Hall Ticket Number :										

R-17

Code: 7GC24

I B.Tech. II Semester Supplementary Examinations June 2024

Engineering Mathematics-II

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) Change of order of integration and evaluate $\int_0^{\infty}\int_x^{\infty}\frac{e^{-y}}{y}dx\,dy$ 7M

   b) Evaluate $\int_0^{\infty}\int_0^{\infty}e^{-\left(x^2+y^2\right)}dx\,dy$ by changing to polar coordinates. 7M

OR

2. a) Trace the curve $r=a(1-\cos^{-})$. 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) Evaluate $\int_0^{\infty}t\,e^{-2t}\,\mathrm{Cos}\,t dt$ 7M

   b) Find the Laplace Transform of $\int_0^t\int_0^t\int_0^t\mathrm{Cos}\,a\,u\,du\,du\,du$ 7M

OR

4. a) Find the Laplace Transform of $\frac{\mathrm{Sin}\,3t\,\mathrm{Cos}\,t}{t}$ 7M

   b) Find the Laplace Transform of $t\,e^{-t}\,\mathrm{Sin}\,t$ 7M

UNIT–III

5. a) Find the inverse transform of $\frac{1}{s(s^2+a^2)}$. 7M

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

OR

6. Find the inverse transform of $\log\left(\frac{s+1}{s-1}\right)$. 14M

UNIT–IV

7. Find the directional derivative of $f\left(x,y,z\right)=x\,y^2+y\,z^3$ at the point $\left(2,-1,1\right)$ in the direction of the vector $\bar{i}+2\,\bar{j}+3\bar{k}$ 7M

OR

8. a) Prove that $div\,curl\,\bar{F} = 0$ 7M

   b) Show that $\nabla^2\left(\frac{1}{r}\right) = 0$ 7M

UNIT–V

9. Verify Green's Theorem for $\int_c \left[\left(3x - 8y^2\right)dx + \left(4y - 6xy\right)dy\right]$ where 'c' is bounded by region bounded by $x = 0$, $y = 0$ and $x + y = 1$ 14M

OR

10. Verify stoke's theorem for a vector field $\bar{F} = \left(x^2 + y^2\right)\bar{i} - 2xy\,\bar{j}$ taken round the rectangle bounded by the lines $x = \pm a,\ y = 0,\ y = b$. 14M

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Hall Ticket Number :										

R-17

Code: 7GC23

I B.Tech. II Semester Supplementary Examinations June 2024

Engineering Physics

(Common to CE, ME and CSE)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1.	a)	Differentiate Step-Index and Graded-Index optical fibers	9M
	b)	Distinguish Interference and Diffraction of light	5M
		OR	
2.	a)	Describe Newton's rings experiment for diameter of ring	9M
	b)	What is LASER and write characteristics of laser	5M

UNIT–II

3.	a)	Describe the production of ultrasonics by Inverse Peizo electric effect	8M
	b)	Estimate the packing fractions of SC and BCC	6M
		OR	
4.	a)	What is space lattice and draw Bravias lattices	10M
	b)	Formulate applications of Ultrasonics	4M

UNIT–III

5.		Analyze motion of electron in periodic potential of metal	14M
		OR	
6.	a)	How the solids are classified on the basis of energy band theory	7M
	b)	Describe Fermi-Dirac distribution function	7M

UNIT–IV

7.	a)	Derive Hall voltage and justify its importance	6M
	b)	Brief BCS theory and Flux quantization	8M
		OR	
8.	a)	Brief Joshepson's effect with types	6M
	b)	Explain the diamagnetic nature of superconductors by Meissner's effect	8M

UNIT–V

9.	a)	classify the ferromagnetics by hysteresis property	7M
	b)	Narrate the importance of nano materials by basic principles	7M
		OR	
10.	a)	What is CNT and explain it	7M
	b)	Derive magnetic moment of magnetic material through origin	7M

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Hall Ticket Number :										

R-17

Code: 7G121

I B.Tech. II Semester Supplementary Examinations June 2024

Data Structures

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) What is a pointer? What are the features of pointers? Write a C program to print address of a variable 8M

   b) Write a C program to swap two numbers using pointers. 6M

OR

2. Compare array and pointers in terms of memory efficiency and execution time efficiency. 14M

UNIT–II

3. a) Define union. List out the differences between unions and structures 7M

   b) Write a program for sorting given numbers using selection sort technique 7M

OR

4. a) Define Structures. Explain with an example how structure members are initialized and accessed 8M

   b) Write a C program to find the given element using linear searching. 6M

UNIT–III

5. Write a program to implement a linear queue using arrays. Take into account the exceptions like Queue Full and Queue Empty. 14M

OR

6. a) What is Data Structure? Explain in detail about different type of data structures. 7M

   b) Write applications of stack 7M

UNIT–IV

7. Write advantages of doubly linked list over singly linked list. Write C function that will insert a given integer value into an ordered doubly linked list. 14M

OR

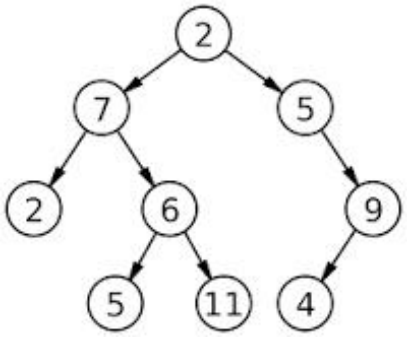
8. What is a Singly Linked List.? Explain different operations of a singly linked list with suitable examples. 14M

UNIT–V

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

OR

10. Write the recursive algorithms for different binary tree traversal techniques. Find all the tree traversals for the following binary tree:



14M

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Hall Ticket Number :										

R-17

Code: 7G522

I B.Tech. II Semester Supplementary Examinations June 2024

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) Prove that the path traced by a projectile is Parabola. 7M

OR

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

   b) Deduce the general expression to determine the maximum height and horizontal range of projectile 10M

UNIT–II

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

   b) A prismatic bar AB has its ends A and B constrained to move horizontally and vertically as shown in Figure.2. If the end A of the bar moves with constant velocity v_a, find the angular velocity ω of the bar and the velocity v_b of the end B for the instant when the axis of the bar makes the angle θ with the horizontal axis. 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 block of 100 N weight is resting on a rough horizontal table. What force p inclined at 30^0 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. 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.

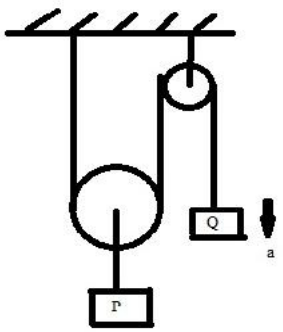

Figure.2 7M

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) State and prove Impulse – Momentum principle 7M

OR

8. a) Define impulsive force and non impulsive force. Give examples. 5M

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? 9M

UNIT–V

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

b) 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. 7M

OR

10. 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, 14M

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