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C09–CHPP–103/C09–CHPC–103/C09–CHOT–103/
C09–CHST–103/C09–EC–103/C09–EE–103/
C09–IT–103/C09–M–103/C09–MET–103/C09–MNG–103/
C09–PET–103/C09–TT–103/C09–RAC–103

3003

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2016

FIRST YEAR (COMMON) 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 the limitations of dimensional analysis.

2. State and explain the dot product of two vectors.

3. A stone is dropped from the top of a building and reaches the ground after 4 seconds. What is the height of the building? [Let g $10\,m/s^2$]

4. Why is static friction more than kinetic friction?

5. Define the terms 'seconds pendulum' and 'phase'.

6. Why does a gas has two specific heat?

7. Write any three differences between musical sound and noise.

8. Define viscosity. Give two examples for it.

9. Define the terms *(a)* magnetic field, *(b)* magnetic moment and *(c)* magnetic induction field strength.

10. Write any three properties of superconductor.

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 and derive an expression for the magnitude of the resultant of the two vectors. 6

(b) A force of $\vec{F}$ $3\vec{i}$ $5\vec{j}$ $5\vec{k}$, produces a displacement $\vec{S}$ $5\vec{i}$ $7\vec{j}$ $2\vec{k}$ in 1 minute. Find the work done and power. 4

12. *(a)* A body is projected vertically upwards. Derive expression for *(a)* maximum height reached and *(b)* time of ascent. 3+3=6

(b) A football player hits the ball with a velocity of 50 m/s at an angle of 60° with the horizontal. Find the maximum height reached and time of flight. 4

13. *(a)* Define kinetic energy and prove that $KE = \frac{1}{2} mV^2$. 6

(b) Calculate the horsepower of the engine required to lift 1 08 10^6 kg of coal per hour from a mine of 74·6 m deep. 4

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

(b) The displacement of a particle executing SHM is given by the equation $Y \quad 5 \sin (4 \quad t \quad /6)$. All quantities are expressed in SI. Find the amplitude, angular velocity, time period and phase. 4

15. *(a)* State gas law. 3

(b) Prove that $PV = RT$. 4

(c) Pressure of a certain mass of a gas at 27 °C is 780 mm of Hg. If it is heated to 77 °C by keeping volume constant, what is its new pressure? 3

16. *(a)* What is Doppler effect? Derive an expression for the apparent frequency of sound when the source is in motion and observer is at rest. 7

(b) State and explain Sabine's formula. 3

17. *(a)* Explain surface tension on the basis of molecular theory. 4

(b) State and explain three moduli of elasticity. 6

18. *(a)* Derive the equation for the balancing conclusion of Wheatstone bridge. 7

(b) If the moment of magnet is 0·4 Am^2, what is the magnetic induction on the axial line at point 40 cm away from the midpoint? 3

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