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—2017

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. Define dimensional formula. Write the dimensional formula of density and speed.

2. Two vectors of equal magnitude 8 N each are directed in north and east respectively. Explain whether the two are equal vectors or not.

3. Define a projectile. Give any two examples of it.

4. A body of mass 5 kg is sliding down a rough inclined plane of angle 60°. If the length of the inclined plane is 10 m and the coefficient of friction is 0·5, find the time taken by it to reach the bottom of the plane.

5. Define periodic motion and give two examples.

6. State the first law of thermodynamics. Apply this to an isothermal process.

7. When a wave propagates through a medium, write the directions of vibrations of particle if the wave motion is *(a)* transverse and *(b)* longitudinal.

8. Explain how mosquito breed on surface of stagnant water can be destroyed.

9. A magnet of magnetic moment $20\,\mathrm{A\,m^2}$ is placed in uniform magnetic field of induction 0·02 T, so that it makes an angle 45° with the field. Find the torque acting on it.

10. Write any three uses of photoelectric cells.

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PART—B   10×5=50

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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 and explain polygon law with a figure.   5

      (b) A force $6\bar{i}\ 12\bar{j}\ 8\bar{k}$ produces a displacement of $2\bar{i}\ 3\bar{j}\ 5\bar{k}$. Find the work done.   5

12. *(a)* A body is thrown vertically upwards. Show that the time of ascent is equal to the time of descent.   7

      (b) A stone is thrown up vertically with a velocity 98 m/s. Find the total distance travelled before it reaches the ground.   3

13. *(a)* State the principle of conservation of energy. 2

(b) Prove the law of conservation of energy in case of a freely falling body. 6

(c) A bullet of mass 10 grams is fired with a velocity of 300 m/s. Find its kinetic energy. 2

14. *(a)* Derive the expression for the time period of a simple pendulum. 7

(b) The time period of a pendulum having length 1 m is 2 s. Calculate the acceleration due to gravity at that place. 3

15. *(a)* Explain why the value of universal gas constant is same for all the gases. 2

(b) Derive the gas equation $PV = RT$. 5

(c) Calculate the value of R at STP. 3

16. *(a)* Define reverberation. Give the Sabine's formula for reverberation time. 4

(b) Explain on what factors the reverberation time depends upon. 2

(c) A car moving with a speed of 30 m/s is approaching a factory whistle having the frequency 700 Hz. Calculate the apparent pitch of the whistle as heard by the driver of the car. (Velocity of sound = 350 m/s) 4

17. *(a)* Explain the term 'viscosity' giving two examples of it. 4

(b) Write Poiseuille's equation and briefly describe the method of experimental determination of coefficient of viscosity. 6

18. *(a)* Explain Kirchhoff's laws of electricity with a neat sketch. 6

(b) Explain the principle of Wheatstone's bridge and how it is applied to find the unknown resistance. 4

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