Maneckji Cooper Education Trust School, Juhu Tara Road, Mumbai 400 049

PRELIMINARY EXAMINATION, 2019

Marks: 80 Date: 11-01-2019

Time: 2 HOURS Std: X

Subject: Physics

SECTION A

Answer all the questions

Question 1

a) Define work. State its S.I. unit. 2

b) State two differences between centripetal and centrifugal force. 2

c) A man exerts a force of 100N in pulling a cart at a constant speed of 20m/s. Calculate the power spent by the man. 2

d) State two differences between class I and class II lever. 2

e) What is the use of the lever if its mechanical advantage: 2

i) More than one

ii) Equal to one

Question 2

a) A light ray suffers reflection and refraction at the boundary in passing from air to water. Draw a diagram and label angle of incidence, angle of reflection and angle refraction. 2

b) For which colour of white light, is the refractive index of a transparent medium: 2

i) Least

ii) Most

c) Give scientific reason: A tank appears shallow than its actual depth. 2

d) State the essential conditions for total internal reflection to take place. 2

e) State two properties of ultra violet radiations which differ from visible light. 2

Question 3

a) State two differences between light and sound waves. 2

b) Define forced vibrations. What can you say about the amplitude of a body undergoing forced vibration? 2

c) Comment on the statement: Pitch of a sound is subjective in nature, while frequency is objective in nature. 2

d) Two wires of the same material and same length have radii 1mm and 2 mm respectively. Compare their: 3

i) Resistance

ii) Specific resistance 1

e) Define internal resistance of a cell.

Question 4

a) An electric bulb is rated 240v, 100w. What information does this convey? Calculate the current in the bulb. 2

b) A bulb of power 50w is used for 12 hrs a day. Calculate the energy consumed in a day. 2

c) What is a transformer? What is its principle? 2

d) Define specific heat capacity and state its SI unit. 2

e) What are background radiation? Give one example. 2

Section B

Answer any four questions

Question 5

a) State:
   i) State principle of moments
   ii) Define uniform circular motion — 3

b) Draw a diagram of block and tackle system of pulleys having velocity ratio 5. In your diagram indicate clearly the points of application and the directions of the load L and effort E. Also mark the tension T in each strand. — 3

c) Give scientific reason for the following:
   i) In a single fixed pulley the velocity ratio is always more than the mechanical advantage.
   ii) A spanner has a long handle. — 4

Question 6

a) — 3
   i) Define critical angle:
   ii) The absolute refractive index of glass is 1.5. What do you mean by this statement?
   iii) The lower block of a block and tackle pulley system must be of negligible weight. Give reason.

b)

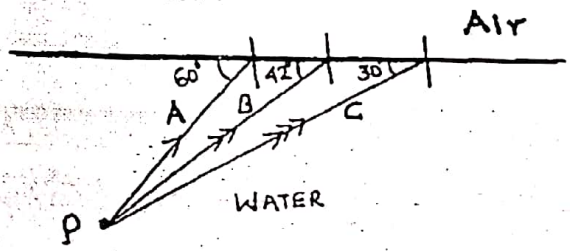


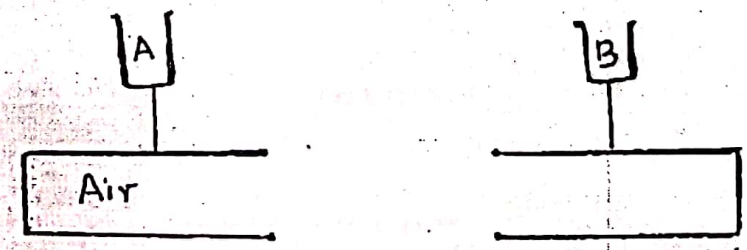
Figure shows a point source P inside a water container. Three rays A, B, C starting from the source P are shown upto the water surface. Show in the diagram the path of these rays after striking the water surface. The critical angle for water air surfaces 48°. Name the phenomenon which the rays A and C exhibit. — 4

c) A lens forms an upright and diminished image of an object. Draw a ray diagram to show the image formation. — 3

Question 7

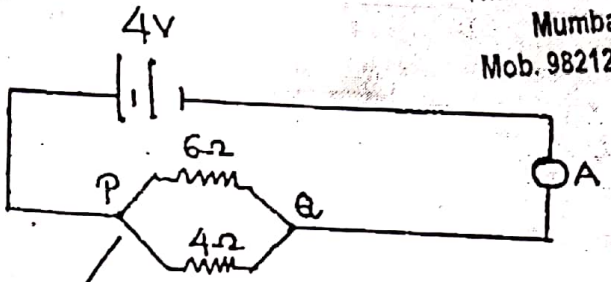
a) An object is placed at a distance of 20cm in front of a concave lens of focal length 20cm. Find the position of the image and the magnification of the image. — 3

b) What is a fuse? Where is it connected? What material is it made of? — 3



c) Figure shows two tuning forks A and B of the same frequency mounted on two sound boxes. The fork A is set into vibration: — 4
   i) Name the vibration that the air in the sound box undergoes and comment on its loudness along with the reason.
   ii) Name the vibration that the tuning fork B undergoes and comment on its loudness and amplitude.

Question 8



3

Calculate the equivalent resistance between P and Q and the reading of the ammeter.

Name the 3 connecting wires used in a household circuit. 3
Which of the two wires mentioned in part (i) are at the same potential?
In which of the wires stated in part (i) the switch is connected

Draw a circuit diagram representing a dual control switch, in the 'ON' position. 4
Which of the two cables 5A or 15A will be of thicker wire. Give reason for your answer.

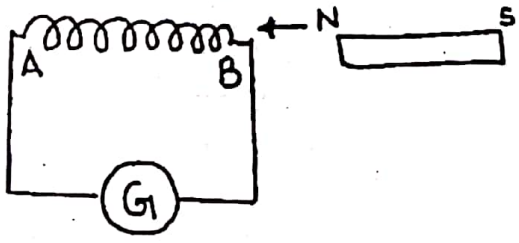
Question 9

a) Define the term specific latent heat of melting of ice. State its SI unit. 2
b) Give scientific reason for the following:
   i) The weather becomes very cold after a hail storm. 2
   ii) Food cooked faster in a pressure cooker. 2
c) 250g of water at 30^0 C is present in copper vessel of mass 50g. Calculate the mass of ice required to bring down the temperature of the vessel and its contents to 5^0C. 4

Specific latent heat of ice 336J/g
Specific heat capacity of water 4.2J/g/k
Specific heat capacity of copper 0.4J/g/k

Question 10

a) 3
   i) Define nuclear fusion and write one equation representing the reaction.
   ii) What is nuclear waste?
b) A nucleus $^{24}_{11}Na$ is radioactive:
   i) What are the numbers 11 and 24 called? 3
   ii) Write an equation representing the beta decay of the given nucleus
   iii) What name is given to the product nucleus with respect to $^{24}_{11}Na$
c)



4

The diagram shows a coil connected to a galvanometer and a magnet which moves in the direction shown in the diagram. Describe the observation in the galvanometer:

i) The magnet is moved rapidly
ii) The magnet is kept stationery after it has moved into the coil
iii) The polarity of the coil at A and B
iv) How would the observation in the galvanometer change if a more powerful magnet is used.