

Code: 19A322T

I B.Tech. II Semester Supplementary Examinations April 2023

Engineering Mechanics

(Common to CE & ME)

Max. Marks: 70

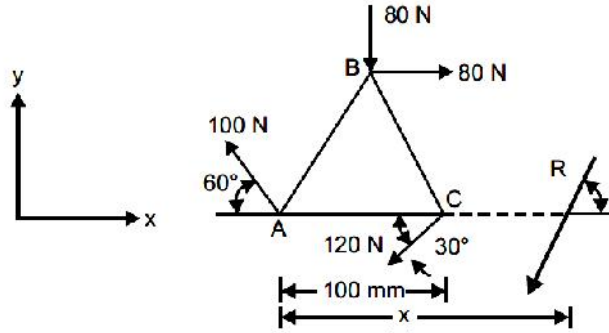
Time: 3 Hours

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

Marks CO BL

UNIT-I

1. Find the resultant of the force system shown in Fig. acting on a lamina of equilateral triangular shape.



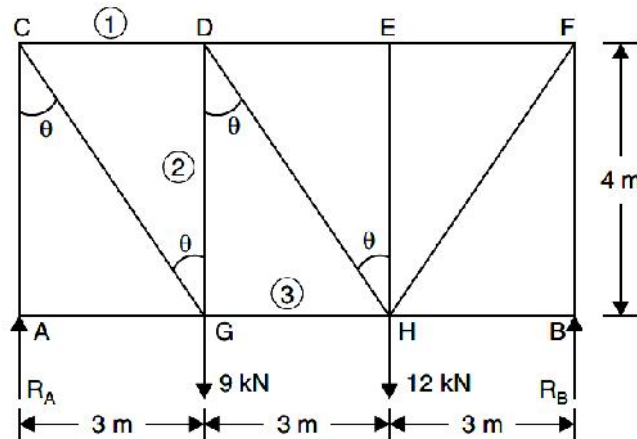
14M 1 3

OR

2. 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

UNIT-II

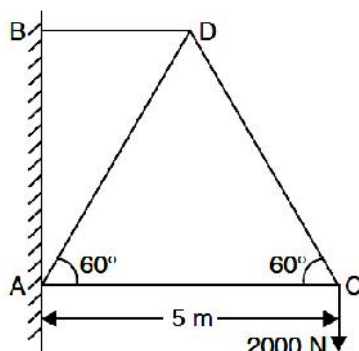
3. A truss of span 9 m is loaded as shown in Fig. Find the reactions and forces in the members marked 1, 2 and 3.



14M 2 3

OR

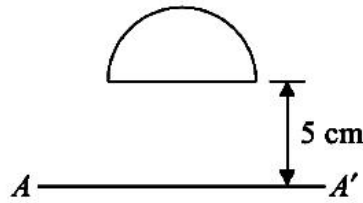
4. Determine the forces in all the members of a cantilever truss shown in Fig.



14M 2 3

UNIT-III

5. Determine the surface area and volume of a solid generated when a semi-circular area of 3 cm radius is revolved through 360° about axis AA as shown in fig.



14M 3 3

OR

6. State the theorem of perpendicular axis. How will you prove this theorem?

14M 3 1

UNIT-IV

7. A ball is thrown upwards from the top of a 50 m high building with an initial velocity of 20 m/s. At the same instant, another ball is thrown upwards with an initial velocity of 30 m/s from ground. Determine (i) when and where they will meet each other, and (ii) the velocity of each ball at that instant.

14M 4 3

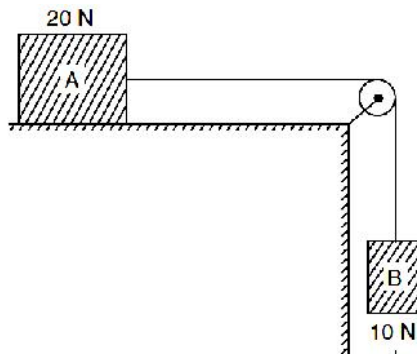
OR

8. 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

UNIT-V

9. Two blocks shown in Fig. have weights $A = 20 \text{ N}$ and $B = 10 \text{ N}$ and co-efficient of friction between the block A and the horizontal plane is $\mu = 0.25$. If the system is released from the rest and the block B falls through a vertical distance of 2 m, what is the velocity attained by block B? Neglect the friction in the pulley and the extension of the string.



14M 5 4

OR

10. A train of weight 2000 kN is pulled by an engine on a level track at a constant speed of 36 kilometre per hour. The resistance due to friction is 10 N per kN of the train's weight. Find the power of the engine.

14M 5 3

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R-19

Code: 19AC23T

I B.Tech. II Semester Supplementary Examinations April 2023

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 BL

UNIT-I

- | | | | |
|---|----|-----|----|
| 1. a) Derive the acceleration of particle in non-inertial frame of reference with constant angular velocity | 8M | CO1 | L3 |
| b) Show that conservative force is not depend on path followed by the particle | 6M | CO1 | L3 |

OR

- | | | | |
|---|----|-----|----|
| 2. a) Define torque and angular momentum and how they are related | 8M | CO1 | L1 |
| b) State Kepler's laws of gravitation | 6M | CO1 | L2 |

UNIT-II

- | | | | |
|--|-----|-----|----|
| 3. a) Narrate the circuit diagram of Piezo-electric method for ultrasonic production | 10M | CO2 | L2 |
| b) Illustrate the method of Acoustic grating | 4M | CO2 | L2 |

OR

- | | | | |
|---|-----|-----|----|
| 4. a) List the factors affecting acoustics of building and their remedies | 10M | CO2 | L2 |
| b) Define reverberation and reverberation time | 4M | CO2 | L1 |

UNIT-III

- | | | | |
|--|-----|-----|----|
| 5. a) Deduce orbital magnetic moment in terms of Bhor Magneton | 10M | CO3 | L3 |
| b) Derive Clausius Mosetti relation | 4M | CO3 | L2 |

OR

- | | | | |
|--|-----|-----|----|
| 6. a) Define magnetic susceptibility and moment | 4M | CO3 | L1 |
| b) Classify three types of magnetic materials and write properties | 10M | CO3 | L2 |

UNIT-IV

- | | | | |
|---|-----|-----|----|
| 7. a) Illustrate the procedure for finding Acceptance Angle and Numerical Aperture of Optical fiber | 10M | CO4 | L3 |
| b) Describe attenuation in optical fiber | 4M | CO4 | L2 |

OR

- | | | | |
|---|----|-----|----|
| 8. a) What is LASER and write characteristics of laser | 6M | CO4 | L1 |
| b) Recite the semiconductor laser for production of laser | 8M | CO4 | L2 |

UNIT-V

- | | | | |
|---|-----|-----|----|
| 9. Summarize any two methods of sensors in industry | 14M | CO5 | L3 |
|---|-----|-----|----|

OR

- | | | | |
|--|----|-----|----|
| 10. a) What is sensor and list various sensors | 6M | CO5 | L1 |
| b) Write a note on Strain and pressure sensors | 8M | CO5 | L1 |

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R-19

Code: 19A521T

I B.Tech. II Semester Supplementary Examinations April 2023

Python Programming
(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)

Marks CO BL

UNIT-I

1. Discuss in detail about the following
a) Input error checking b) multi-way selection 14M CO1 L4
- OR**
2. a) List out arithmetic operators in python and illustrate them with examples 7M CO1 L2
b) Describe and illustrate Boolean operators with examples. 7M CO1 L2

UNIT-II

3. Justify the use of list comprehensions in Python. 14M CO2 L5
- OR**
4. a) Summarize in detail about function routine. 7M CO2 L2
b) Compare lists and tuples in Python 7M CO2 L3

UNIT-III

5. Explain the process of exception handling in detail. 14M CO3 L3
- OR**
6. a) Explain the use of modular design in software development 7M CO3 L2
b) Write a python program to write some text into a file. 7M CO3 L2

UNIT-IV

7. Determine three fundamental features of object oriented programming 14M CO4 L3
- OR**
8. a) Justify the need of automatic garbage collection in python 7M CO4 L5
b) Summarize the concept of memory allocation and de allocation. 7M CO4 L5

UNIT-V

9. Write an algorithm for Single Linked List-traversing and explain it with an example. 14M CO5 L5
- OR**
10. a) Define data structures and list out various types of data structures 7M CO5 L2
b) Discuss about the common operations performed on data structures 7M CO5 L2

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

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R-19**Code: 19AC21T**

I B.Tech. II Semester Supplementary Examinations April 2023

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 BL

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 $\frac{d^2y}{dx^2} + y = e^{-x} + e^x \sin x$ 14M CO1 L3

UNIT-II

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

OR

4. Solve $x^2 \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} + 6y = x^2$ 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. 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

UNIT-IV

7. a) Find $\text{grad } f$ 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 $r^n \bar{r}$ is solenoidal if $n = -3$. 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. Verify stokes theorem for the function $\bar{F} = x^2\bar{i} + xy\bar{j}$ integrated around the square in the plane $z=0$ whose sides are along the lines $x=0, y=0, x=a, y=a$. 14M CO5 L3

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

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R-19

Code: 19A321T

I B.Tech. II Semester Supplementary Examinations April 2023

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 BL

UNIT-I

1. A Pentagonal pyramid, base 30mm side and axis 60mm long, is lying on one of its triangular faces on the HP with the axis parallel to the VP. A vertical section plane, whose HT bisects the top view of the axis and makes an angle of 30° with the reference line cuts the pyramid, removing its top part. Draw the top view, sectional front view, true shape of the section. 14M CO1 L4

OR

2. 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

UNIT-II

3. A cylinder of base diameter 50mm and axis length 70mm is resting on HP on its base. A cylindrical hole of 40mm diameter is drilled on the surface of the cylinder. The axis of the hole intersects with the axis of the cylinder at right angles and bisects it. Draw the development of the lateral surface of the cylinder. 14M CO2 L3

OR

4. a) Draw the development of lateral surface of a cone of base diameter 48mm and altitude 50mm. 7M CO2 L3
b) A Cylinder of 50 mm diameter and axis 75mm is resting on its base on HP. Draw the development of lateral surface of the cylinder. 7M CO2 L3

UNIT-III

5. A vertical cone diameter of base 80mm and axis 100mm long is completely penetrated by a cylinder of 40mm diameter. The axis of the cylinder is parallel to HP and the VP and intersects the axis of the cone at a point 30mm above the base. Draw the projections of the solids showing curves of intersection. 14M CO3 L4

OR

6. 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

UNIT-IV

7. Draw the isometric view of a square with the side of the base 40mm and length of axis 70mm, when its axis is vertical and horizontal. 14M CO4 L4

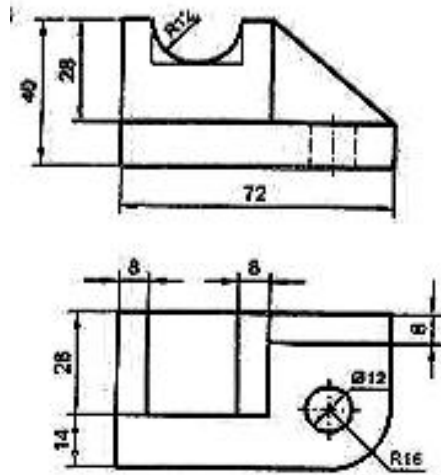
OR

8. A hexagonal pyramid with side of base 30mm and axis 120mm long is resting on its base on HP. An edge of the base is parallel to VP. A horizontal section plane passing through a point on the axis at a distance of 60mm from the base. Draw the isometric view of the frustum of the pyramid.

14M CO4 L4

UNIT-V

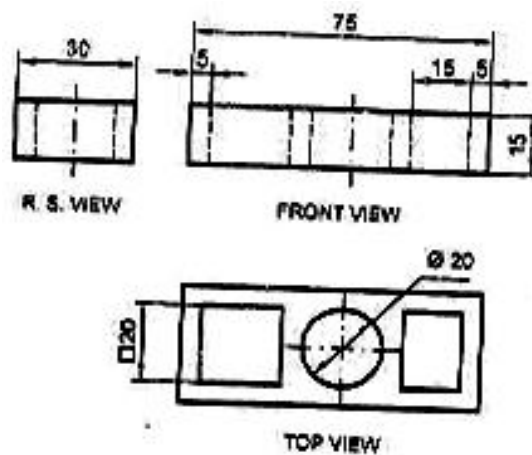
9. Draw the isometric view of the following figure



14M CO5 L4

OR

10. Draw the isometric view of the following figure



14M CO5 L4
