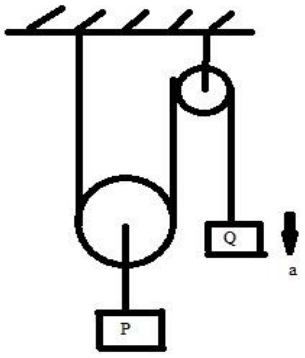

Figure.2 7M

   b) 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. 7M

UNIT–IV

7. a) State and prove Work-Energy principle of rectilinear translation. 7M

   b) When a ball of weight 'W' rests on a spring of constant 'k', it produces a static deflection of 25 mm. How much will the same ball compress the spring if it is dropped from a height h = 300 mm? Neglect the mass of the spring. 7M

OR

8. a) State and prove Impulse – Momentum principle 7M

   b) A locomotive weighing 60 tons has a velocity of 15 kmph and backs into a freight car weighing 10 tons that is at rest on a level train track. After the coupling is made, with what velocity '*v*' will the entire system continue to move? 7M

UNIT–V

9. a) Derive the equation of motion of a rigid body rotating about a fixed axis. 7M

   b) A homogeneous sphere, of radius a = 0.25 m and weight W = 1 KN, can rotate freely about a diameter. If it starts from rest and gains, with constant angular acceleration, an angular speed of n = 180 rpm in 12 revolutions, find the acting moment 'M'. 7M

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-17

Code: 7GC24

I B.Tech. II Semester Regular Examinations May 2018

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) Trace the curve $y^2(2a-x) = x^3$ 7M

   b) Evaluate $\iint r \sin\theta \, dr\, d\theta$ over the cardioid $r = a(1-\cos\theta)$ above the initial line. 7M

OR

2. a) Evaluate the double integral $\int_0^a \int_0^{\sqrt{a^2-y^2}} (x^2+y^2)\,dx\,dy$ by changing into polar coordinates 7M

   b) Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ *and* $z = 0$ 7M

UNIT–II

3. a) Find the Laplace transform of $e^{4t}\sin 2t \cos t$ 7M

   b) Evaluate $\int_0^\infty t\, e^{-3t}\sin t \, dt$ applying Laplace transform. 7M

OR

4. a) Find the Laplace transform of $\frac{\sin 3t \cos t}{t}$ 7M

   b) Evaluate $L(f(t))$ where $f(t)$ is a periodic function of period 2π given by

$$f(t) = \begin{cases} \sin t & , \ 0 < t < \pi \\ 0 & , \ \pi < t < 2\pi \end{cases}$$

7M

UNIT–III

5. a) Find the inverse Laplace transform of $\frac{s+2}{s^2-2s+5}$ 7M

   b) Applying Laplace transforms, solve the differential equation

$$\frac{d^3y}{dt^3} + 2\frac{d^2y}{dt^2} - \frac{dy}{dt} - 2y = 0, \quad y(0) = 1, \quad y'(0) = y''(0) = 2$$

7M

OR

6. a) Find the inverse Laplace transform of $\frac{e^{-2s}}{s^2+4s+5}$ 7M

   b) Applying Laplace transforms, solve the differential equation

$$\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 5x = e^{-t}\sin t, \quad x(0) = 0, \quad x'(0) = 1$$

7M

UNIT–IV

7. a) Find the directional derivative of the function $f = x^2 - y^2 + 2z^2$ at the point $P = (1, 2, 3)$ in the direction of PQ where $Q = (5, 0, 4)$ 7M

   b) Show that $F = (e^x \cos y + yz)i + (xz - e^x \sin y)j + (xy + z)k$ is conservative over its natural domain and find potential function for it. 7M

OR

8. a) Establish the relation $\nabla^2[f(r)] = \frac{d^2 f}{dr^2} + \frac{2}{r}\frac{df}{dr}$ *where* $r = |\bar{r}|$ 7M

   b) Evaluate $\int_S \bar{F} \cdot \bar{n}\, dS$ where $\bar{F} = 18z\,\bar{i} - 12\,\bar{j} + 3y\,\bar{k}$ and S is the part of the surface of the plane $2x + 3y + 6z = 12$ located in the first octant. 7M

UNIT–V

9. a) Applying divergence theorem evaluate $\iint_S x\,dydz + y\,dzdx + z\,dxdy$ where S is the surface of the sphere $x^2 + y^2 + z^2 = a^2$ 7M

   b) Evaluate by Greens theorem $\oint_C (y - \sin x)dx + \cos x\, dy$ where C is the triangle enclosed by the lines $y = 0$, $x = \frac{®}{2}$ *and* $® \; y = 2x$ 7M

OR

10. Verify stokes theorem for the vector field $\bar{F} = (2x - y)\,\bar{i} - yz^2\,\bar{j} - y^2 z\,\bar{k}$ over the upper half of the surface $x^2 + y^2 + z^2 = 1$ bounded by its projection on the xy – plane. 14M

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Hall Ticket Number :										

R-17

Code: 7GC23

I B.Tech. II Semester Regular Examinations May 2018

Engineering Physics

(Common to CE, ME & CSE)

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 the phenomenon of interference of light. Obtain conditions for maxima and minima due to interference of reflected light in Thin films. 10M

   b) In a Newton's Rings experiment diameter of 10^{th} ring changes from1.4cm to 1.27cm when a liquid is introduced between lens and the plate. Calculate R.I. of liquid. 4M

OR

2. a) Explain the following

   i) Population inversion ii) Pumping mechanism iii) Active system 6M

   b) Explain the working of semi conductor laser. 8M

UNIT–II

3. a) What do you understand by space lattice? Describe briefly the seven crystal systems and Bravais lattices. 10M

   b) Find the miller indices of a set of parallel planes which makes intercepts in the ratio 3a:4b on the X and Y axes and are parallel to Z axis, a, b, c, being primitive vectors of the lattice. 4M

OR

4. a) Define ultrasonics. Describe piezo-electric method of production of ultrasonics. 8M

   b) Give an account of the methods used in the detection of ultrasonics. 6M

UNIT–III

5. a) Derive Schrodinger's time independent wave equation. 8M

   b) Explain the significance of wave function. 6M

OR

6. a) Explain the concept of Kronig Penny model. 7M

   b) Obtain an expression for the electrical conductivity of metals on the basis of free electron theory. 7M

UNIT–IV

7. a) What are the diffusion and drift currents, and derive. 7M

   b) What is Hall effect? Obtain an expression for Hall coefficient for an extrinsic semiconductor. 7M

OR

8. a) Discuss general properties of super conductors. 8M

   b) Explain DC and AC Josephson effects. 6M

UNIT–V

9. a) Give the classification of Magnetic materials and explain their properties. 8M

   b) Explain magnetic flux density B, magnetic flux intensity H and magnetization M. How are they related to each other? 6M

OR

10. a) Explain the Basic principles responsible for unusual properties of Nano materials. 6M

    b) Explain Sol-gel method of synthesis of Nano materials. 8M

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