



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

3041

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2014

DME—FIRST YEAR EXAMINATION

ENGINEERING PHYSICS

Time : 3 hours ]

[ Total Marks : 80

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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 the base and supplementary units of SI system along with their symbols.
2. Express work done by a force as a dot product.
3. A balloon rising vertically with uniform velocity releases a body at a height of 18.4 m. If it reaches the ground in 8 seconds, find the initial velocity of the balloon.
4. Write any three advantages of friction.
5. Define the terms (i) time period, (ii) amplitude (iii) frequency.
6. A cylinder contains 90.3 cc of gas at 17 °C and 735 mm of Hg pressure. Find its volume at NTP.
7. What is Doppler effect? Write two applications of Doppler effect.
8. Define viscosity and coefficient of viscosity.
9. State and explain Kirchhoff's laws.
10. Write three applications 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) State parallelogram law of vectors. Derive the expressions for magnitude and direction of resultant of two vectors.  
(b) Find the dot and cross products of two vectors  $\vec{A} = 2\vec{i} - 3\vec{j} + 4\vec{k}$  and  $\vec{B} = 5\vec{i} + 2\vec{j} + 4\vec{k}$ .
- 12.** (a) Derive expressions for maximum height, time of ascent of a body projected vertically upwards.  
(b) A body is projected obliquely with an initial velocity of 10 m/s at an angle  $30^\circ$  to the horizontal. Find the maximum height reached and the time of descent.
- 13.** (a) Define kinetic energy. Derive the expression for kinetic energy.  
(b) A machine gun fires 240 bullets per minute. Mass of each bullet is 10 grams. If the power of the machine gun is 7.2 kW, find the velocity with which each bullet is fired.
- 14.** (a) Derive the expressions for velocity and acceleration of a particle executing SHM.  
(b) The maximum velocity in SHM is 100 m/s while the maximum acceleration is 1.57 m/s. Calculate the time period.
- 15.** (a) Obtain the relation between molar specific heats of a gas.  
(b) Calculate the value of universal gas constant.
- 16.** (a) Define noise pollution. Write any four sources of noise pollution.  
(b) A source of sound of frequency 300 Hz is moving towards a stationary observer with a speed of 80 m/s. Find the frequency as heard by the observer. (Velocity of sound=330 m/s).
- 17.** (a) State Hooke's law.  
(b) Describe an experiment for the determination of surface tension of a liquid by capillary rise method.
- 18.** (a) State and explain Coloumb's inverse square law of magnetism.  
(b) Derive an expression for magnetic induction field strength at a point of the equatorial line of a bar magnet.

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