**S5 HOLIDAY EXERCISE TERM 2**

**Instructions : ( Attempt all questions)**

**01.** Fill the missing using the words **global warming; greenhouse gases; smog; fossil fuel; ozone depletion ; acid rain6pts**

1. \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ refers to the rise in the world’s average temperature due to air pollution.
2. \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_ are gases in the atmosphere that absorb and emit radiation, causing the greenhouse effect.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a mixture of smoke and fog in the atmosphere.
4. \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_is a non-renewable source of energy formed from the remains of dead plants and animals.
5. \_\_\_\_\_\_ \_\_\_\_\_ is the reduction of the amount of ozone

 f) The water sources and the land are polluted by \_\_\_\_\_\_ \_\_\_\_\_\_\_\_ when exhaust gases dissolve in the rain

**02:** To and fro oscillatory motion in which acceleration of body is directly proportional to displacement of body from mean position and is always directed towards mean position is known as

 A. compressional motion C. damped motion

**B**. simple harmonic motion D. none of the above**1pt**

**03:** Time taken by simple pendulum to complete one cycle is called its

**A.**time period B. amplitude C. frequency D. wave length**1pt**

**04:** One complete round trip of a vibrating body about its mean position is called one

 A. wave length B. time period C. amplitude **D.** vibration**1pt**

**05:** Time period of simple pendulum 1 m long at a location where g=10ms-1will be

 A. 2.5 s B. 1.5 s C. 3 s **D**.1.99 s**1pt**

**06:** Velocity of simple harmonic motion at mean position is always

**A.**Maximum B. minimum C. zero D. negative**1pt**

**07.** a) List the type of damped oscillations**3pts**

b) How does damping force affect the amplitude of oscillations?**2pts**

c) When does resonance of system occur?**2pts**

**08.**a) How does nuclear power plant function?**4pts**

b) Does nuclear power plant produce greenhouse gases?**3pts**

**09.**a) State Newton’s law of gravitation.**2pts**

b) prove the escape velocity for Earth is 1.119x104m/s, mass of

the earth is 5.98x1024kg, itsradius is 6.37x106m and G= 6.67X10-11 Nm2/kg2

**3pts**

 c) Verify the Kepler’s third law of planetary motion ( )**5pts**

**10.** Two parallel metal plates P and Q each of length l=4cm. a p.d of 12V is applied between them. The space between P and Q is virtual which is 4cm. A beam of electrons of speed 1.0x106m/s is directed mid-way between P and Q at right angles to the electric field between P and Q. show that the electrons beam emerges from the space between P and Q at an angle 64.60 to the initial direction of the beam.**5pts**

 **11**. Find the time taken for a particle moving in S.H.M. from **A/2 to –A/2**. Given that the period of oscillation is 12seconds.**5pts**

**12**. Explain the environmental problems of fossil fuels.**6pts**

**14.**Consider an helical spring suspended vertically from a fixed point. Place a mass m on it. if the mass is pulled down a little and then released, it vibrates up and down.

a) By considering the forces on the mass, show that the motion is simple harmonic motion and derive the time period. Assume that the spring obeys Hookes law. The resistance of air is negligible. **6pts**

 **b)** A 0.5kg stone attached to the end of an ideal spring with force constant k=450N/m, undergoes simple harmonic motion with amplitude of 0.04m. Compute:

 i) maximum speed of the stone . **2pts**

 ii) the speed of the stone when it is at x = -0.015m . **2pts**

 iii) the acceleration of the stone when it is at x = -0.015m . **2pts**

 iv) the total mechanical energy of the stone at any point in its motion . **2pts**

 v) state the law used to solve the question 14(a) . **1pts**

**15. a)** State Kirchhoff’s junctions and loop rules **4pts**

 b) give the sign convention for electromotive force and voltages drops across the resistor in applying loop rule.**4pts**

 **c)** find the reading of idealized ammeter and voltmeter and show the direction of current clearly**7pts**



**16.** a) By Huygens’ luminiferous ether is a hypothetical medium which is present in vacuum as well as in all material objects. Give 4 properties attributed to ether since it couldn’t be detected.**4pts**

 b) State the Huygens’ principle of the wave theory of light **3pts**

 c) Briefly describe limitations of Huygens’ wave theory of light **4pts**

 d) Explain the principle of complementarities.**4pts**

**17.**A travelling wave is described by the equation y(x, t) = 0.003 cos (20x + 200t) where y and x are measured in metres and t in seconds.

 a) What is the direction in which the wave is travelling? **1pt**

 b) Calculate the following physical quantities:

 (i) angular wave number **2pts** (ii) wavelength **1pt** (iii) angular frequency **1pt** (iv) frequency **1pt** (v) time period**1pt**  (vi) wave speed **1pt**

(vii) amplitude **1pt** (viii) particle velocity when x = 0.3 m and t = 0.02 s**3pts**

 (ix) particle acceleration when x = 0.3 m and t = 0.02 s**3pts**

**18.** If a photo emissive surface has a threshold wavelength of 0.65x10-6m, calculate,

1. Its threshold frequency**2marks**
2. Its work function in electronvolts and **2marks**
3. The maximum speed of the electrons emitted by violet light of wave length 0.40x10-6m. (take c=3x108m/s h= 6.6x10-34Js, e= 1.6x10-19C, and mass of electron m = 9.1x10-31kg)**3marks**

19. consider two point electric charges Q1= 2.5 x10-6C in (0, 6cm) and

Q2= -4.2x10-6C at (-8cm,0) in a coordinate system oxy.

 Determine the magnitude or the intensity and direction of the electric field at the point P located at the origin of coordinates (0,0)**10marks**

**20.** A particle is projected from a point on a horizontal plane and has an initial velocity of 45 m/s at an angle of elevation of tan-1(3/4). Find the time of flight and the range of the particle on the horizontal plane**. 5marks**