Answer to this paper must be written on the paper provided separately.

*You will **not** be allowed to write during the first **15** minutes.*

This time 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.

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

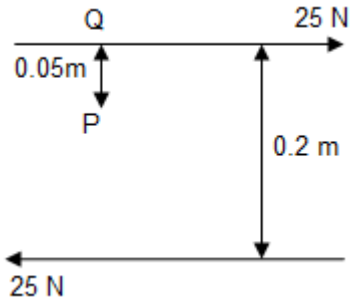
The intended marks for questions or parts of the questions are given in brackets [ ].

SECTION I (40 marks)

Question 1.

(a) What are the factors affecting the rotational effect of a body ? [2]

(b) From the following figure calculate the moment of force about point P.



[2]

(c) What is the relationship between the mechanical advantage and the velocity ratio for:
(i) an ideal machine (ii) a practical machine. [2]

(d) Draw a labeled diagram to show a pulley system whose actual mechanical advantage is less than one. [2]

(e) A bullet of mass 50 g leaves the barrel of a gun with a velocity of 200 ms^{-1}. Find the kinetic energy of the bullet. [2]

Question 2

(a) Draw a diagram to show the bending of light by 180 degrees using a prism. [2]

(b) the velocity of light in diamond is 121000 kms-1. Find its refractive index. [2]

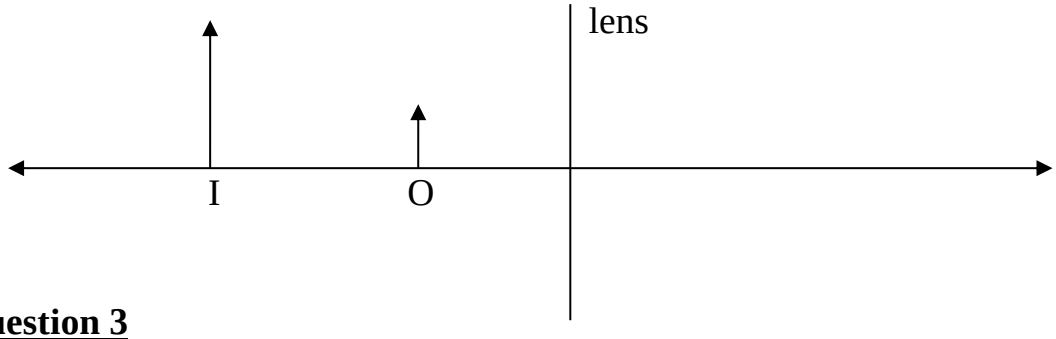
(c) Explain why is it better to cool a drink with ice pieces than using ice cold water?[2]

Cont. 2..

Question 2(Continue)

(d) The ratio of the amplitudes of two waves is 4 : 9. Find the ratio of their intensities.[2]

(e) Name the lens and one application of the following ray diagram.



[2]

Question 3

(a) Draw a graphical representation for ohmic conductors. [2]

(b) What are damped vibrations ? Give one example. [2]

(c) The turn ratio of a transformer is 1:20. If the supplied a.c source is 220 V, find the output voltage. [2]

(d) Give two uses of infrared rays. [2]

(e) A young science student is surprised to see water boiling at 115°C. What can be the possible reasons for this. [2]

Question 4

(a) Name the radioactive ray which is (i) most ionizing (ii) most penetrating. [2]

(b) State two causes of the energy loss in a transformer. [2]

(c) Name the characteristics of a fuse wire. [2]

(d) How do you tune your radio set to a particular station ? Name the phenomenon involved in doing so and define it. [2]

(e) Name and explain the reaction occurring on the sun. [2]

Section II (40 marks) (Attempt any 4)

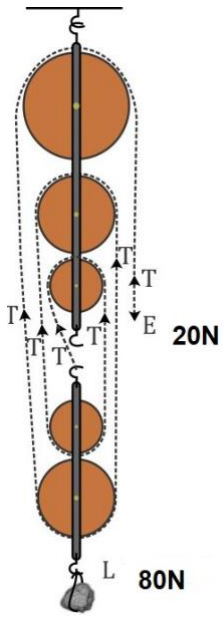
Question 5

(a) Justify giving proper reasons, whether the work done in the following cases is negative positive or zero:
(i) A man lifts a bucket out of a well, by means of a rope tied to the bucket.
(ii) the work done by the gravity in the above case.
(iii) Work done by the brakes of a car when applied. [3]

Cont. 3..

Question 5(continued)

(b) In the given diagram, find the efficiency.



[3]

(c) (i) What is couple? (ii) What is its S.I unit? (iii) is it a scalar or a vector ? (iv) Give an example of a couple in our daily life. [4]

Question 6

(a) Give two factors on which lateral displacement depends. [2]

(b) What is mirage ? What is the principle behind mirage ? [2]

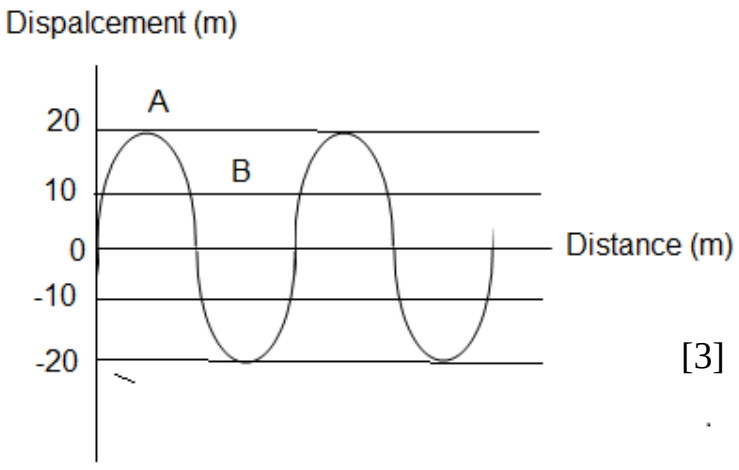
(c) Draw a ray diagram to get a real inverted and a magnified image. [2]

(d) (i) Why is the rising sun appear red ?
(ii) How are ultraviolet rays and infrared rays detected? [4]

Question 7

(a) Name the three characteristics of sound. Name the factors on which it depends. [3]

(b) A displacement time graph of two waves A and B travelling in the same medium is shown in the diagram. Study the two waves and find the ratio of its (i) amplitude (ii) loudness and (iii) its pitch.



[3]

(c) What is resonance ? What are the conditions for resonance ? Give two examples of resonance. [4]

Cont..4

Question 8

(a) (i) What is the main advantage of alternating current over a direct current for the purpose of supplying power ?
(ii) Why is it necessary to raise the emf to a high value when electricity is transmitted over a long distance ?
(iii) What is the voltage of electricity supplied to our houses ? [3]

(b) Draw a diagram of a dual control switch when the appliance is switched ON. [3]

(c) Find the resistivity and conductivity of a wire of length 20 cm and the area of cross section is 4×10^{-4} m^2, If its resistance is $1.5 \times 10^{13} \Omega$. [4]

Question 9

(a) One kilogram of ice at 0ºC is heated at a constant rate and its temperature is recorded after every minute till steam is formed at 100ºC. Draw a temperature time graph to represent the above changes. [3]

(b) The total heat needed to convert 1 kg of ice at -10^0C to water at 100^0C is 7.77×10^5 J. Calculate the specific latent heat of ice.
[Sp. Heat capacity of ice = 2100 J. Kg^{-1}. K^{-1}
Sp. Heat capacity of water = 4200 J. Kg^{-1}. K^{-1}] [3]

(c) Give two similarities and two differences between a D.C motor and an A.C generator. [4]

Question 10

(a) (i) State the medical use of radioactivity.
(ii) A nucleus does not contain electrons, but it can emit electrons. How ? [3]

(b) (i) An atomic nucleus composed of 84 protons and 128 neutrons. The nucleus A emits an alpha particle and a beta particle. As a result it is transformed to nucleus B. What is the Atomic number and atomic mass number of B ? [3]

(c) (i) What is electromagnetic induction ?
(ii) State Lenz's law.
(iii) Name a device working on the principle of electromagnetic induction. [4]

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