SECTION – A

[10X2=20M]

NOTE: (i) Answer all questions.
      (ii) Each question carries two marks.
      (iii) All are very short answer type questions.

1. What are the fundemental forces in nature?
2. What are significant figures and what do they represent when reporting the result of a measurement?
3. A car travels the first third of a distance with a speed of 10kmph, the second third at 20 kmph and the last third at 60kmph. What is its mean speed over the entire distance?
4. According to Newton's third law, every force is accompained by an equal and opposite force. How can a movement ever take place?
5. Define: Work, power and energy. state their SI units.
6. Why do we prefer a spanner of longer arm as compared to the spanner of shorter arm?
7. What would be the change in acceleration due to gravity (g) at the surface, if the radius of Earth decreases by 2% keeping the mass of Earth constant?
8. What is the principle behind the carburetor of an automobile?
9. What is greehouse effect? Explain global warming.
10. How much will be the internal energy change in

    i) Isothermal process   ii) adiabatic process

SECTION – B   [6X4=24M]

NOTE: (i) Answer any six of the following questions.
      (ii) Each question carries four marks.
      (iii) All are short answer type questions.

11) State parallelogram law of vectors. Derive an expression for the magnitude and direction of the resultant vector.

12) Why is pulling the lawn roller preferred to pushing it?

13) When 100J of wok is done on a fly wheel, its angular velocity is increased from 60 rpm to 180 rpm. What is the moment of inertia of the wheel?

14) State Kepler's laws of planetary motion

15) Describe the behaviour of a wire under gradually increasing load.

16) Explain how surface tension can be measured experimentally.

17) Derive a relation between the two specific heat capacities of gas on the basis of first law of thermodynamics.

18) Prove that the average kinetic energy of a molecule of an ideal gas is directly proportial to the absolute temperature of the gas.

NOTE: (i) Answer any two of the following 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 60 kg of water per minute from a well 25m deep and to eject it with a speed of $50ms^{-1}$ Calculate the power required to perform the above task.

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.

The bob of a pendulum is made of a hollow brass sphere. What happens to the time period of the pendulum, if the bob is filled with water completely? Why?

21) State and explain Newton's law of cooling . State the conditions under which Newton's law of cooling is applicable.

A body cools from 60^0c to 40^0c in 7 minutes. What will be its temperature after next 7 minutes if the temperature of its surroundings is 10^0c?