Paper 1 (Physics)

(One hour and a half)

moments as this paper must be written on the paper provided separately.

The way NOT be allowed to write during the first 15 minutes.

This time is to be spent in reading the question paper.

for writing the answers.

Section I is compulsory. Attempt any four questions from Section II.

The mended marks for questions or parts of questions are given in brackets [].

SECTION I (40 Marks)

Compulsory: To be attempted by all candidates.

(i) What is the weight of a body of mass 12 kg? What is the force acting on it? ($g = 10 \text{ m/s}^2$).

To use a machine as a force multiplier, what type (class) of lever should preferably be used? Draw a sketch of such a lever.

State if pressure at a point in a liquid is a vector or a scalar quantity.

- A block of wood is so weighted that it just floats in water in a jar at room temperature.
 - If the water is now heated, what change will occur in the state of floatation of the block?
 - If the water in the jar is cooled to 4°C, what change will be observed in the state of floatation?
 - 3. Give reasons for the above.

[4]

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This paper consists of 7 printed pages and 1 blank page.

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ena cristad	Sector republic Corres		This namer consists of 7 primes pages and 1 blank page	
	(j)	(i)	What is carbon-14 dating?	
			of radioactive decay.	[4]
	a stur be	ta Iliw s	number A of the parent nucleus brought about by the two types	[5]
		(ii)	Show by equations, the effect on the proton number Z and mass	
	(i)	(i)	Name the particles given out during radioactive decay.	
	jar	(ii)	How does earthing prevent electrical shock?	[4]
			electricity?	F 4 7
			Ks.2 per unit, what is the expenditure for the family per day, on	
			of 1000 W, each for 8 hours a day. If the cost of electricity is	
	(h)	(i)	A family uses a light bulb of 100 W, a fan of 100 W and a heater	
		(iv)	acting on it? ($g = 10 \text{ m/s}^{\circ}$).	[4]
		(iii)	(a) (i) What is the weight of a body of mass 12 kg rasy thgil	
		(ii)	Kilowatt hour	Ques
		(i)	Kilowattibuos Ila ed batquesta ad officialitatione	
	(g)	Nam	e the physical quantity that is measured in:	
		(ii)	Mention one practical use of echoes.	[4]
	(8)	in to:	resonance.	
	(f)	(i)	Give one example each of natural vibration, forced vibration, and	Ècore contenter 1
		(ii)	Draw the diagram of the ring main circuit.	[4]
	(e)	(i)	Explain why one feels Ice-cream at 0°C colder than water at 0°C.	
		(ii)	Name the extreme colours in a pure spectrum of light.	[4]
			through a red glass and black when seen through a blue glass?	
	(d)	(i)	Explain why in day light, an object appears red when seen	
		(iii)	Two characteristics of the image formed by the lens.	[4]
		(ii)	What is meant by f-number?	
	(•)	(i)	The nature of the lens used.	
	(c)	In an	optical camera state:—	

Given OC = f, the focal length of the lens. Copy the diagram in your answer book. Draw two rays from the linear object OO_1 and obtain the image formed by the lens.

SECTION II (40 Marks)

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Attempt any four questions.

A pair of scissors and a pair of pliers belong to the same class of levers.

Which one has a mechanical advantage less than 1?

- State the usefulness of such a machine whose mechanical advantage is less than 1.
- A truck driver starts off with his loaded truck. What are the major emergy changes that take place in setting the truck into motion?
- A glass jar contains a liquid of density 'd' upto a height 'h' at a place where acceleration due to gravity is g. The atmospheric pressure is P_A .
 - That is the pressure at the free surface of the liquid?
 - The an expression for the total pressure at the base of the jar.

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(iii) What will be the lateral pressure at this depth on the inner side of the jar?

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Question 3

- (a) (i) State three characteristics of a musical sound.
 - (ii) How does the musical sound differ from noise?
- (b) (i) How does a stretched string on being set into vibration, produce an audible sound?
 - (ii) Will this sound be audible if the string is set into vibration on the surface of the moon? Give reasons for your answer.

[4]

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[2]

(c) Radio waves of speed 3 x 10^8 m/s are reflected off the moon and received back on earth. The time elapsed between the sending of the signal and receiving it back at the earth station is 2.5 seconds. What is the distance of the moon from the earth?

Question 4

The diagram below shows the path of a ray of light, through a rectangular glass block placed in a liquid of uniform density.



- (a) (i) Does the light speed up or slow down in glass?(ii) Give reasons for your answer.
- (b) What is the angular deviation of the emergent ray from the glass block with respect to the incident ray? [1]
- (c) Show with the help of a ray diagram, the path of the ray when incident normally on the first surface of the glass block, through the block and the liquid.

T 01 521

- The should be the ratio of the speed of light through the liquid to the speed through glass so that there is no refraction of light at the mondances of the glass block when the system is illuminated by light
- see the equation for the relation between the frequency and
 - What is the relation between the angle of incidence i in the liquid and the angle of refraction r in the glass?
 - The second provide the second pr
 - The list the quantity of heat released per kg of water per 1°C fall in temperature?
 - Calculate the heat energy released by water in the experiment, in cooling from 70°C to 45°C.
 - (iii) Assuming that the heat released by water is entirely used to raise the temperature of the calorimeter from 15°C to 45°C, calculate the specific heat capacity of copper.
- Define the emf (E) of a cell and the potential difference (V) across a resistor R in terms of the work done in moving a unit charge. State the relation between these two works and the work done in moving a unit charge through a cell connected across the resistor. Take the internal resistance of the cell as r. Hence obtain an expression for the current I in the circuit.

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- (a) A bulb is marked 100 W, 220 V and an electric heater is marked 2000 W, 220 V.
 - (i) What is the ratio between the resistances of these two devices?
 - (ii) How does the power-voltage rating of a device help us to decide about the type of leads (connecting wires) to be used for it?
 - (iii) In which of the above two devices, a thicker connecting wire or lead is required?

[5]

[5]

- (b) Draw a representative diagram of a DC motor. Label the following in your diagram.
 - (i) The field magnet
 - (ii) The armature
 - (iii) Commutators
 - (iv) Wire brushes

What is the energy change involved in this case?

Question 7

(a) The following diagram is of the simplified version of an electron gun which is an integral part of a cathode ray tube. 'A' is a filament and 'B' is a metal cylinder.



T 01 521

B

Copy the diagram in your answer book. Draw a pair of plates P_1 and P_2 to apply electric field, a screen S and an enclosure.

[5]

[3]

what are the functions of A, B, P_1 and P_2 ?

 $\xrightarrow{\beta} Al \xrightarrow{\gamma}$

In the above nuclear reaction

- β β β particle and is transformed to Aluminium. Write the mass number and the atomic number of Aluminium.
- Aluminium emits a γ ray. What is the resulting nucleus?
- maximum biological damage?

7

State three precautions that must be taken while handling a
radioactive source. [2]

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