



C09-CHOT-103/C09-M-103/RAC-103

3041

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2014

DME—FIRST YEAR EXAMINATION

ENGINEERING PHYSICS

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write three applications of dimensional analysis.

2. A force of $2\hat{i} - 3\hat{j} + 4\hat{k}$ N acts on a body and produces a displacement of $3\hat{i} + 4\hat{j} + 5\hat{k}$ m. Calculate the work done.

3. Write the equations of motion in the case of a body thrown up vertically.

4. State the laws of friction.

5. The displacement of a particle executing simple harmonic motion is represented by an equation $y = 0.25 \cos(6280t)$. Find the amplitude, angular frequency and time period of that particle.

6. State any three differences between 'isothermal process' and 'adiabatic process'.

- * 7. State and explain Sabine's formula.
8. Explain briefly 'viscosity' of gases.
9. Explain Coulomb's inverse square law in magnetism.
10. State any three laws of photoelectric effect.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.
 (2) Each question carries **ten** marks.
 (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) State the parallelogram law of vectors. 2
 (b) Derive an expression for the magnitude and direction of the resultant vector using parallelogram law. 8
12. (a) Define an oblique projectile. Give any two examples. 3
 (b) Derive an equation for the horizontal range for an object projected at a certain angle with the horizontal. 4
 (c) Find the angle of projection for which the projectile can attain the maximum height which is numerically equal to its horizontal range. 3
13. (a) Define the terms work, power and energy. State their units and dimensional formulae. 6
 (b) A man weighting 50 kg climbs up a staircase of height 5 m carrying a bag of 10 kg in 15 seconds. Calculate his power ($g = 10 \text{ ms}^{-2}$). 4
- * 14. Derive expression for (a) displacement, (b) velocity, (c) acceleration, (d) time period and (e) frequency for a body in simple harmonic motion. 10
15. (a) Derive $C_p = C_v + R$. 6
 (b) One litre of gas at 27 °C is heated such that its volume and pressure are doubled. Find the final temperature. 4

- * 16. (a) What is noise pollution? What are effects of noise pollution? How to minimize the noise pollution? 7
- (b) Two tuning forks give 4 beats per second when sounded simultaneously. The frequency of one of the forks is 384 Hz. When the other fork is loaded with a little wax 6 beats per second are produced. What is the frequency of the second fork? 3
17. (a) What is strain? Explain the different types of strain. 7
- (b) A steel wire 2 mm diameter and of length 2 m is stretched by applying a force of 11 N. If the increase in length is 0.036 mm, find Young's modulus. 3
18. (a) Explain the principle, construction of a metre bridge with the help of diagram and explain the experimental determination of unknown resistance. 7
- (b) In a metre bridge experiment the balancing length is 40 cm. The resistance in the left gap is 4 ohms. Find the resistance in the right gap. 3
