3041

C09-CHOT-103/C09-M-103

# 3041

## BOARD DIPLOMA EXAMINATION, (C-09)

## MARCH/APRIL—2013

## 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.** Can we use dimensional analysis in all cases? Mention any two limitations.

**2.** Two parallel vectors have magnitudes 2 m and 3 m. What will be the magnitude of their resultant?

**3.** A body is dropped from the top of a building of height 40 m. Find the velocity of the body on reaching the ground.

**4.** What is the difference between static friction and limiting friction?



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5. Write the formula for velocity of particle executing SHM and obtain the formula for minimum and maximum values of velocity.

6. Explain the concept of internal energy of a gas.

7. A man is at a certain distance from a hill and produces a sound. If he hears an echo after 3 seconds, find the distance from the hill. (Velocity of sound = 340 m/s.)

8. Explain the term viscosity. What is the cause of viscosity of a fluid?

9. Define resistivity. Write the expression for it. State its SI units.

10. What is optical fiber? Name different types of optical fiber.

## 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)* Define scalar product and vector product of two vectors. 6

*(b)* If $\overline{A} = 2i + j + 2k$ and $\overline{B} = i + 2j + 3k$ form the two sides of a triangle, find the area formed by them. 4

12. *(a)* Define a projectile. Give one example. 3

*(b)* Derive the expression for the magnitude and direction of the resultant velocity of a projectile at an instant *t*. 7



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13. *(a)* Define potential energy. Give its units and dimensional formula. 3

*(b)* Derive an expression for potential energy. 4

*(c)* A pump can hoist 8400 kg of coal per hour from a mine of 100 m deep. Find the power, if its efficiency is 75%. 3

14. *(a)* Derive an expression to find the time period of a simple pendulum. 6

*(b)* The acceleration due to gravity on the surface of moon is 1·7 $m/s^2$. What is the time period of a simple pendulum on the moon if its period on the earth is 3·5 seconds ($g$ on earth is 9·8 $m/s^2$)? 4

15. *(a)* State Charles' law at constant pressure and constant volume. 4

*(b)* Define absolute zero and write the relation between absolute temperature and centigrade temperature. 3

*(c)* The pressure and volume of a gas at 30 °C are 750 mm and 550 cc respectively. Find the volume at 80 °C and 730 mm of pressure. 3

16. *(a)* Distinguish between musical sound and noise. 4

*(b)* Write any six effects of noise pollution. 6



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**17.** *(a)* Describe the experimental method to determine the surface tension of liquid. 6

*(b)* Water rises to a height of 4 cm in a certain capillary tube. Find the height to which water will rise in another capillary tube whose radius is half of the first tube. 4

**18.** *(a)* Derive an expression for couple acting on a bar magnet suspended in a uniform magnetic field. When is the couple zero and when is it maximum?

*(b)* Each pole of a bar magnet experiences a force of $4 \times 10^{-4}$ N when placed in a uniform magnetic field of induction $2 \times 10^{-5}$ N/Am. Calculate the pole strength. 10

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