



C09-A-103/C09-AA-103/C09-AEI-103/C09-BM-103/  
C09-C-103/C09-CM-103/C09-CH-103/  
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)  
MARCH/APRIL—2018  
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. Using dimensional method, check the correctness of the equation  $T = 2\sqrt{l/8g}$ , where  $T$  is the time period,  $l$  is the length of the pendulum and  $g$  is the acceleration due to gravity.
2. Define equal vectors, like vectors and null vector.
3. Derive an expression for the horizontal range of a body projected obliquely.

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1

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4. Derive an expression for the acceleration of a body sliding down on a rough inclined plane.
5. A particle executes SHM whose displacement is given by  $y = 0.04 \sin(100t)$ . Find its amplitude and frequency.
6. Define an adiabatic process. Does the internal energy change or not in this process?
7. Define noise and write any two characteristics.
8. Define surface tension and write its SI unit.
9. State Ohm's law. If the applied voltage is increased, does the resistance of a conductor change at constant temperature?
10. Write any three properties of superconductors.

**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 vector product of vectors. 3  
 (b) Write any three properties of cross product. 3  
 (c) A force of  $2\vec{i} - 3\vec{j} + 6\vec{k}$  acts on a body at a point which is at a perpendicular distance of  $3\vec{i} + 4\vec{j} + 3\vec{k}$  from the axis of rotation. Find the torque. 4
12. (a) Define acceleration due to gravity ( $g$ ) and write its SI unit. 3  
 (b) Write the equations of motion of a freely falling body. 3  
 (c) A body is thrown up vertically from the ground with a velocity of 19.6 m/s. Find the maximum height reached and the total time taken to reach the ground. 4

13. (a) State the law of conservation of energy and verify this law in the case of a freely falling body. 7
- (b) A body of mass 5 kg falling freely under gravity. Find its kinetic energy after 5 seconds. 3
14. (a) Show that the time period of a simple pendulum is independent of the mass of the bob by deriving expression for time period. 7
- (b) The length of a seconds pendulum is 1 m. Find its length if the time period changes to 1.88. 3
15. (a) State Boyle's law. 2
- (b) Describe the method of experimental verification of Boyle's law using Boyle's law apparatus. 8
16. (a) State whether Doppler effect in sound can be extended to light also. Write any three applications of Doppler effect. 4
- (b) A train at the outer signal of railway station blows a whistle of frequency 400 Hz in air. What is the frequency of the whistle for a platform observer at rest when the train (i) approaches the platform with a speed of 10 m/s and (ii) recedes from the platform with a speed of 10 m/s? (Velocity of sound in air = 340 m/s) 6
17. (a) Define viscosity and give two examples. 4
- (b) Derive Newton's formula for viscous force of a liquid. 6
18. (a) State Coulomb's inverse square law. 2
- (b) Derive an expression for the magnetic field strength at a point on the equatorial line of a bar magnet. 8

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