Hall Ticket Number :										

R-19

Code: 19A322T

I B.Tech. II Semester Supplementary Examinations July/August 2022

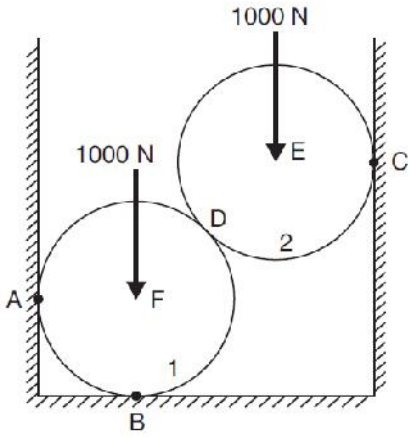
Engineering Mechanics

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

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

****

		Marks	CO	Blooms Level
	UNIT–I			
1.	Two spheres, each of weight 1000 N and of radius 25 cm rest in a horizontal channel of width 90 cm as shown in Fig. Find the reactions on the points of contact A, B and C. 	14M	1	3
	OR			
2.	State the law of parallelogram of forces and show that the resultant $R=\sqrt{P^2+Q^2}$ when the two forces *P* and *Q* are acting at right angles to each other. Find the value of *R* if the angle between the forces is zero.	14M	1	3
	UNIT–II			
3.	A pull of 60 N inclined at 25° to the horizontal plane, is required just to move a body placed on a rough horizontal plane. But the push required to move the body is 75 N. If the push is inclined at 25° to the horizontal, find the weight of the body and co-efficient of friction.	14M	2	3
	OR			
4. a)	State the laws of friction.	7M	2	1
b)	A body of weight 100 Newtons is placed on a rough horizontal plane. Determine the co-efficient of friction if a horizontal force of 60 Newtons just causes the body to slide over the horizontal plane.	7M	2	3
	UNIT–III			
5.	Prove that moment of inertia of a triangular section about the base of the section $=\frac{bh^3}{12}$ where *b* = Base of triangular section, and *h* = Height of triangular section.	14M	3	5

OR

6.	State and explain theorems of Pappus-Guldinus.	14M	3	1

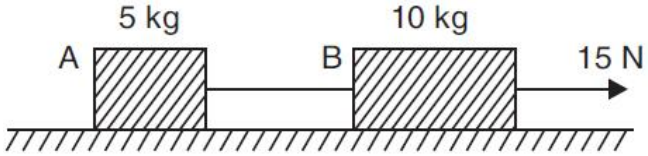
UNIT–IV

7.	A boy drops a stone from the top of well vertically downwards into it. The splash is heard by him after 6 seconds. Find the well depth by taking sound velocity as 400 m/s.	14M	4	3

OR

8.	A car moving at a constant speed of 60kmph enters a curved path of radius of curvature measuring 100 m. Determine its total acceleration.	14M	4	3

UNIT–V

9.	Find the acceleration of bodies and tension in the string joining A and B shown in Fig. 	14M	5	3

OR

10.	A block is pushed with a velocity of 10 m/s along a rough horizontal plane, whose coefficient of kinetic friction is 0.25 and that of static friction is 0.3. Determine the time taken for the block to come to a stop.	14M	5	3

***

Hall Ticket Number :										

R-19

Code: 19AC23T

I B.Tech. II Semester Supplementary Examinations July/August 2022

Engineering Physics

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

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

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Define vector and write basic laws of vectors	7M	CO1	L1
	b)	What is conservative force and explain it	7M	CO1	L1
		OR			
2.	a)	Prove that conservative force is negative gradient of potential energy	7M	CO1	L3
	b)	Deduce the expression for torque of a particle in a frame of reference	7M	CO1	L3
		UNIT–II			
3.	a)	What is ultrasonic and write properties	6M	CO2	L1
	b)	Describe the NDT in detail	8M	CO2	L2
		OR			
4.	a)	Brief the inverse piezo-electric effect	4M	CO2	L2
	b)	Describe how magnetostriction method is used to produce ultrasonic waves	10M	CO2	L2
		UNIT–III			
5.	a)	What is dielectric and give any three examples	4M	CO3	L1
	b)	Describe the various types of dielectric polarization	10M	CO3	L2
		OR			
6.	a)	Deduce orbital magnetic moment in terms of Bhor Magnetron	10M	CO3	L3
	b)	Derive Clausius Mosetti relation	4M	CO3	L2
		UNIT–IV			
7.	a)	Discuss the construction and working of He-Ne laser	8M	CO4	L2
	b)	Mention the applications of laser in various fields	6M	CO4	L1
		OR			
8.	a)	Distinguish spontaneous and stimulated emissions	6M	CO4	L2
	b)	Formulate the requirements for laser ray process	8M	CO4	L2
		UNIT–V			
9.		Write a detailed note on various types of sensors	14M	CO5	L2
		OR			
10.		Describe the detailed application of fire and smoke sensors	14M	CO5	L2

***

Hall Ticket Number :										

R-19

Code: 19A521T

I B.Tech. II Semester Supplementary Examinations July/August 2022

Python Programming

(Common to CE, ME & CSE)

Max. Marks: 70 Time: 3 Hours

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

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Describe and illustrate Boolean operators with examples.	7M	CO1	L2
	b)	Write a program using if statements in Python.	7M	CO1	L3
		OR			
2.		Difference between sequential, selection, and iterative control	14M	CO1	L4
		UNIT–II			
3.		Define set and illustrate set in Python with suitable example	14M	CO2	L2
		OR			
4.		Define dictionary data type in python? Illustrate dictionary with suitable example.	14M	CO2	L3
		UNIT–III			
5.	a)	Write a python program to write some text into a file.	7M	CO3	L2
	b)	Discuss about string traversal in python	7M	CO3	L2
		OR			
6.	a)	How to deal with text files in python?	7M	CO3	L3
	b)	Write a python program to read the lines of a file.	7M	CO3	L3
		UNIT–IV			
7.		Illustrate encapsulation with suitable example.	14M	CO4	L3
		OR			
8.	a)	Explain the difference between a reference and dereferenced value	7M	CO4	L3
	b)	Infer about constructors in Python	7M	CO4	L4
		UNIT–V			
9.		What is stack? Demonstrate stack operations with the example.	14M	CO5	L3
		OR			
10.		Outline the concept of queue implementation using python list.	14M	CO5	L4

***

Hall Ticket Number :										

R-19

Code: 19AC21T

I B.Tech. II Semester Supplementary Examinations July/August 2022

Differential Equations and Vector Calculus

(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)

****

		Marks	CO	Blooms Level
	UNIT–I			
1.	Solve $\frac{d^2y}{dx^2} + y = e^{-x} + e^x \sin x$	14M	CO1	L3
	OR			
2.	Solve $(D^2+1)x = t\cos t \ \ given \ \ x = 0, \frac{dx}{dt} = 0 \ at \ t = 0.$	14 M	CO1	L3
	UNIT–II			
3.	Solve $x^2\frac{d^2y}{dx^2} - 4x\frac{dy}{dx} + 6y = x^2$	14M	CO2	L3
	OR			
4.	Solve $(2x+3)^2\frac{d^2y}{dx^2} - (2x+3)\frac{dy}{dx} - 12y = 6x$	14M	CO2	L3
	UNIT–III			
5.	Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$	14M	CO3	L3
	OR			
6.	Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u \ \ where \ u(x,0) = 6e^{-3x}$	14M	CO3	L3
	UNIT–IV			
7.	Evaluate the line integral $\int_c [(x^2+xy)dx + (x^2+y^2)dy]$ where c is the square formed by the lines $x = \pm 1 and \ y = \pm 1.$	14M	CO4	L2
	OR			
8.	Find the angle between the surfaces $x^2+y^2+z^2 = 9 and \ z = x^2+y^2-3$ at the point (2,-1,2)	14M	CO4	L2
	UNIT–V			
9.	Verify Gauss divergence theorem for $\bar{F} = x^2\,\bar{i} + y^2\,\bar{j} + z^2\,\bar{k}$, over the cube formed by the planes x=0, x=a, y=0,y=b, z=0,z=c.	14M	CO5	L3
	OR			
10.	Verify Green's theorem in the plane for $\oint (3x^2-8y^2)dx + (4y-6xy)dy$ where C is the region bounded by $x = 0, y = 0 \ and \ x + y = 1.$	14M	CO5	L3

***