

Reg. No. : **E N G G T R E E . C O M****Question Paper Code : 30082**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

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Second Semester

Aeronautical Engineering

PH25C05 — APPLIED PHYSICS (ME) — II

(Common to : Aerospace Engineering/Automobile Engineering/Industrial Engineering and Management/Manufacturing Engineering/Marine Engineering/Mechanical Engineering/Mechanical Engineering (Specialised in Automobile)/Mechanical Engineering (Specialised in Smart Manufacturing)/Mechanical and Automation Engineering/Mechatronics Engineering/Robotics and Artificial Intelligence/Robotics and Automation)

(Regulations 2025)

Time : 3 hours

Maximum : 100 marks

CO – Course Outcomes

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CO1	Explain the concepts of physics in mechanical engineering stream.
CO2	Apply appropriate techniques in physics to solve engineering problems.
CO3	Analyse physical systems and interpret data from the virtual studies in the core branches in mechanical engineering.

BL – Bloom's Taxonomy Levels

(L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create)

Answer ALL questions.

PART – A (Total Marks = 40)[Q. No. 1 to Q. No. 10 ; $10 \times 1 = 10$ Marks (Multiple Choice Questions)]Q. No. 11 to Q. No. 20; $10 \times 3 = 30$ Marks]

Q.No.	Questions	Marks	CO	BL
1.	Moment of inertia, of a spinning body about an axis, doesn't depend on (A) Distribution of mass around axis (B) Orientation of axis (C) Mass (D) Angular velocity	1	1	2

2.	A solid sphere and a solid cylinder of the same mass and radius roll down an inclined plane. Which one will reach the bottom first? (A) Solid cylinder (B) Solid sphere (C) Both at the same time (D) Depends on the length of the plane	1	1	2
3.	The ratio of the speed of the driving gear to the speed of the driven gear is called (A) Gear ratio (B) Torque ratio (C) Velocity ratio (D) Mechanical efficiency	1	1	1
4.	Every particle in the rotating body executes circular motion. (A) circular motion (B) rotational motion (C) random motion (D) relative motion	1	2	1
5.	Arrange the following materials in descending order, as per the value of their thermal conductivity. (1) Pure iron (2) Liquid water (3) Steam (4) Pure Brass (A) 4-3-2-1 (B) 4-1-2-3 (C) 2-3-1-4 (D) 1-2-3-4	1	2	2
6.	Forbe's method is used to determine the thermal conductivity of (A) Poor conductors (B) Good conductors (C) Liquids (D) Insulating materials	1	2	2
7.	The first law of thermodynamics is a restatement of which of the following principles? (A) Conservation of mass (B) Conservation of entropy (C) Conservation of energy (D) Conservation of momentum	1	3	1

8.	The melting point of pure iron in degrees centigrade is (A) 1525°C (B) 1535°C (C) 1543°C (D) 1150°C	1	3	2
9.	TTT diagrams are also known as (A) Isothermal transformation diagrams (B) Equilibrium diagrams (C) Phase diagrams (D) Cooling curves	1	1	2
10.	The recombination of electrons and holes in an LED occurs in which region? (A) N-type region (B) P-type region (C) Depletion region (D) Ohmic contact region	1	2	3
11.	Define Centre of mass of the system.	3	1	2
12.	Calculate the rotational kinetic energy for a gear of mass 20 kg and radius 0.4 m rotates at 10 rad/s.	3	2	3
13.	Distinguish between conduction and convection.	3	1	3
14.	Write about Transient Line Source.	5	2	3
15.	State the First law of thermodynamics.	3	2	3
16.	Write a note on phase diagram.	5	2	3
17.	State the use of heat treatment of steels.	3	1	3
18.	Ceramics are stronger in compression than in tension. Justify.	3	3	3
19.	What are composites? Mention the role of matrix.	3	2	3
20.	Mention the characteristics of Light Emitting Diodes.	3	1	3

PART - B (5 × 12 = 60 marks)

Q.No.		Questions	Marks	CO	BI
21.	(a)	Derive the moment of inertia of a solid sphere of mass M and radius R about its diameter.	12	3	3
		OR			
	(b)	Describe the principle, construction and working of gyroscope and mention its applications in various engineering fields.	12	1	3

22	(a)	Illustrate the Transient Plane Source method for measuring thermal conductivity using a double-spiral disc sensor.	12	1	4
	OR				
	(b)	Describe the Forbe's method for determining thermal conductivity of a rod. Discuss its role in engineering application.	12	1	4
23	(a)	Deduce the formula for heat conduction through a compound medium with neat sketch.	12	2	4
	OR				
	(b)	Examine the T-T-T diagram in detail and discuss its significance in steel heat treatment.	12	2	4
24	(a)	Analyse the iron carbon equilibrium diagram and discuss its types of invariant reactions.	12	2	3
	OR				
	(b)	Compare and contrast the thermal, mechanical, electrical, and chemical properties of ceramic materials.	12	3	3
25	(a)	Discuss the techniques of reinforcing fibers in plastics. Give the importance of fibers in FRP and explain their properties.	12	3	4
	OR				
	(b)	Illustrate the preparation, characteristic properties and applications of metallic glasses.	12	3	4