O.P.Code: 19HS0850 | **R19** | **H.T.No.** [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. I Year I Semester Supplementary Examinations October/November-2025
ADVANCED PHYSICS
(Mechanical Engineering)

Time: 3 Hours   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Describe the formation of Newton's ring with necessary theory.	CO1	L2	6M
	b	Explain how the wavelength of light sources is determined by forming Newton's ring.	CO1	L2	6M

OR

2	a	Distinguish between Fresnel's and Fraunhofer diffraction.	CO1	L4	8M
	b	A plane grating having 10520 lines per cm is illuminated with light having a wave length of 5×10^{-5} cm at normal incidence how many orders are visible in the grating spectra?	CO1	L2	4M

UNIT-II

3	a	Write Sabine's formula for reverberation time? Mention factors controlling the reverberation time?	CO2	L2	8M
	b	What are the basic requirements of acoustically good hall?	CO2	L2	4M

OR

4	a	Describe the application of Ultrasonic in non-destructive testing (NDT) of material.	CO2	L2	6M
	b	Give the important applications of ultrasonic waves.	CO2	L2	6M

UNIT-III

5	a	Explain B-H curve of ferromagnetic material.	CO3	L2	8M
	b	What are soft and hard magnetic materials.	CO3	L2	4M

OR

6	a	Discuss the frequency dependence of various polarization process in dielectric materials.	CO3	L2	6M
	b	Derive Clausius – Mossotti equation.	CO3	L4	6M

UNIT-IV

7	a	Explain the construction and working of Nd:YAG laser with suitable energy level diagram.	CO4	L2	8M
	b	What are the advantages of Nd:YAG laser.	CO4	L1	4M

OR

8	a	Distinguish between single mode and multimode optical fibers.	CO4	L4	8M
	b	Write brief note on the structure of fiber cables.	CO4	L2	4M

UNIT-V

9	a	Discuss properties of nanomaterials.	CO5	L2	6M
	b	Discuss the synthesis nanomaterial by Sol-Gel technique.	CO5	L2	6M

OR

10	a	Define Condensation, Crystal growth and Nucleation.	CO5	L2	6M
	b	Discuss the biomedical applicatins of nanomaterials.	CO5	L2	6M

*** END ***

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. I Year I Semester Supplementary Examinations October/November-2025
THERMAL & FLUID ENGINEERING
(Electrical & Electronics Engineering)

Time: 3 Hours

Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	Explain the various elements of hydroelectric power station with a neat sketch.	CO1	L2	12M

OR

2	Explain the factor to be considered for selection of site for hydroelectric powerplant.	CO1	L2	12M

UNIT-II

3	a	Differentiate between the cyclic process and non-cyclic process.	CO2	L2	6M
	b	What do you understand by path function and point function?	CO2	L3	6M

OR

4	a	State and explain second law of thermodynamics.	CO2	L1	6M
	b	Establish the equivalence of Kelvin-Planck and Clausius statements.	CO2	L3	6M

UNIT-III

5	A steam power plant is supplied with dry saturated steam at a pressure of 12 bar and exhausts into a condenser at 0.1 bar, Calculate the Rankine efficiency by using steam tables, and Mollier chart.	CO3	L4	12M

OR

6	Draw the P-V and T-S diagrams of Rankine cycle and Carnot cycle.	CO3	L1	12M

UNIT-IV

7	Explain the terms: (i) Path line (ii) Streak line (iii) Stream line, and (iv) Stream tube.	CO4	L2	12M

OR

8	a	Explain how a U tube manometer is used to measure both positive and negative pressures.	CO4	L2	6M
	b	A U tube manometer is used to measure the pressure of oil of specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and the right limb is open to the atmosphere. The centre of the pipe is 100 mm below the mercury in the right limb. If the difference of ercury level in the two limbs is 160 mm. Determine the absolute pressure of the oil in the pipe.	CO4	L3	6M

UNIT-V

9	a	What are minor losses? Under what circumstances they are negligible.	CO5	L1	6M
	b	An orifice-meter with orifice diameter 15 cm is inserted in a pipe of 30 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter give readings of 14.715 N/cm^2 and 9.81 N/cm^2 respectively. Find the rate of flow of water through the pipe in liters/s. Take C = 0.6.	CO3	L3	6M

OR

10	Explain the pipes in series and derive equation for total loss of head in pipe.	CO3	L4	12M

*** END ***

Q.P.Code: 19CE0101 **R19** H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. I Year I Semester Supplementary Examinations October/November-2025
ENGINEERING MECHANICS
(Common to CE, ME & AGE)

Time: 3 Hours Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1	a	Classify different system of forces with suitable examples.	CO1	L2	6M
	b	The resultant of the two forces, when they act at an angle of 60° is 14 N. If the same forces are acting at right angles, their resultant is √137 N. Determine the magnitude of the two forces.	CO1	L4	6M

OR

2	A simply supported beam AB of span 4.5 m is loaded as shown in Figure 1. Find the support reactions at A and B.	CO1	L4	12M

Figure 1

UNIT-II

3	Define the following: a) Limiting Force of Friction b) Kinetic Friction c) Co-efficient of Friction d) Angle of Friction e) Angle of Repose	CO2	L1	12M

OR

4	A screw jack raises a load of 40kN. The screw is square threaded having three threads per 20mm length and 40mm in diameter. Calculate the force required at the end of a lever 400mm long measured from the axis of the screw, if the coefficient of friction between screw and nut is 0.12.	CO2	L4	12M

UNIT-III

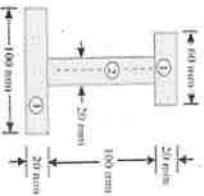| 5	An I-section is made up of three rectangles as shown in Figure 2. Find the moment of inertia of the section about the horizontal axis passing through the centre of gravity of the section.	CO3	L4	12M

Figure 2

OR

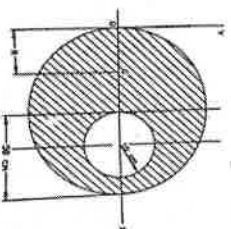| 6	Determine the centroid of the remaining portion of a circular sheet of metal of radius 50cm when a hole of 10cm radius is taken out from the centre of the circular disc along its horizontal diameter as shown in figure 3.	CO3	L4	12M

Figure 3

UNIT-IV

7	Prove the parallel axis theorem in the determination of moment of inertia of areas with the help of a neat sketch.	CO4	L3	12M

OR

8	Find the moment of inertia about the centroidal X-X and Y-Y axes of the angle section shown in Figure 4.	CO4	L4	12M

Figure 4

UNIT-V

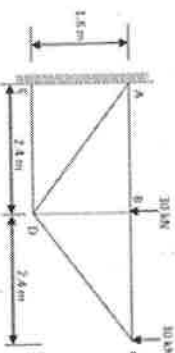| 9	Find the forces in the members of a truss as shown in Figure 5.	CO5	L4	12M

Figure 5

OR

10	a) What is a cantilever truss? How will you find out its reactions? b) State the assumptions made in the analysis of pin jointed trusses. c) How method of joint differs from the method of section in the analysis of pin jointed trusses? d) What is meant by perfect frame? e) What are the types of vibrations.	CO5	L2	12M

END

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. I Year I Semester Supplementary Examinations October/November-2025
ENGINEERING GRAPHICS
(Common to ECE, CSE & CSIT)

Time: 3 Hours   **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	Construct a hyperbola with the distance between the focus and directrix as 50 mm and eccentricity as 3/2. Also, draw normal and tangent to the curve at a point 30 mm from the directrix.	CO1	L6	12M

OR

2	Construct a rectangular hyperbola when a point P is at distance of 18 mm and 34 mm from two asymptotes. Also draw a tangent to the curve at a point 20 from an asymptote.	CO1	L6	12M

UNIT-II

3	A line AB of 70 mm long, as its end A at 10 mm above H.P and 15 mm in front of V.P. Its front view and top view measures 50 mm and 60 mm. Draw the projections of the line and determine its inclination with H.P and V.P	CO2	L4	12M

OR

4	A Thin 30^0-60^0 set- square has its longest edge (diagonal) on H.P and inclined at 300 to V.P. Its surface makes an angle of 45^0 with H.P. Draw the projections, choosing suitable size for the set -square.	CO2	L6	12M

UNIT-III

5	A hexagonal pyramid side of base 25 mm and axis 50 mm long rest with one of its edges of base on H.P and its axis is inclined at 30^0 to H.P and parallel to V.P. Draw the projections.	CO3	L3	12M

OR

6	A cone with base 60 mm diameter and axis 75 mm long, is resting on its base on H.P. It is cut by a section plane parallel to H.P and passing through the mid-point of the axis. Draw the projections of the cut solid.	CO3	L4	12M

UNIT-IV

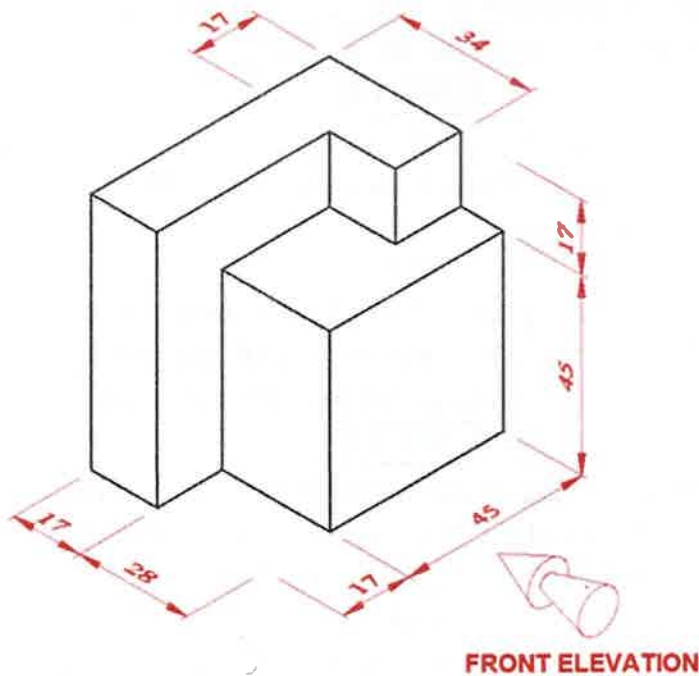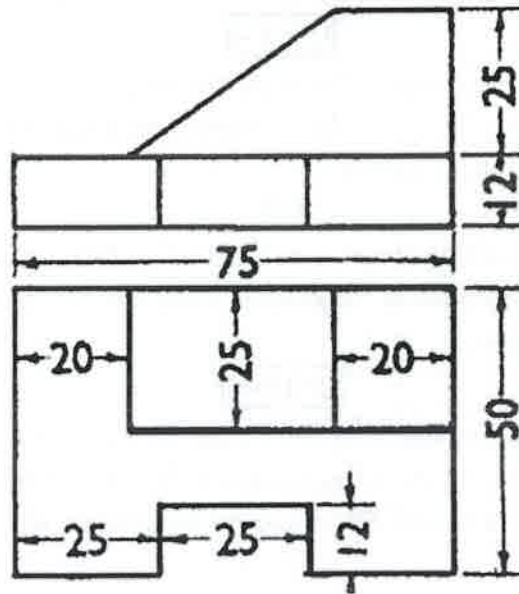|				
7	A pentagonal pyramid of side of base 30 mm and 60 mm long, is resting on its base on H.P, with an edge of the base parallel to V.P. draw the development of the lateral surface of the pyramid.	CO4	L4	12M

OR

8	A vertical square prism of base 30 mm side and 70 mm axis is penetrated by a horizontal square prism of base 25 mm side and 70mm axis. Both the axes intersects and bisects each other. All the faces of the prisms are equally inclined to V.P. Draw the projections showing the curves of intersection.	CO4	L4	12M

9   Draw the isometric view of a hexagonal prism, with side of base 25 mm **CO5   L4   12M**
and axis 60 mm long .The prism is resting on its base on H.P, with an
edge of the base parallel to V.P. Use box method.

OR

10   Draw the isometric view of the following sketch.   **CO5   L4   12M**

FRONT ELEVATION

*** END ***