**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)

OCT/NOV—2015

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. If the atmospheric pressure P at a place depends on the height h, density d of mercury in barometer and acceleration due to gravity g, find the relation among them by dimensional method.

2. Define scalar product and vector product with one example for each.

3. A stone is dropped into a well and the sound of splash is heard after 4·23 seconds. If the depth of the well is 78·4 metre, find the velocity of sound.

4. Define three types of frictional force.

5. Write the conditions of simple harmonic motion.

6. State first and second laws of thermodynamics.

7. Distinguish between musical sound and noise.

8. Define three types of strain.

9. Derive the relation $F \quad mB$.

10. Write any three applications of superconductors.

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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 parallelogram law of vectors. Derive an expression for the magnitude and direction of resultant vector. 7

(b) If a force $\vec{F} \quad \vec{i} \quad 2\vec{j} \quad 3\vec{k}$ produced a displacement of $S \quad 2\vec{i} \quad 3\vec{j} \quad 4\vec{k}$, find the work done. 3

12. *(a)* Show that the path of a projectile is a parabola in case of obliquely projected body. 7

(b) A stone is projected vertically upwards from the top of a tower with a velocity 25 m/s. If the stone reaches the ground after 20 seconds, find the height of the tower. 3

13. *(a)* State work-energy theorem. Show that the change in kinetic energy of a body is equal to the work done.   6

(b) A body of mass 5 kg starts falling freely from a height of 8 m. Find the potential and kinetic energies of the body when the height of the body is 5 m above the ground.   4

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

(b) A tuning fork vibrates with a frequency of 130 Hz and with an amplitude of 3 mm. Calculate the maximum velocity and maximum acceleration.   3

15. *(a)* Prove that $C_P - C_V = R$.   6

(b) A certain mass of gas exerts a pressure of 72 cm of Hg at 27 °C. It is heated at constant volume and the pressure observed after some time is 90 cm of Hg. Calculate its temperature.   4

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

(b) A railway engine whistling with a frequency of 240 Hz approaches a station with a velocity of 30 m/s. Find the apparent frequency of sound heard by a listener standing on a platform. $(V = 330$ m/s)   3

17. *(a)* Define surface tension and capillarity.   4

(b) Describe an experiment to determine the coefficient of viscosity of a liquid by Poiseuille's method.   6

18. *(a)* State Ohm's law and explain.   3

(b) Write the experimental determination of specific resistance of the material of the wire using metre bridge.   7

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