119/TS

A

Total No. of Questions – 21

Total No. of Printed Pages - 2

Regd. No.

Part – III
PHYSICS, Paper-I
(English Version)

Time : 3 Hours] **[Max. Marks : 60**

SECTION – A **10 × 2 = 20**

Note : (i) Answer **all** questions.

(ii) Each question carries **two** marks.

(iii) All are very short answer type questions.

1. What is Physics ?
2. Distinguish between fundamental units and derived units.
3. If $P = 2i + 4j + 14k$ and $Q = 4i + 4j + 10k$, find the magnitude of $P + Q$.
4. If a bomb at rest explodes into two pieces, the pieces must travel in opposite directions. Explain.
5. What is magnus effect ?
6. Give the expression for the excess pressure in a soap bubble.
7. What are the lower and upper fixing points in Celsius and Fahrenheit scales ?
8. What is thermal expansion ?
9. When does a real gas behave like an ideal gas ?
10. State the law of equipartition of energy.

SECTION – B

$6 \times 4 = 24$

Note : (i) Answer any **six** questions.

(ii) Each question carries **four** marks.

(iii) All are short answer type questions.

11. A car travels the first third of a distance with a speed of 10 kmph, the second third at 20 kmph and the last third at 60 kmph. What is its mean speed over the entire distance ?
12. Derive an expression for the magnitude and direction of the resultant vector using parallelogram law.
13. Mention the methods used to decrease friction.
14. Distinguish between centre of mass and centre of gravity.
15. Define angular velocity (ω). Derive $v = r\omega$.
16. What is escape velocity ? Obtain an expression for it.
17. Define stress and explain the types of stress.
18. Explain conduction, convection and radiation with examples.

SECTION – C

$2 \times 8 = 16$

Note : (i) Answer any **two** questions.

(ii) Each question carries **eight** marks.

(iii) All are long answer type questions.

19. State and prove law of conservation of energy in case of a freely falling body.

    A pump is required to lift 600 kg of water per minute from a well of 25 m deep and to eject it with a speed of 50 ms^{-1}. Calculate the power required to perform the above task. ($g = 10\ ms^{-2}$)

20. Define simple harmonic motion. Show that the motion of (point) projection of a particle performing uniform circular motion, on any diameter, is simple harmonic.

    Can a simple pendulum be used in an artificial satellite ? Give the reason.

21. State Second Law of Thermodynamics. How is heat engine different from a refrigerator ?
