

Hall Ticket Number :																			
----------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**R-17**

**Code: 7G121**

I B.Tech. II Semester Supplementary Examinations March 2021

**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) 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 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].

\*\*\*

Code: 7G522

I B.Tech. II Semester Supplementary Examinations March 2021

**Engineering Mechanics-Dynamics**

( Common to CE &amp; 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. 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  $2 \text{ rad/s}^2$  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  $W = 600 \text{ KN}$  goes around a curve of radius  $r=300\text{m}$  at a uniform speed of  $70\text{kmph}$ . 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  $20 \text{ m/s}$  at an angle of  $30^\circ$  with respect to ground level. Find the force exerted by the player on the ball if duration of strike is 0.02 seconds.

**OR**

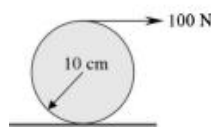
8. a) Derive impulse – momentum equation.  
b) Derive work-energy equation.

**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.



\*\*\*

Code: 7GC24

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 )

\*\*\*\*\*

**UNIT-I**

1. a) Trace the curve  $y^2(2a-x) = x^2$ .  
 b) Evaluate the double integral  $\iint_R xy \, dx \, dy$  where 'R' is the region bounded by the lines  $x$ -axis, the line  $y = 2x$  and  $y = \frac{x}{4a}$

**OR**

2. a) Trace the curve  $ay^2 = x^2(a^2 - x^2)$   
 b) Change the order of integration in  $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 \, dy \, dx$  and hence evaluate.

**UNIT-II**

3. a) Find the Laplace Transform of  $t^2 e^{-3t}$ .  
 b) Find the Laplace Transform of  $\frac{\sin 3t \cos t}{t}$

**OR**

4. Find the Laplace Transform of the periodic function defined by the triangular wave

$$f(t) = \begin{cases} \frac{t}{a} & ; 0 \leq t \leq a \\ \frac{2a-t}{a} & ; a \leq t \leq 2a \end{cases} \quad \text{and } f(t+2a) = f(t)$$

**UNIT-III**

5. a) Find the inverse transform of  $\frac{s^2 - 3s + 4}{s^3}$ .  
 b) Find the inverse transform of  $\frac{1}{s(s^2 + a^2)}$ .

**OR**

6. Find the inverse transform of  $\log\left(\frac{s+1}{s-1}\right)$ .

**UNIT-IV**

7. a) Find the unit vector normal to the surface  $x^3 + y^3 + 3xyz = 3$  at the point (1, 2, -1)  
 b) Prove that  $\text{div curl } \vec{F} = 0$

**OR**

8. Find the angle between the surface  $x^2 + y^2 + z^2 = 12$  and  $x^2 + y^2 - z = 12$  at the point (2, 2, 2)

**UNIT-V**

9. Verify stoke's theorem for a vector field  $\vec{F} = (x^2 + y^2)\vec{i} - 2xy\vec{j}$  taken round the rectangle bounded by the lines  $x = \pm a$ ,  $y = 0$ ,  $y = b$ .

**OR**

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

\*\*\*

Hall Ticket Number :										
----------------------	--	--	--	--	--	--	--	--	--	--

<b>R-17</b>
-------------

**Code: 7GC23**

I B.Tech. II Semester Supplementary Examinations March 2021

**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 )

\*\*\*\*\*

<b>UNIT-I</b>
---------------

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

<b>UNIT-II</b>
----------------

3. a) Define ultrasonics and write its properties  
b) Describe the production of ultrasonics by Inverse Piezo electric effect

**OR**

4. a) Deduce Bragg's law equation  
b) Illustrate the powder method to describe the structure of crystal

<b>UNIT-III</b>
-----------------

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

<b>UNIT-IV</b>
----------------

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 Josephson's effect with types

<b>UNIT-V</b>
---------------

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

\*\*\*