6. An open pipe has fundamental frequency 'f'. What is the fundamental frequency if one of its ends closed.

7. Initial volume and pressure of a gas are V and P. It is adiabatically expanded to a volume 4V. What is the new pressure (γ= 1.5)

8. Velocity-time graph of a body is a straight line. What does this imply.

Question 9 – 16 carry 2 marks each :

9. What do you mean by recoil of a gun. Obtain an expression for recoil velocity.

10. Obtain the relation between linear velocity and angular velocity.

OR

A particle moves round a circle with constant speed. Derive an expression for the centripetal acceleration.

11. At what temperature will oxygen molecules have the same rms velocity as hydrogen molecules at 60°C. Molecular mass of hydrogen and oxygen - 2 and 32 respectively.

12. Frequency of vibrations of a string (f)may depend on (1) length of the string *l*, (2) linear mass density m (3) tension T. Obtain an expression for frequency by dimensional method.

13. Show that the path followed by an oblique projectile is parabola.

14. Two planets are made of same materials. Find the ratio of acceleration due to gravity on their surfaces in terms of their radii.

15. Distinguish between reversible and irreversible process.

16. Derive Mayer's relation.

Question 17 – 25 carry 3 marks each :

17. Derive an expression for second cosmic velocity.

18. A ball falls on a floor from a height of 19.6m. Calculate the velocity with which it strikes the ground. To what height will the ball rebounce if it loses 25% of its energy on striking the floor. ($g = 9.8 m/s^2$)

19. Derive expression for displacement of a progressive wave.

20. Show that average kinetic energy of a molecule is proportional to temperature.

21. Define angular momentum. Obtain the relation $L = I\omega$.

22. A grindstone has moment of inertia of $6 kgm^2$ about its axis. A constant torque is applied and the grindstone is found to acquire a speed of 150r.p.m. in 10 seconds after starting from rest. Calculate the torque.

Contd.....3

M.E.S. INDIAN SCHOOL, DOHA – QATAR
MODEL EXAMINATION – JANUARY 2014

SUBJECT : PHYSICS

Class : XI (CBSE) Time : 3 Hrs. Max. Marks: 70

SET : B

General Instructions :

- *All questions are compulsory.*
- *There is **29** questions in total. Question numbers **1 to 8** are very short answer questions, and carry **1** mark each.*
- *Question numbers **9 to 16** are short answer questions, carrying **2** mark each.*
- *Question numbers **17 to 25** are short answer questions, carrying **3** mark each.*
- *Question number **26** is value –based question carrying **4** marks.*
- *Question numbers **27 to 29** are long answer questions, carrying **5** mark each.*
- *There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all three questions of 5 marks each. You have to attempt only one of the given choices in such questions.*
- *Draw neat and labelled diagrams wherever necessary.*
- *Take value of $g = 10m/s^2$*
- *Use of calculators is not permitted. However, you may use log tables if necessary.*

1. Write a physical quantity which has same dimensional formula as that of energy.

2. Write the formula for the pressure exerted by a liquid column of height 'h' and density 'ρ'.

3. Write the condition necessary for a motion to be SHM.

4. Can bodies with different velocities have the same acceleration ? Explain.

5. A wire loaded with 'mg' extends by 'l'. Find the work done.

(This question paper contains 03 pages)

Contd....2