119

II

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 the contribution of S. Chandrasekhar to Physics ?
2. Distinguish between fundamental units and derived units.
3. When two right angled vectors of magnitude 7 units and 24 units combine, what is the magnitude of their resultant ?
4. What happens to the co-efficient of friction if the weight of the body is doubled ?
5. Why are drops and bubbles spherical ?
6. Give the expression for the excess pressure in an air bubble inside the liquid.
7. Can a substance contract on heating ? Give an example.
8. State Wein's displacement law.
9. When does a real gas behave like an ideal gas ?
10. What is the expression between pressure and kinetic energy of a gas molecule ?

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. If $|\bar{a} + \bar{b}| = |\bar{a} - \bar{b}|$, prove that the angle between $\bar{a}$ and $\bar{b}$ is 90°.

13. Mention the methods used to decrease friction.

14. Distinguish between centre of mass and centre of gravity.

15. Define angular acceleration and torque. Establish the relation between angular acceleration and torque.

16. What is escape velocity ? Obtain an expression for it.

17. Describe the behaviour of a wire under gradually increasing load.

18. In what way is the anomalous behaviour of water advantageous to aquatic animals ?

SECTION – C

$2 \times 8 = 16$

Note : (i) Answer any **two** of the following questions.
(ii) Each question carries **eight** marks.
(iii) **All** are "long answer" type questions.

19. (a) Develop the notions of work and kinetic energy and show that it leads to work-energy theorem.
(b) A machine gun fires 360 bullets per minute and each bullet travels with a velocity of 600 m/sec. If the mass of each bullet is 5 gm, find the power of the machine gun.

20. Show that the motion of a simple pendulum is simple harmonic and hence derive an equation for its time period. What is seconds pendulum ?

21. Explain reversible and irreversible processes. Describe the working of Carnot engine. Obtain an expression for the efficiency.
