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-A

I B.Tech. II Semester Regular Examinations May 2018

Engineering Graphics –II

(Civil 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 cylinder, base 25 mm radius and axis 70 mm long, resting on one of its generator on the H. P., with the axis inclined at 45^0 to the V. P.

OR

2. A pentagonal pyramid, base 30 mm side and axis 50 mm long has one of triangular faces in V.P. and the edge of the base contained by that face makes an angle of 30 degrees with the H.P. Draw its projections.

UNIT–II

3. A rectangular prism 30 mm × 60 mm and height 100 mm is standing on the base on the ground with the longer edges of the base parallel to the VP. It is cut by an AIP plane to give the view from above the section as a square of 30 mm sides. Draw an auxiliary View with the true shape of the section and find the inclination of the auxiliary inclined plane with the ground.

OR

4. A cylinder of base 40 mm diameter and height 60 mm is standing on one of the points on the base circle and the base makes 30^0 to the ground and the axis is parallel to the V.P. The axis leans towards the right. The object is cut by a section plane such that the view from the right shows the true shape of the section. The top most portion of the section is 50 mm above the ground. Draw the true shape of the section and also find the inclination of the section plane with the V.P and H.P.

UNIT–III

5. A vertical cylinder of 70 mm diameter is penetrated by a horizontal cylinder of the diameter 50mm. 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. A pentagonal prism having a base with 30 mm side and 65 mm long axis, is resting on its base in the H.P. with a rectangular face parallel to the V.P. It is cut by a section plane perpendicular to the V.P., inclined at 30^0 with the H.P., and passing through a point on the axis, 25 mm from one of the bases. Draw the development of its lateral surface.

UNIT–IV

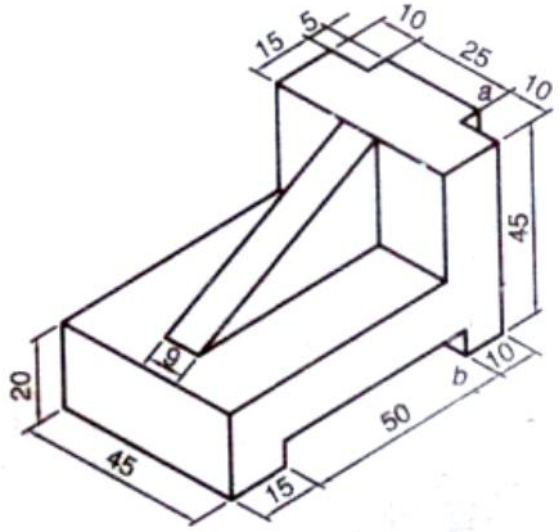
7. A hexagonal prism with a 30 mm base and 45 mm axis has an axial hole with a 30 mm diameter. Draw its isometric projection.

OR

8. A hexagonal prism of base edge 30 mm and height 70mm long is resting on its rectangular face on the ground with its axis parallel to the VP. A square prism of 20 mm base edge and height 40 mm rests on its base on the top rectangular face of the hexagonal prism. The axis of the square prism intersects and bisects the axis of the hexagonal prism when produced. One of the base edges of the square prism is parallel to the VP. Draw an isometric projection of the set up.

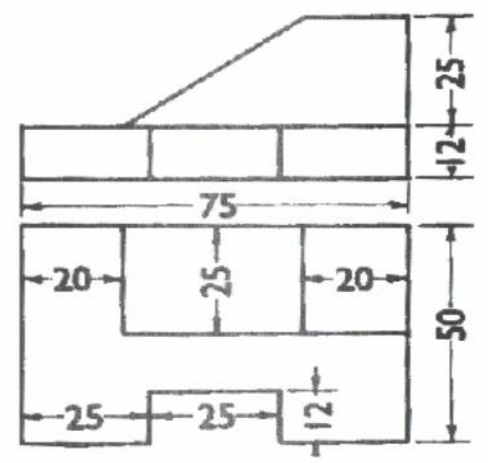
UNIT–V

9. Draw the front view, top view and side view of the object whose isometric view is shown in the Figure below (All dimensions are in mm).



OR

10. Draw isometric view for the following orthographic projection.



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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?

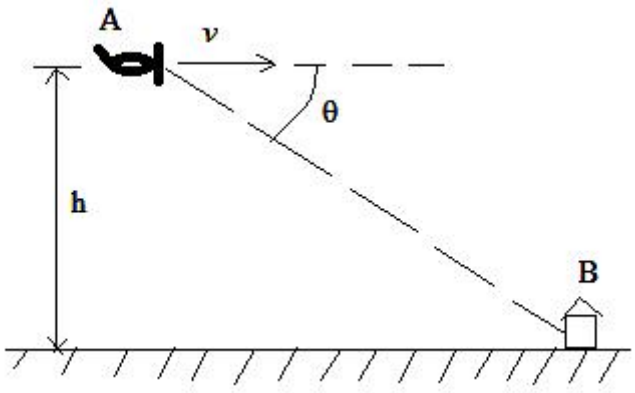

Figure.1 10M

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.

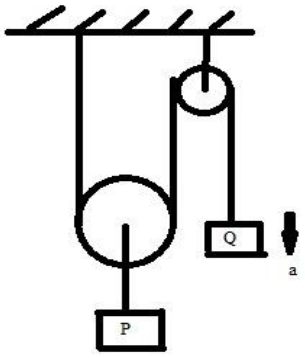

Figure.2 7M

   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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