HOLIDAY HOME WORK – 2017.

CLASS: A. LEVEL.

MATHEMATICS

Book--Pure mathematics (Sophie Goldie) 1(A)--9,10,11,15,17,21,25,28
Exercise 1(B)--6,7,10, 17 to 21
Exercise 1(C)--4(vi),5(IV),7
Exercise 2(A)--3(vii,x) , 4(vi to x), 5(vi), 6(vii)
Exercise 2(B)--3,5,11
Exercise 2(C)--4,5(IV),6,9

CHEMISTRY

a.) Write the definition of mole no.
b.) What is stoichiometry
c.) Write general formula alcohol and acid
d.) Write formula of methl benzene and nitro benzene
e.) Convert benzene to chloro benzene
f.) Convert benzene to iodo benzene

PHYSICS:

Exercise on the chapter Uniform Circular motion, Qscillations including numerical to be done.

Additional problems are given for practice:

1 On an open ground, a motorist follows a track that turns to his left by an angle of 600 after every 500 m. Starting from a given turn, specify the displacement of the motorist at the third, sixth and eighth turn. Compare the magnitude of the displacement with the total path length covered by the motorist in each case.

2 An insect trapped in a circular groove of radius 12 cm moves along the groove steadily and completes 7 revolutions in 100 s.
(a) What is the angular speed, and the linear speed of the motion? (b) Is the acceleration vector a constant vector ? What is its magnitude ?

3. (a) A child stands at the centre of a turntable with his two arms outstretched. The turntable is set rotating with an angular speed of 40 rev/min. How much is the angular speed of the child if he folds his hands back and thereby reduces his moment of inertia to 2/5 times the initial value ? Assume that the turntable rotates without friction.
(b) Show that the child's new kinetic energy of rotation is more than the initial kinetic energy of rotation. How do you account for this increase in kinetic energy?

4. A rope of negligible mass is wound round a hollow cylinder of mass 3 kg and radius 40 cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30 N ? What is the linear acceleration of the rope ? Assume that there is no slipping.

5. To maintain a rotor at a uniform angular speed or 200 rad s-1, an engine needs to transmit a torque of 180 N m. What is the power required by the engine ?
(Note: uniform angular velocity in the absence of friction implies zero torque. In practice, applied torque is needed to counter frictional torque). Assume that the engine is 100% efficient.

6. A man stands on a rotating platform, with his arms stretched horizontally holding a

5 kg weight in each hand. The angular speed of the platform is 30 revolutions per minute. The man then brings his arms close to his body with the distance of each weight from the axis changing from 90cm to 20cm. The moment of inertia of the man together with the platform may be taken to be constant and equal to 7.6 kg m2.
(a) What is his new angular speed? (Neglect friction.)
(b) Is kinetic energy conserved in the process? If not, from where does the change come about?

7. . From point 4 above, given amplitude or energy, phase of motion is determined by the initial position or initial velocity.

8. . A combination of two simple harmonic motions with arbitrary amplitudes and phases is not necessarily periodic. It is periodic only if frequency of one motion is an integral multiple of the other's frequency. However, a periodic motion can always be expressed as a sum of infinite number of harmonic motions with appropriate amplitudes.

9. The period of SHM does not depend on amplitude or energy or the phase constant. Contrast this with the periods of planetary orbits under gravitation (Kepler's third law).

10. The motion of a simple pendulum is simple harmonic for small angular displacement.

11. Which of the following examples represent periodic motion?
(a) A swimmer completing one (return) trip from one bank of a river to the other and back.
(b) A freely suspended bar magnet displaced from its N-S direction and released.
(c) A hydrogen molecule rotating about its centre of mass.
(d) An arrow released from a bow.

12. Which of the following examples represent (nearly) simple harmonic motion and which represent periodic but not simple harmonic motion?
(a) the rotation of earth about its axis.
(b) motion of an oscillating mercury column in a U-tube.
(c) motion of a ball bearing inside a smooth curved bowl, when released from a point slightly above the lower most point.
(d) general vibrations of a polyatomic molecule about its equilibrium position.

13 Which of the following functions of time represent (a) simple harmonic, (b) periodic but not simple harmonic, and (c) non-periodic motion? Give period for each case of periodic motion (is any positive constant):
(a) sin t – cos t
(b) sin3 t
(c) 3 cos (/4 – 2 t)
(d) cos t + cos 3 t + cos 5 t
(e) exp (– $2t2$)
(f) 1 + t + $2t2$

14. A particle is in linear simple harmonic motion between two points, A and B, 10 cm apart. Take the direction from A to B as the positive direction and give the signs of velocity, acceleration and force on the particle when it is
(a) at the end A,(b) at the end B, (c) at the mid-point of AB going towards A,

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