

Hall Ticket Number :									
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R-19

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)

Marks	CO	Blooms Level
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UNIT-I

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|----|----|-------------------------------|----|-----|----|
| 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

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

UNIT-II

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

OR

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

UNIT-III

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|----|----|---|----|-----|----|
| 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

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|----|---|-----|-----|----|
| 6. | Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 4 \frac{\partial u}{\partial y}$ where $u(0, y) = 8e^{-3y}$ | 14M | CO3 | L3 |
|----|---|-----|-----|----|

UNIT-IV

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|----|----|---|----|-----|----|
| 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

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

UNIT-V

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|----|---|-----|-----|----|
| 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

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|-----|---|-----|-----|----|
| 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 |
|-----|---|-----|-----|----|

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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)

	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° 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

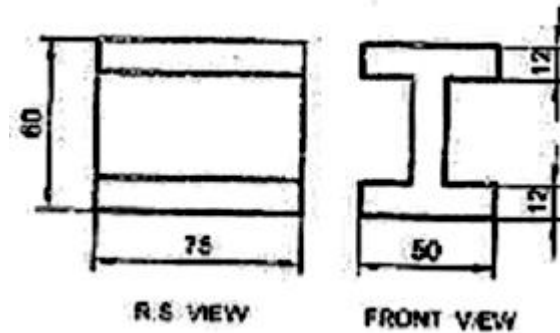
7. a) Draw the isometric view of a square of 40mm in both horizontal and vertical plane. 7M CO4 L4
- b) Draw the isometric view of an equilateral triangle of 40mm side with a side horizontal and the plane of the triangle being vertical. 7M CO4 L4

OR

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

UNIT-V

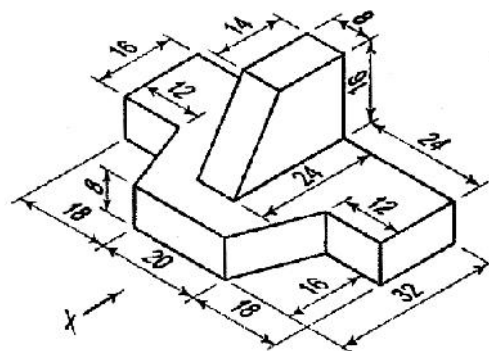
9. Draw the isometric view of the following figure



14M CO5 L4

OR

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



14M CO5 L4

END

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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)

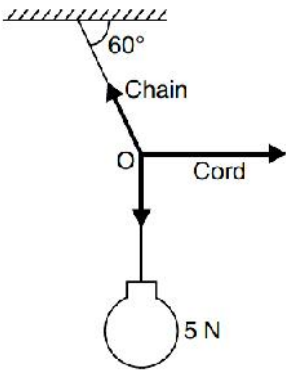
Marks	CO	Blooms Level
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UNIT-I

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|----|--|----|---|---|
| 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

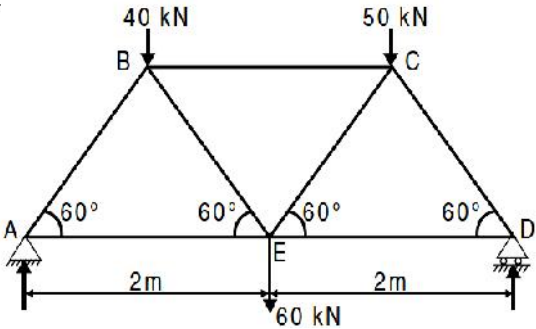
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|----|--|----|---|---|
| 2. | a) State and prove Lami's theorem. | 7M | 1 | 1 |
| | b) A lamp weighing 5 N is suspended from the ceiling by a chain. It is pulled aside by a horizontal cord until the chain makes an angle of 60° with the ceiling as shown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



7M	1	3
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UNIT-II

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.



14M	2	3
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OR

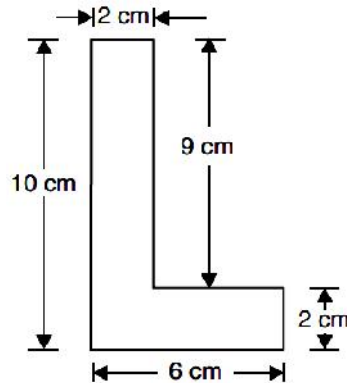
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|----|--|-----|---|---|
| 4. | The force required to pull a body of weight 50 N on a rough horizontal plane is 15 N. Determine the co-efficient of friction if the force is applied at an angle of 15° with the horizontal. | 14M | 2 | 3 |
|----|--|-----|---|---|

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

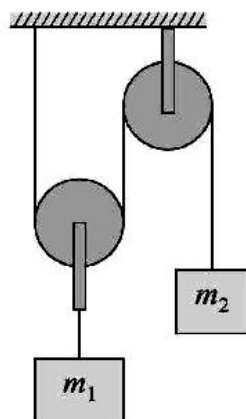
8. A car covers 100m in 10seconds, while accelerating uniformly at a rate of 1 m/s^2 . Determine (i) initial and final velocities of the car. (ii) distance traveled before coming to this point assuming it started from rest and (iii) its velocity after the next 10 seconds. 14M 4 3

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 $m_1 = 20\text{kg}$ and $m_2 = 15\text{kg}$.



14M 5 3

END

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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)

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 various polarizabilities 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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R-19

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)

Marks	CO	Blooms Level
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UNIT-I

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|-------|---|----|-----|----|
| 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

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|-------|--|----|-----|----|
| 2. a) | Write a program using while statements in Python | 7M | CO1 | L3 |
| b) | Explain about membership operators | 7M | CO1 | L2 |

UNIT-II

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|----|---|-----|-----|----|
| 3. | What is a list in python? Explain about list in detail. | 14M | CO2 | L2 |
|----|---|-----|-----|----|

OR

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|-------|---|----|-----|----|
| 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

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|-------|--|-----|-----|----|
| 5. a) | What is exception handling? | 4M | CO3 | L2 |
| b) | How to Catch and handle exceptions in Python | 10M | CO3 | L2 |

OR

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|-------|--|----|-----|----|
| 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

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|-------|--|----|-----|----|
| 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

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|----|---|-----|-----|----|
| 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

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|----|---|-----|-----|----|
| 9. | What is stack? Demonstrate stack operations with the example. | 14M | CO5 | L3 |
|----|---|-----|-----|----|

OR

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|-----|---|-----|-----|----|
| 10. | Explain in detail about the built in types for queue in python. | 14M | CO5 | L3 |
|-----|---|-----|-----|----|