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**C14–A/AA/AEI/BM/C/CH/CHOT/CHPC/
CHPP/CHST/CM/EC/EE/IT/M/MET/MNG/
PCT/PET/RAC/TT–103**

4003

BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—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. Write the base and supplementary units of SI system along with their symbols.
2. Define scalars and vectors. Write two examples of each.
3. A ball is thrown at an angle of 30° to the horizontal with an initial velocity of 20 m/s. Find its horizontal range.
4. The displacement of a particle in SHM is given by $y = 6 \sin(0.2 t + \pi/4)$. Find (a) Amplitude, (b) Time period, (c) Initial phase
5. State the gas laws.

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6. Define beats. Write any two applications of beats.
7. Write Poiseuille's equation for coefficient of viscosity explaining the terms involved.
8. Define angle of contact and capillarity.
9. State Kirchhoff's laws.
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) The answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Derive the expression for the magnitude and direction of resultant vector in parallelogram law of vectors.
(b) A force of 50 N is acting on a body at angle of 30° with the horizontal. Find its horizontal and vertical components.
12. (a) Define oblique projectile. Give any two examples.
(b) Show that the path of a projectile is parabola in oblique projection.
13. (a) Explain any three methods of minimizing friction.
(b) Write any four advantages of friction.
(c) A body of mass 5 kg rests on a horizontal surface. If $\mu = 0.25$, find the work done in moving the body through a distance of 1 m along the plane.

14. (a) Define work, power and energy and write their SI units and dimensional formulas.
- (b) State work-energy theorem.
- (c) Show that work done by a force is equal to the change in kinetic energy of the body. A force $2\vec{i} - 3\vec{j} + \vec{k}$ is applied on a body producing a displacement of $\vec{i} + 2\vec{j} + \vec{k}$. Find the work done.
15. (a) Define simple pendulum.
- (b) Show that the oscillations of simple pendulum are simple harmonic and hence derive expression for its time period.
16. (a) State second law of thermodynamics.
- (b) Distinguish between isothermal and adiabatic processes.
- (c) Define gas constant (r) and universal gas constant (R).
17. (a) Define noise pollution and write its SI units.
- (b) Define echo and the methods of minimizing echoes.
- (c) Define reverberation time and state Sabine's formula for reverberation time.
18. (a) Derive an expression for the magnetic induction field strength at a point on the axial line of a bar magnet.
- (b) In a metre bridge experiment balancing point is obtained at 40 cm from left. If the right gap has 10.5 resistance, calculate the resistance in the left gap.
