119

I

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 discovery of C.V. Raman ?
2. The percentage error in the mass and speed are 2% and 3% respectively. What is the maximum percentage error in kinetic energy ?
3. When two right angled vectors of magnitude 7 units and 24 units combine, what is the magnitude of their resultant ?
4. According to Newton's third law, every force is accompanied by an equal and opposite force. How can a movement ever take place ?
5. What is magnus effect ?
6. Why are drops and bubbles spherical ?
7. State Newton's law of cooling.
8. Why are utensils coated black ? Why are the bottom of the utensils made of copper ?
9. Define mean free path.
10. What is the expression between pressure and kinetic energy of a gas molecule ?

SECTION B

6×4=24

Note :— (*i*) Answer any SIX questions.
(*ii*) Each question carries FOUR marks.
(*iii*) ALL are short answer type questions.

11. A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 kmh^{-1}. Finding the market closed, he instantly turns and walks back home with a speed of 7.5 kmh^{-1}. What is the (*a*) magnitude of average velocity and (*b*) average speed of the man over the time interval 0 to 50 minutes ?

12. Show that the trajectory of an object thrown at certain angle with horizontal is a parabola.

13. Explain the methods used to decrease friction.

14. Show that a system of particles moving under the influence of an external force moves as if the force is applied at its centre of mass.

15. Define vector product. Explain the properties of a vector product with *two* examples.

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

17. Explain the concept of elastic potential energy in a stretched wire and hence obtain the expression for it.

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

SECTION C

2×8=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 25 m deep and to eject it with a speed of 50 ms^{-1}. Calculate the power required to perform the above task ?

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

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