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C09-CHPC-103/C09-EC-103/C09-PET-**103**

3029

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2014

DECE—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 the dimensional formula for the following quantities :

(a) Work

(b) Stress

(c) Strain

2. Define scalar product of two vectors. Give two properties of scalar product.

3. A ball is dropped from the top of a building and it is found to reach the ground in 2 seconds. Find the height of the building.

4. State the laws of static friction.

5. What are the conditions of simple harmonic motion?

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6. Explain absolute zero.

7. Distinguish between musical sound and noise.

8. Define stress and strain. Give their SI units.

9. State Kirchhoff's laws.

10. What are the applications of superconductivity?

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 an expression for the magnitude and direction of resultant vector. 2+4=6

(b) Two forces of magnitudes 30 N and 40 N are acting on a body perpendicular to each other. Find the resultant force both in magnitude and direction. 4

12. *(a)* Define projectile and show that the path of a projectile is parabola in the case of oblique projection. 1+5=6

(b) A shell is fired at an angle of 30° with a velocity of 100 m/s. Find the time of flight and horizontal range.

[Take : $g = 10\ m/s^2$] 2+2=4

13. *(a)* State and prove the law of conservation of energy in the case of freely falling body. 1+5=6

(b) A man weighing 60 kg lifts a mass of 40 kg to the top of a building 10 m high in 50 seconds. Find the power exerted by the man. 4

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14. (a) Derive an expression for displacement and velocity of a particle executing SHM. 3+3=6

(b) A particle executing SHM has an acceleration of 12 cm/s^2 when its displacement is 3 cm. Calculate the time period of the vibrating particle. 4

15. (a) Derive ideal gas equation $PV = RT$. 6

(b) Write any four differences between isothermal process and adiabatic process. 4

16. (a) Define beats and give four applications of beats. 2+4=6

(b) Write any four effects of noise pollution. 4

17. (a) Describe the method of determining the surface tension of a liquid by the capillary rise method. 6

(b) The radius of a capillary tube is 0·025 mm. The tube is dipped vertically in a liquid of density $0 \cdot 8 \times 10^3$ kg / m^3 and surface tension is 3×10^{-2} N/m. [Angle of contact $\theta = \cos^{-1}(0 \cdot 3)$]. Calculate the height to which liquid rises in the capillary tube.

[Take : $g = 10$ m / s^2.] 4

18. (a) Derive an expression for magnetic induction field strength at a point on the axial line of a bar magnet. 6

(b) The magnetic moment of a short magnet is 4 A-m^2. What is the magnetic induction at a point in the axial line at a point 40 cm away from its midpoint? 4

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