ALLEN CAREER INSTITUTE

PRELIMINARY EXAM : 2019-20

Paper Set : SET-I(HT) **SUBJECT : Physics** **Max Marks : 80**

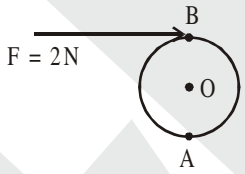
ICSE Board - Sample Paper - 1 **Duration : 2 Hrs.**

General Instructions :

- *You will not allowed to write during the first 15 minutes.*
- *This time is to be spent in reading the question paper*
- *The time given at the head of this paper is the time allowed for writing the answers.*
- *Use of calculator and mobile devices are not allowed.*
- *Section A is compulsory. Attempt any four question from Section B.*

SECTION - A ---- (40 Marks)

Q.1 (A) A wheel of diameter 2m is shown in fig. Which axle at O. A force F = 2N is applied at B in the direction shown in figure. Calculate the moment of force about.



(i) the centre O and

(ii) the point A

(B) (i) On what factors does the position of the centre of gravity of a body depend ? **(2 M)**

(ii) What is the S.I unit of the moment of force ?

(C) Is it possible to have an accelerated motion with a constant speed ? Explain. **(2 M)**

(D) A type of single pulley is very often used as a machine even though it does not give any gain in mechanical advanatage. **(2 M)**

(i) Name the type of pulley used.

(ii) For what purpose is such a pulley used ?

(E) Prove that force = Rate of change of momentum. **(2 M)**

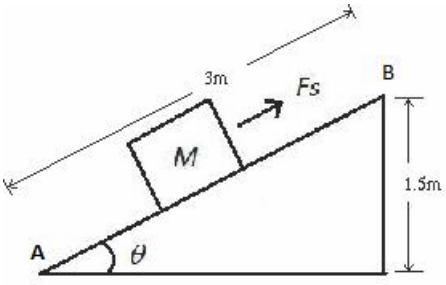
Q.2 (A) Convert 1 eV energy into C.G.S system of units. **(2 M)**

(B) State the energy changes in the following while in use : **(2 M)**

(i) Photoelectric cell.

(ii) Nuclear Reactor.

(C) A block of mass 30 kg is pulled up a slope with a constant speed by applying a force of 200 N parallel to the slope. A and B are initial and final positions of the block.



(i) Calculate the work done by the force in moving the block from A to B.

(ii) Calculate the potential energy gained by the block. **(2 M)**

(D) You are provided with a printed piece of paper. Using this paper how will you differentiate between a convex lens and a concave lens ? **(2 M)**

(E) (i) How is the refractive index of a medium related to its depth and apparent depth ? **(2 M)**

(ii) Which characteristic property of light is responsible for the blue colour of the sky ? **(2 M)**

Q.3 (A) State the factor that determines :

(i) the pitch of a note

(ii) the loudness of the sound heard and

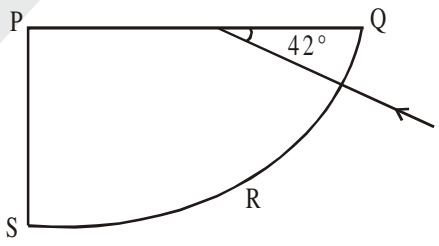
(iii) the quality of the note **(2 M)**

(B) Three heaters each rated '250 W, 100 V' are connected in parallel to a 100 V supply. Calculate :

(i) the total current taken from the supply

(ii) the resistance of each heater. **(2 M)**

(C) A ray of light enters a glass slab PQRS, as shown in the diagram. The critical angle of the glass is 42°. Copy this diagram and complete the path of the ray till it emerges from the glass slab. Mark the angles in the diagram wherever necessary. **(2 M)**



(D) When acoustic resonance takes place, a loud sound is heard. Why does this happen ? Explain. **(2 M)**

(E) An electrical appliance is rated at 1000 KV, 220V. If the appliance is operated for 2 hours, Calculate the energy consumed by the appliance in : **(2 M)**

(i) kWh (ii) joule

Q.4 (A) (i) What is an a.c generator or Dynamo used for ? **(2 M)**

(ii) Name the principle on which it works ?

(B) Which of the radioactive radiations : **(2 M)**

(i) Can cause severe genetical disorder

(ii) are deflected by an electrical field ?

(C) 1300 J of heat energy is supplied to raise the temperature of 0.5 kg of lead from 20°C to 40°C. Calculate the specific heat capacity of lead. **(2 M)**

(D) (i) Why does a current carrying freely suspended solenoid rest along a particular direction ?

(ii) State the direction in which it rests. **(2 M)**

(E) Why does the heat supplied to a substance during its change of state not cause any rise in its temperature ? **(2 M)**

SECTION - B ---- (40 Marks)

Q.5 (A) Draw a simplified diagram of a lemon crusher, indicating direction of load and effort. **(3 M)**

(B) A fixed pulley is driven by a 100 kg mass falling at a rate of 8.0 m in 4 sec. It lifts a load of 75.0 kgf. Calculate :

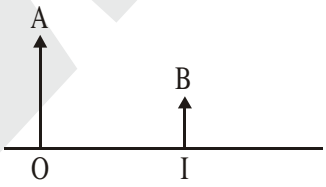
(i) the power input to the pulley taking the force of gravity on 1kg as 10 N.

(ii) the efficiency of the pulley and

(iii) the height to which the load is raised in 4.0 sec.

(C) Distinguish between Forced vibration and Resonant vibration.

Q.6 (A) In figure, OA is the object and IB is the image formed by a lens.



(i) Complete the diagram. Locate the lens and mark the focus of the lens by the letter F.

(ii) State the condition when a lens is called on equiconvex or equiconcave. **(3 M)**

(B) Varshita puts a pencil into a glass container having water and is surprised to see the pencil in different state **(4 M)**

(i) What change is oberved in the apperance of the pencil ?

(ii) Name the phenomenon responsible for the change.

(iii) Draw a ray diagram how the eye sees the pencil.

(C) (i) Light passes through a rectangular glass slab and through a traingular glass prism. In what way does the direction of the two emergent beams differ and why ?

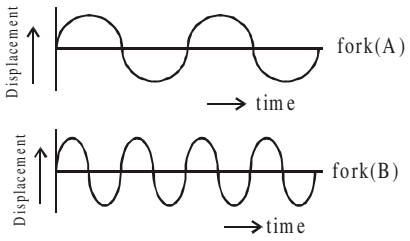
(ii) How will you increase the magnifying power of microscope. **(3 M)**

Q.7 (A) The equivalent resistance of two conductors in series is 40Ω and their equivalent resistance becomes 6.4Ω when connected in parallel. Find the individual resistances. **(3 M)**

(B) (i) How does the frequency of sound given by stretched string depend on its

(a) Length (b) Tension

(ii)



(a) Which fork has higher pitch and why.

(b) Which fork has higher loudness. **(3 M)**

(C) (i) Explain why stringed musical instruments, like the gitar, are provided with a hollow box.

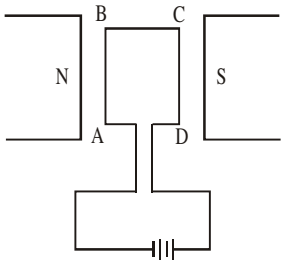
(ii) An observer stands at a certain distance away from a cliff and produces a load sound. He hears the echo of the sound after 1.8s. Calculate the distance between the cliff and the observer if the velocity of stand in air is 340 m/s **(4 M)**

Q.8 **(A)** (i) Name the device used to increase the volatge at a generating station. **(3 M)**

(ii) At what frequency is A.C supplied to residential houses ?

(iii) Name the wire in a household electrical circuit to which the switch is connected.

(B) A rectangular coil ABCD having a battery connected between its ends A and D is placed in between the pole pieces of a horseshoe magnet as shown in figure. **(3 M)**



(i) What is the direction of current in the coil ?

(ii) What is the direction of force on each arm ?

(iii) What is the effect of the forces on coil ?

(C) (i) Name the principle on which a transformer works. **(4 M)**

(ii) What is the function of a step up transformer ?

(iii) Draw a simple labelled diagram of a step down transformer.

(iv) Can a transformer work when it is connected to a d.c source ? Give reason.

Q.9 (A) A mass m_1 of a substance of specific heat capacity c_1 at temperature t_1 mixed with a mass m_2 of other substance of specific heat capacity c_2 at a lower temperature t_1. Deduce the expression for the temperature t of the mixture. State the assumption made, if any. **(3 M)**

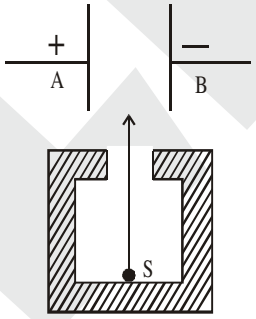
(B) 2 kg of ice melts when water at 100°C is poured in a hole drilled in a block of ice. What mass of water was used ? Given : specific heat capacity of water = 4200 J/Kg K, specific latent heat of ice = 336×10^3 J/Kg **(4 M)**

(C) Explain the following : **(3 M)**

(i) The surrounding become pleasantly warm when water in a lake starts freezing in cold countries.

(ii) The heat supplied to a substance during its change of state, does not cause any rise in its temperature.

Q.10 (A) Figure shows a radioactive sources S in a thick lead walled container having a narrow opening. The radiations pass through an electric field between the plates A and B. **(3 M)**



(i) Complete the diagram to show the paths of α, β and γ radiations.

(ii) Why is the source S kept in a thick lead walled container with a narrow opening ?

(B) (i) Complete the following nuclear fission reactions : **(3 M)**

(a) ${}^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}_{56}Ba \quad {}^{92}Kr \quad 3{}^{1}_{0}n$ .....

(b) ${}^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{148}La \quad {}^{85}_{35}Br$ ..... ${}^{1}_{0}n$ energy

(ii) What do you mean by the chain reaction in nuclear fission ?

(C) (i) Give two differences between Radioactive decay and Nuclear fission. **(4 M)**

(ii) In fussion of one uranium-235 nucleus the loss in mass is 0.3 a.m.u. Calculate the energy released.