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—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.

(4) Take the value of acceleration due to gravity '*g*' as $9 \cdot 8 \text{ m/s}^2$ wherever it is necessary.

1. Write any three uses of dimensional formulae.

2. A force $\vec{F} = 6\hat{i} + 12\hat{j} + 8\hat{k}$ N displaced an object through $\vec{S} = 2\hat{i} + 8\hat{j} + 2\hat{k}$ m in its direction. Find the work done.

3. A food bag is dropped from a balloon ascending with a uniform velocity of 19·6 m/s and reaches the ground in 10 seconds. Find the height of the balloon when the bag reaches the ground.

4. Define angle of friction and angle of repose.

5. State the conditions of SHM.

6. Define gas constant r and universal gas constant R.

7. Write any three characteristics of musical sound.

8. Define the three types of stress.

9. Define the terms magnetic moment M and magnetic induction field strength B.

10. Write any three applications of photo electric cell.

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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 of vectors with a neat diagram. 2+4

(b) If the vectors $\vec{A}$ $2\hat{i}$ $2\hat{j}$ $\hat{k}$ and $\vec{B}$ $\hat{i}$ $3\hat{j}$ $\hat{k}$ are two adjacent sides of a parallelogram. Find the area of the parallelogram. 4

12. *(a)* Define projectile and give two examples. 4

(b) Show that the path of the projectile is a parabola in case of horizontal projection. 6

13. *(a)* State law of conservation of energy and verify it in the case of a freely falling body. 2+6

(b) A body of mass 10 kg is lifted to a height 20 m. Find the work done. 2

14. *(a)* Derive the equations for velocity and acceleration of a body in SHM. 3+3

(b) A particle is executing SHM according to the equation

$$y = 4\sin\left(\frac{\pi}{4}t + \frac{\pi}{6}\right)$$

All the quantities are in SI system. Find the maximum velocity and initial displacement. 4

15. *(a)* Derive the ideal gas equation $PB = nRT$. 6

(b) Some energy is supplied to a gas at constant pressure 2×10^5 Pa. The increase in volume of the gas is 10^{-2} m^3. If the increase in internal energy of the gas is 1500 J, find the energy supplied to the gas. 4

16. *(a)* Define reverberation and reverberation time. 4

(b) What is Doppler Effect? Derive the equation for apparent frequency of sound heard by an observer who is approaching a source of sound at rest. 1+5

17. *(a)* Define coefficient of viscosity. What is the effect of temperature on viscosity of liquids and gases? 2+1+1

(b) Define surface tension. Explain surface tension based on molecular theory. 2+4

18. *(a)* Derive the balancing condition for Wheatstone bridge with circuit diagram. 6

(b) A balance point in a meter bridge experiment is obtained at 40 cm from left. If the right gap has 10·5 ohm resistance, calculate the resistance in the left gap. 4

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