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R-17

Code: 7G121

I B.Tech. II Semester Supplementary Examinations Nov/Dec 2020

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)

UNIT-I

- 1. a) What is a pointer? Explain in detail about pointer arithmetic. 7M
- b) Write a program to read and display array elements using pointers 7M

OR

- 2. a) What is the use of command line arguments 4M
- b) Explain in detail about dynamic memory allocation functions in C. 10M

UNIT-II

- 3. a) Define Structures. Explain with an example how structure members are initialized and accessed 8M
- b) Explain different modes to open a file 6M

OR

- 4. a) Write a C Program to sort the given array in descending order using Bubble Sort. 7M
- b) Write a C program to find the given element using linear searching. 7M

UNIT-III

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

OR

- 6. Write a C Program to perform the following operations on a queue 14M
 - i) Insert
 - ii) Delete

UNIT-IV

- 7. What is a Singly Linked List.? Explain different operations of a singly linked list with suitable examples. 14M

OR

- 8. Write C functions to perform the following operations: 14M
 - i. Create a circular singly linked list
 - ii. Display Circular singly linked list

UNIT-V

- 9. Define binary search tree. Explain with example deletion of an element from a binary search tree. 14M

OR

- 10. Define Graph and describe various representations of a graph with suitable examples. 14M

Code: 7G522

I B.Tech. II Semester Supplementary Examinations Nov/Dec 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)

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. A ball is thrown from the ground with a initial velocity of 20 m/s at an angle of 30° to the horizontal. Determine (i) the velocity of the ball at $t=1.5$ s, (ii) total time of flight of the ball, (iii) Maximum height reached, (iv) range of the ball and (v) maximum range.

UNIT-II

3. A ceiling fan when switched on attains a maximum angular speed of 1240 rpm in 10seconds. Determine (i) the constant angular acceleration and (ii) the number of revolutions made in 10seconds. 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. A flywheel rotating at 300rpm reduces its speed to 240 rpm while making 10 complete revolutions. Determine its angular retardation assuming it to be uniform what is its speed after 3 seconds assuming the same retardation? Also, determine how much time is taken to come to a rest from a speed of 300 rpm.

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° 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 bodies of mass 100 kg and 40 kg are connected by a thread and move along a horizontal plane under the action of a force 450 N applied to the first body of mass 100 kg as shown in figure. The coefficient of friction between the sliding surfaces of bodies and the plane is 0.3. Determine the acceleration of the two bodies and the tension in the thread using D-Alembert's principle.

UNIT-IV

7. A block weighing 100 N is moving along a horizontal rough surface of friction coefficient 0.2 with a velocity of 5 m/s. A push of 80 N inclined at 30° to the horizontal acts on the block. Using work – energy principle, find the velocity of the block after it had moved through a distance of 20 m.

OR

8. 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.

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 flywheel of 5 kg mass and 20 cm radius of gyration is directly coupled to an electric motor, which can develop 10 kw power when rotating at a speed of 1200 rpm. Determine the irving torque to maintain this speed. If power is switched off and the flywheel comes to rest in 10 seconds, determine the uniform retarding torque on the flywheel.

Code: 7GC24

I B.Tech. II Semester Supplementary Examinations Nov/Dec 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)

UNIT-I

1. a) Trace the curve $r = a(1 - \cos \theta)$. 7M
- b) Evaluate the integral by changing the order of integration $\int_0^1 \int_{x^2}^{2-x} xy dx dy$. 7M

OR

2. a) Evaluate $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$ by changing to polar coordinates. 7M
- b) Evaluate $\int_0^1 \int_0^{1-z} \int_0^{1-x-y} x + y + z dx dy dz$ 7M

UNIT-II

3. a) Find the Laplace Transform of $\sin 2t \sin 3t$ 7M
- b) Find the Laplace Transform of $\frac{\cos at - \cos bt}{t}$ 7M

OR

4. a) Evaluate $\int_0^\infty e^{-2t} \sin^3 t dt$ 7M
- b) Find the Laplace Transform of the periodic function defined by the triangular wave $f(t) = \begin{cases} t & ; 0 \leq t \leq 1 \\ 2-t & ; 1 \leq t \leq 2 \end{cases}$ and $f(t+2) = f(t)$ 7M

UNIT-III

5. a) Find the inverse transform of $\frac{s+2}{s^2-4s+13}$. 7M
- b) Find the inverse transform of $\frac{s^2-3s+4}{s^3}$. 7M

OR

6. Solve the differential equation $y'' + y = t$, $y(0) = 1$, $y'(0) = 2$ Using Laplace Transform 14M

UNIT-IV

7. a) Find the angle between the surface $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$ 7M
- b) Evaluate $\text{curl of } \vec{V} = e^{xyz} (\vec{i} + \vec{j} + \vec{k})$ at the point $(1, 2, 3)$. 7M

OR

8. Find $\text{div } \vec{F}$ and $\text{curl } \vec{F}$ where $\vec{F} = \text{grad} (x^3 + y^3 + z^3 - 3xyz)$ 14M

UNIT-V

9. Evaluate by Green's theorem $\int_c [(x^2 - \cos hy) dx + (y + \sin x) dy]$, where 'c' is the rectangle with vertices $(0,0)$, $(f,0)$, $(f,1)$, $(0,1)$. 14M

OR

10. Verify stoke's theorem for a vector field $\vec{F} = y^3 \vec{i} - x^3 \vec{j}$ in the region $x^2 + y^2 \leq 1$, $z = 0$. 14M

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Code: 7GC23

I B.Tech. II Semester Supplementary Examinations Nov/Dec 2020

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)

UNIT-I

1. a) Define constructive and destructive interferences 4M
b) Describe Newton's rings experiment for diameter of ring 10M

OR

2. a) What is LASER and write characteristics of laser 6M
b) Recite the ruby laser for production of laser 8M

UNIT-II

3. a) What is Unit cell & describe the Seven Crystal Systems. 10M
b) Show Bragg's law as $2d \sin \theta = n\lambda$ 4M

OR

4. a) What is space lattice and draw Bravais lattices 10M
b) Write steps to find Miller indices 4M

UNIT-III

5. a) State de-Broglie hypothesis of dual nature and derive its wavelength 8M
b) Define and explain Heisenberg uncertainty principle 6M

OR

6. a) Explain postulates of free electron model 6M
b) How the solids are classified on the basis of energy band theory 8M

UNIT-IV

7. a) Define and explain drift and diffusion currents in semiconductors 10M
b) what is LED brief it 4M

OR

8. Explain Meissner's effect and how superconductors are classified as Type-I & Type-2 14M

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) What is CNT and explain it 8M
b) Write the applications of nano materials 6M
