| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A322T**

I B.Tech. II Semester Supplementary Examinations December 2022

# Engineering Mechanics

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

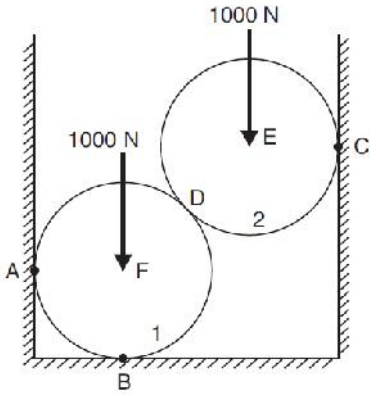
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

*********

Marks CO BL

## UNIT–I

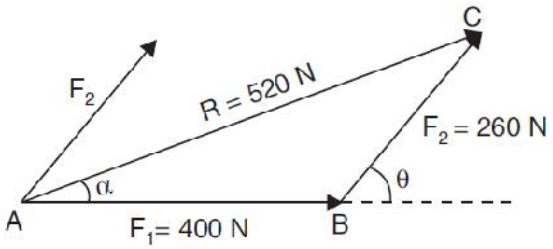
1. Two spheres, each of weight 1000 N and of radius 25 cm rest in a horizontal channel of width 90 cm as shown in Fig. Find the reactions on the points of contact A, B and C.




14M 1 3

**OR**

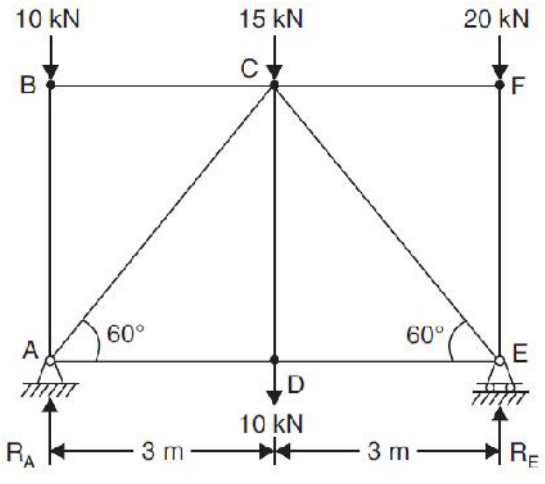
2. The resultant of two forces F1 = 400 N and F2 = 260 N acting at point A is 520 N. Determine the angle between the two forces and the angle between the resultant and force F1.




14M 1 3

## UNIT–II

3. A truss is shown in Fig. Find the forces in all the members of the truss and indicate it is in tension or compression.

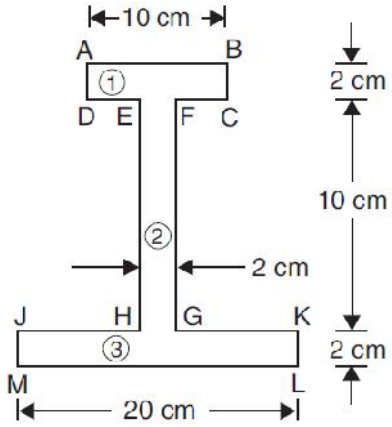



14M 2 3

**OR**

| | | | | |
|---|---|---|---|---|
| 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. | Find the moment of inertia of the section shown in Fig. about the centroidal axis X-X perpendicular to the web.   | 14M | 3 | 3 |

**OR**

| | | | | |
|---|---|---|---|---|
| 6. | State and prove the theorem of parallel axis. | 14M | 3 | 1 |

**UNIT–IV**

| | | | | |
|---|---|---|---|---|
| 7. | An electric train starting from rest attains a maximum speed of 100 kmph in 20 second. Determine (i) its acceleration assuming it to be uniform, (ii) distance covered during this time period, and (iii) its velocity 15 seconds after starting from rest. | 14M | 4 | 3 |

**OR**

| | | | | |
|---|---|---|---|---|
| 8. | A wheel rotating about a fixed axis at 20 r.p.m. is uniformly accelerated for 70 second during which time it makes 50 revolutions. Find : (i) angular velocity at the end of this interval, and (ii) time required for speed to reach 100 revolutions per minute. | 14M | 4 | 3 |

**UNIT–V**

| | | | | |
|---|---|---|---|---|
| 9. | A uniform homogeneous cylinder rolls without slip along a horizontal level surface with a translational velocity of 20 cm/s. If its weight is 0.1 N and its radius is 10 cm, what is its total kinetic energy? | 14M | 5 | 4 |

**OR**

| | | | | |
|---|---|---|---|---|
| 10. | 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 |

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| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19AC23T**

I B.Tech. II Semester Supplementary Examinations December 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 )

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| | | | Marks | CO | Blooms Level |
|---|---|---|---|---|---|
| | | **UNIT–I** | | | |
| 1. | a) | Define vector and write basic laws of vectors | 7M | 1 | L1 |
| | b) | What is conservative force and explain it | 7M | 1 | L1 |
| | | **OR** | | | |
| 2. | a) | Summarize the angular momentum of rigid body | 6M | 1 | L2 |
| | b) | Explain conservative force is independent of its path | 8M | 1 | L2 |
| | | **UNIT–II** | | | |
| 3. | | Derive Sabine's formula in an enclose by decay process | 14M | 2 | L3 |
| | | **OR** | | | |
| 4. | a) | Mention the factors influence reverberation time | 9M | 2 | L2 |
| | b) | What is ultrasonic and write properties | 5M | 2 | L1 |
| | | **UNIT–III** | | | |
| 5. | a) | Describe electronic polarizability of dielectric and derive it | 10M | 3 | L2 |
| | b) | Mention applications of dielectrics | 4M | 3 | L2 |
| | | **OR** | | | |
| 6. | | Deduce the expression for Internal/local field | 14M | 3 | L3 |
| | | **UNIT–IV** | | | |
| 7. | a) | Derive the expression for acceptance angle of an optical fiber | 8M | 4 | L3 |
| | b) | List the applications of optical fiber in various fields | 6M | 4 | L2 |
| | | **OR** | | | |
| 8. | a) | Recite the semiconductor laser for production of laser | 8M | 4 | L2 |
| | b) | Describe construction of optical fiber | 6M | 4 | L2 |
| | | **UNIT–V** | | | |
| 9. | a) | Illustrate fiber optic methods of pressure sensing | 10M | 5 | L3 |
| | b) | Brief the temperature sensor | 4M | 5 | L2 |
| | | **OR** | | | |
| 10. | a) | Write a note on Strain and pressure sensors | 7M | 5 | L1 |
| | b) | Describe piezo electric sensor in brief | 7M | 5 | L2 |

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| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A521T / 19A522T**

I B.Tech. II Semester Supplementary Examinations December 2022

# Python Programming / Programming through Python

(Common to CE, ME & CSE) (Common to EEE & ECE)

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) | Write a python program to find weather a given number is odd or even. | 7M | CO1 | L3 |
| | b) | Who invented python? Write what you know about python programming. | 7M | CO1 | L2 |
| | | **OR** | | | |
| 2. | | Write about operator precedence in detail | 14M | CO1 | L4 |
| | | **UNIT–II** | | | |
| 3. | | Define set and illustrate set in Python with suitable example | 14M | CO2 | L2 |
| | | **OR** | | | |
| 4. | | Write a python program for temperature conversion using functions | 14M | CO2 | L4 |
| | | **UNIT–III** | | | |
| 5. | | Write a python program to count the number of vowels in a string provided by the user. | 14M | CO3 | L3 |
| | | **OR** | | | |
| 6. | a) | Explain the process of top-down design | 7M | CO3 | L2 |
| | b) | Differentiate between a text file and a binary file | 7M | CO3 | L3 |
| | | **UNIT–IV** | | | |
| 7. | a) | Define class and explain it with suitable example | 7M | CO4 | L2 |
| | b) | Explain the concept of an object | 7M | CO4 | L2 |
| | | **OR** | | | |
| 8. | | Write in detail about special methods in python | 14M | CO4 | L3 |
| | | **UNIT–V** | | | |
| 9. | | Define queue. Illustrate queue operations with the examples. | 14M | CO5 | L3 |
| | | **OR** | | | |
| 10. | | Draw and explain the operations on stack using liked list. | 14M | CO5 | L3 |

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| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19AC21T**

I B.Tech. II Semester Supplementary Examinations December 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 | BL |
|---|---|---|---|---|
| | **UNIT–I** | | | |
| 1. | Solve $(D^2+3D+2)y = e^{-x} + x^2 + \cos x$ | 14M | CO1 | L3 |
| | **OR** | | | |
| 2. | Solve $\frac{d^2y}{dx^2} + 4y = \sec 2x$ by using method of variation of parameters. | 14M | CO1 | L3 |
| | **UNIT–II** | | | |
| 3. | An uncharged condenser of capacity C is charged by applying an e.m.f $E\sin\left(\frac{t}{\sqrt{LC}}\right)$, through leads of self-inductance L and negligible resistance , prove that for any time t , the charge on one the plate is $\frac{EC}{2}\left[\sin\left(\frac{t}{\sqrt{LC}}\right) - \frac{t}{\sqrt{LC}}\cos(\frac{t}{\sqrt{LC}})\right]$. | 14M | CO2 | L3 |
| | **OR** | | | |
| 4. | Solve $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + y = \log x.$ | 14M | CO2 | L3 |
| | **UNIT–III** | | | |
| 5. | Solve $(p^2+q^{2)})y = qz$ by using Charpits method. | 14M | CO3 | L3 |
| | **OR** | | | |
| 6. | Form the partial differential equation by eliminating arbitrary constants a and b from $(x-a)^2 + (y-b)^2 = z^2\cot^2 \sim$ | 14M | CO3 | L3 |
| | Form the partial differential equation by eliminating arbitrary function from $z = f(x^2+y^2)$ | 14M | CO3 | L3 |
| | **UNIT–IV** | | | |
| 7. | Find the work done by a force $\bar{F} = (x^2-y^2+x)\bar{i} - (2xy+y)\bar{j}$ which moves a particle in xy- plane from (0,0) to (1,1) along the parabola $y^2 = x.$ | 14M | CO4 | L2 |
| | **OR** | | | |
| 8. | Show that the vector $(x^2-yz)\bar{i} + (y^2-zx)\bar{j} + (z^2-xy)\bar{k}$ is irrotational and find its scalar potential. | 14M | CO4 | L2 |
| | **UNIT–V** | | | |
| 9. | Verify Green's theorem in the plane for $\int (xy+y^2)dx + x^2dy$ where C is the region bounded by $y = x \; and \; y = x^2$ | 14M | CO5 | L3 |
| | **OR** | | | |
| 10. | Use Divergence theorem to evaluate $\iint (x\,\bar{i} + y\,\bar{j} + z\,\bar{k}).\bar{n}.ds,$ where s is the surface bounded by the cone $x^2+y^2 = z^2 \; in the \; plane \; z = 4.$ | 14M | CO5 | L3 |

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| Hall Ticket Number : | | | | | | | | | | |
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**R-19**

**Code: 19A321T**

I B.Tech. II Semester Supplementary Examinations December 2022

# Engineerin Graphics-II

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

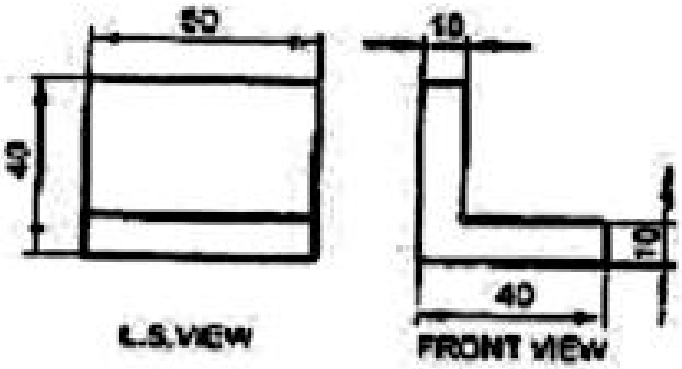
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks )

*********

| | | Marks | CO | BL |
|---|---|---|---|---|
| | **UNIT–I** | | | |
| 1. | A pentagonal pyramid, base 30mm side and axis 65mm long, has its base horizontal and an edge of the base parallel to the V.P. A horizontal section plane cuts it at a distance of 25mm above the base. Draw its front view and sectional top view. | 14M | CO1 | L4 |
| | **OR** | | | |
| 2. | A cone, base 70 mm diameter, axis 75 mm long and resting on its base on the H.P., is cut by a vertical section plane, which is parallel to VP and is 12mm away from the axis. Draw the sectional front view and top view. | 14M | CO1 | L4 |
| | **UNIT–II** | | | |
| 3. 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 |
| | **OR** | | | |
| 4. | A cube of 50mm edge is resting on a face on HP such that a vertical face is inclined at 30° to VP. It is cut by a section plane perpendicular to VP and inclined at 30° to HP passing through a point 12mm from top end of the axis. Develop the lateral surface of the lower portion of the cube. | 14M | CO2 | L3 |
| | **UNIT–III** | | | |
| 5. | A vertical cylinder of base 90mm and 120mm axis is penetrated by a cone of base diameter 90mm and axis 140mm long. The axes of the two solids bisect each other at right angle. Draw the projections of the two solids showing the lines 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 pentagonal prism and pyramid, with side of base 25mm and axis 60mm long. The solid objects are resting on their bases on HP with an edge of the base parallel to VP. | 14M | CO4 | L4 |
| | **OR** | | | |
| 8. a) | Draw the isometric view of a pentagon of 50mm diameter with its plane horizontal and vertical. | 7M | CO4 | L4 |
| b) | Draw the isometric view of a hexagon of 50mm diameter with its plane horizontal and vertical. | 7M | CO4 | L4 |

**UNIT–V**

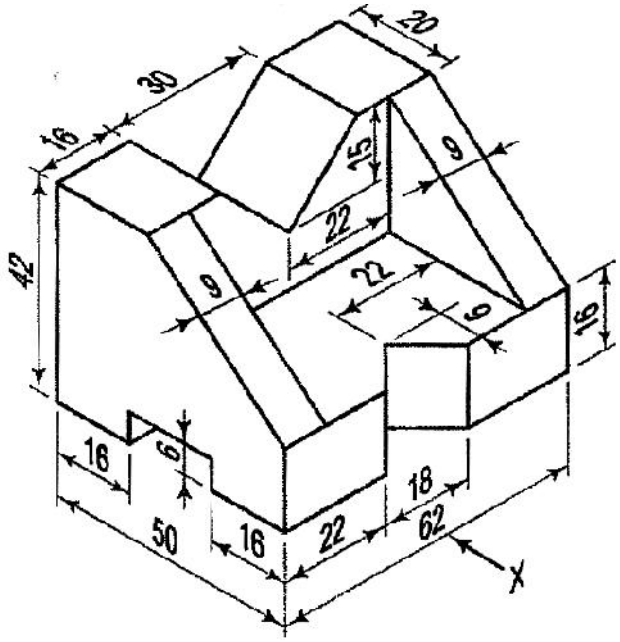
9. Draw the isometric view of the following figure




14M CO5 L4

**OR**

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




14M CO5 L4

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