Code: 19AC21T

I B.Tech. II Semester Supplementary Examinations August 2021
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)
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		Marks	CO	Blooms Level

UNIT-I

1. a) Solve $(D^2 + 5D + 6)y = e^x$ — 7M CO1 L3

   b) Solve $(D^2 + 4)y = \cos x$ — 7M CO1 L3

OR

2. Solve $\dfrac{d^2y}{dx^2} + 4y = \tan 2x$ by using method of variation of parameters. — 14M CO1 L3

UNIT-II

3. Solve $(2x-1)^2 \dfrac{d^2y}{dx^2} + (2x-1)\dfrac{dy}{dx} - 2y = 8x^2 - 2x + 3$ — 14M CO2 L3

OR

4. Solve $(1+x)^2 \dfrac{d^2y}{dx^2} + (1+x)\dfrac{dy}{dx} + y = 2\sin[\log(1+x)]$ — 14M CO2 L3

UNIT-III

5. a) Form the partial differential equations by eliminating arbitrary functions from $z = f(x+at) + g(x-at)$ — 7M CO3 L3

   b) Solve $pyz + qzx = xy$ — 7M CO3 L3

OR

6. Using the method of separation of variables, solve

   $\dfrac{\partial u}{\partial x} = 4\dfrac{\partial u}{\partial y}\ where\ u(0,y) = 8e^{-3y}$ — 14M CO3 L3

UNIT-IV

7. a) Find $grad\ f$ where $f = x^3 + y^3 + 3xyz$ — 7M CO4 L2

   b) Find the directional derivative of $W = x^2 - 2y^2 + 4z^2$ at (1,1,-1) in the direction of $2\bar{i} + \bar{j} - \bar{k}$. — 7M CO4 L2

OR

8. Prove that $\nabla^2(r^n) = n(n+1)r^{n-2}$ — 14M CO4 L2

UNIT-V

9. Using Green's theorem evaluate $\oint_C (2xy - x^2)dx + (x^2 + y^2)dy$, where C is

   the closed curve of the region bounded by $y = x^2\ and\ y^2 = x.$ — 14M CO5 L3

OR

10. Use Stoke's theorem to evaluate $\int_C [(x+y)dx + (2x-z)dy + (y+z)dz]$

    where C is the boundary of the triangle with vertices (2, 0, 0), (0, 3, 0) and (0,0,6). — 14M CO5 L3

****END***

R-19

Code: 19A321T

I B.Tech. II Semester Supplementary Examinations August 2021

Engineering Graphics-II

(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)

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		Marks	CO	Blooms Level

UNIT-I

1. A cube of 35mm long edges is resting on the HP on one of its faces with a vertical face inclined at 30° to VP. It is cut by a section plane parallel to VP and 9mm away from the axis and further away from the VP. Draw its sectional front view and the top view.   14M CO1 L4

OR

2. A hexagonal pyramid, base 30mm side and axis 65mm long, is resting on its base on the H.P. with two edges parallel to the V.P. It is cut by a section plane, perpendicular to the V.P. inclined at 45^0 to the H.P. and intersecting the axis at a point 25mm above the base. Draw the front view, sectional top view and true shape of the section.   14M CO1 L4

UNIT-II

3. Draw the development of lateral surface of a hexagonal pyramid with a 30mm base side and a 60mm long axis, which is resting on its base in the HP such that an edge of the base is perpendicular to VP.   14M CO2 L3

OR

4. A hexagonal prism having base with a 30mm side and a 70mm axis, is resting on its base on the ground with a side of the base inclined at 45° to the VP. It is cut by a section plane making an angle of 45° to HP and passing through the point 15mm below the top end of the axis. Obtain the development of the lateral surface of the truncated prism.   14M CO2 L3

UNIT-III

5. A vertical square prism, base 50mm side and axis 90mm is completely penetrated by a horizontal square prism, base 35mm side and axis 90mm, so that their axes bisect. The axis of the horizontal prism is parallel to the V.P., while the faces of the two prisms are equally inclined to the V.P. Draw the projections of the solids showing lines of intersection.   14M CO3 L4

OR

6. A vertical cylinder of 80 mm diameter is completely penetrated by another cylinder of 60 mm diameter their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of the penetrating cylinder to be parallel to the VP and both cylinders having 120 mm axis.   14M CO3 L4

UNIT-IV

7. a) Draw the isometric view of a square of 40mm in both horizontal and vertical plane.　　7M　CO4　L4

   b) Draw the isometric view of an equilateral triangle of 40mm side with a side horizontal and the plane of the triangle being vertical.　　7M　CO4　L4

OR

8. Draw the isometric view of a circle of 50mm diameter with its plane horizontal and vertical.　　14M　CO4　L4
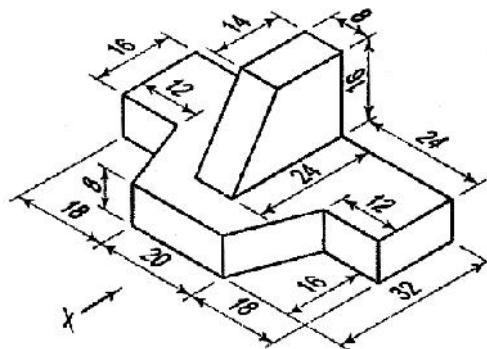
UNIT-V

9. Draw the isometric view of the following figure

R.S VIEW　　FRONT VIEW
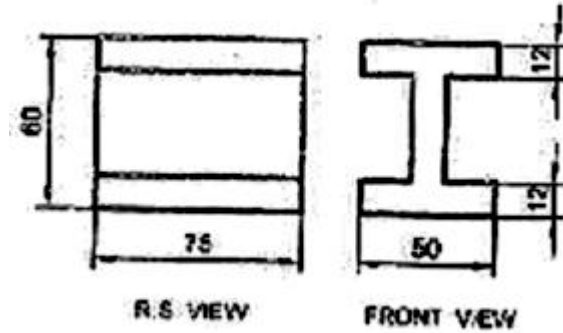
14M　CO5　L4

OR

10. Draw the front view, top view and side view of the solid object given below:

14M　CO5　L4

END

R-19

Code: 19A322T

I B.Tech. II Semester Supplementary Examinations August 2021

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)

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			Marks	CO	Blooms Level

UNIT-I

|			Marks	CO	Blooms Level
1.	a)	State and prove Varignon's theorem.	7M	1	1
	b)	Differentiate between: (i) Concurrent and non-concurrent forces and (ii) Coplanar and non-coplanar forces	7M	1	4

OR

			Marks	CO	Blooms Level
2.	a)	State and prove Lami's theorem.	7M	1	1
	b)	A lamp weighing 5 N is suspended from the ceiling by a chain. It is pulled aside by a horizontal cord until the chain makes an angle of 60° with the ceiling as shown in Fig. Find the tensions in the chain and the cord by applying Lami's theorem.			

			Marks	CO	Blooms Level
			7M	1	3
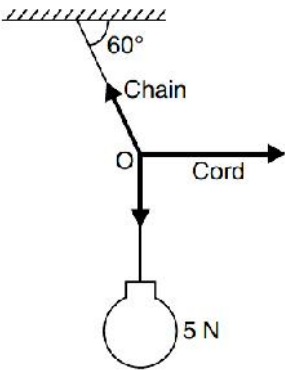
UNIT-II

			Marks	CO	Blooms Level
3.		Determine the forces in all the members of the truss shown in Fig. and indicate the magnitude and nature of forces on the diagram of the truss. All inclined members are at 60° to horizontal and length of each member is 2 m.			

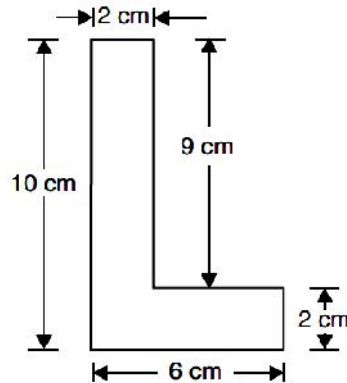|			Marks	CO	Blooms Level
			14M	2	3

OR
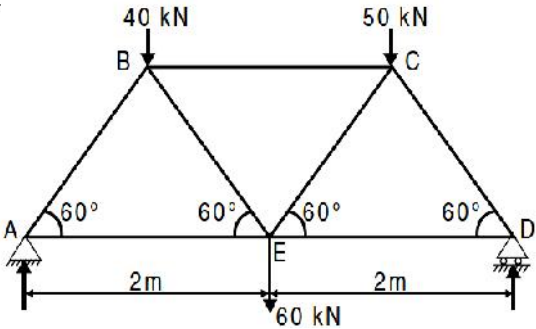
			Marks	CO	Blooms Level
4.		The force required to pull a body of weight 50 N on a rough horizontal plane is 15 N. Determine the co-efficient of friction if the force is applied at an angle of 15° with the horizontal.	14M	2	3

UNIT-III

5. State and prove the theorem of parallel axis.   14M   3   1

OR

6. Find the centre of gravity of the *L*-section shown in Fig.

14M   3   3

UNIT-IV

7. A particle moves along a straight line so that its displacement is metre from a fixed point is given by, $S = 2t^3 + 4t^2 - 6t + 8$ Find : (*i*) velocity at start, (*ii*) velocity after 5 seconds, (*iii*) acceleration at start and (*iv*) acceleration after 5 seconds.   14M   4   3

OR

8. A car covers 100m in 10seconds, while accelerating uniformly at a rate of 1 m/s². Determine (i) initial and final velocities of the car. (ii) distance traveled before coming to this point assuming it started from rest and (iii) its velocity after the next 10 seconds.   14M   4   3

UNIT-V

9. A tangential force of 1800 N is acting on a shaft of diameter 10 mm. Find the work done by the force for one revolution of the shaft.   14M   5   3

OR

10. The block and pulley arrangement shown is released from rest. Determine the time taken for the block of mass m_2 to reach a velocity of 1 m/s. Neglect the mass of the pulleys and assume that they are frictionless. Take $m_1 = 20kg$ and $m_2 = 15kg$.

14M   5   3

END
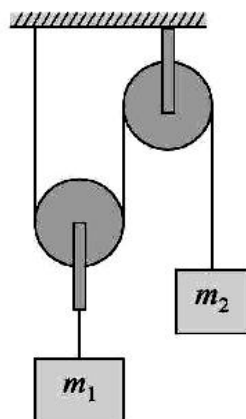
Code: 19AC23T

I B.Tech. II Semester Supplementary Examinations August 2021

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)

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UNIT–I

1. a) Define torque and angular momentum and how they are related   8M
   b) State kepler's laws of gravitation   6M

OR

2. a) Differentiate inertial and non-inertial frames of reference   6M
   b) Describe the angular momentum in a frame of reference   8M

UNIT–II

3. a) Define absorption coefficient and write its expression   4M
   b) Mention the factors influence reverberation time   10M

OR

4. List the applications of ultrasonic and describe any one application in detail   14M

UNIT–III

5. a) How the Ferro magnetics are separated as soft and hard magnets   8M
   b) What is Ferro magnets and give examples   6M

OR

6. a) Derive ionic polarizability of dielectric in an electric field   8M
   b) Describe frequency dependence of variouspolarizabilities   6M

UNIT–IV

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

OR

8. a) Deduce condition of Einstien's coefficients for stimulated emission   10M
   b) Describe population Inversion   4M

UNIT–V

9. a) Describe piezo electric sensor in brief   8M
   b) Mention how pyroelectric sensors are useful   6M

OR

10. a) Narrate Hall effect sensor in detail   8M
    b) Explore bimetallic strip as sensor with diagram   6M

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Code: 19A521T

I B.Tech. II Semester Supplementary Examinations August 2021
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)
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			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Who invented python? Write what you know about python programming.	7M	CO1	L2
	b)	List out arithmetic operators in python and illustrate them with examples	7M	CO1	L2
		OR			
2.	a)	Write a program using while statements in Python	7M	CO1	L3
	b)	Explain about membership operators	7M	CO1	L2
		UNIT-II			
3.		What is a list in python? Explain about list in detail.	14M	CO2	L2
		OR			
4.	a)	Write a Python program using programmer-defined functions	7M	CO2	L3
	b)	Explain the concept of parameter passing for functions	7M	CO2	L3
		UNIT-III			
5.	a)	What is exception handling?	4M	CO3	L2
	b)	How to Catch and handle exceptions in Python	10M	CO3	L2
		OR			
6.	a)	Relate local, global, and built-in namespaces in python.	7M	CO3	L4
	b)	List some string methods and explain them	7M	CO3	L3
		UNIT-IV			
7.	a)	What is object oriented programming? Explain about object oriented concepts.	7M	CO4	L2
	b)	Define class and explain it with suitable example	7M	CO4	L2
		OR			
8.		Write a Python class named Student with two attributes student_id, student_name. Add a new attribute student_class and display the entire attribute and their values of the class	14M	CO4	L5
		UNIT-V			
9.		What is stack? Demonstrate stack operations with the example.	14M	CO5	L3
		OR			
10.		Explain in detail about the built in types for queue in python.	14M	CO5	L3