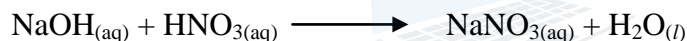


MCQ Questions

- (1) Some statements about the transmission of heat are given below.
- A → Conduction of heat is the transmission of heat in a particular direction through particles without a movement of the particle from place to place.
- B → Convection of heat is the transmission of heat with the movements of particles.
- C → Radiation of heat is the transmission of heat from place to place with the involvement of particles in a medium.

Which of the above statements are correct,

- i) A and B ii) B and C iii) A and C iv) A, B and C
- (2) When the following reaction was performed with 8g of NaOH 14 kJ of heat energy was released.



If 0.5 mol NaOH was used for the above reaction the amount of heat released will be, (Na – 23, O = 16, H – 1)

- i) 0.7 kJ ii) 70 kJ iii) 35 kJ iv) 7 kJ
- (3) What will be the amount of heat released when 200 g of brass pan cooled from 80 °C to 30 °C. (Specific heat capacity of brass – 380 Jkg⁻¹ °C⁻¹)
- i) $\frac{200}{1000} \times 380 \times 80$ J ii) $\frac{200}{1000} \times 380 \times 50$ J
- iii) $\frac{200}{1000} \times 380 \times 30$ J iv) 200 × 380 × 50 J

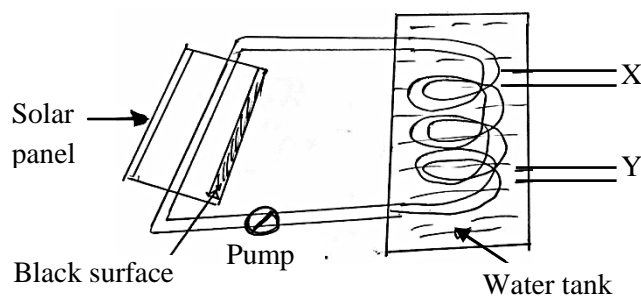
- (4) What is the average body temperature of a healthy person in Kelvin?
- i) 37 ii) 98 iii) 273 iv) 310

- (5) In order to make a mercury thermometer which will measure smaller changes in temperature accurately.
- i) Decrease the volume of the mercury bulb.
- ii) Put the degree marking further apart.
- iii) Decrease the diameter of the capillary tube.
- iv) Leave the capillary tube open to air.

- (6) Which of the following quantities is measured using the unit $\text{Jkg}^{-1} \text{K}^{-1}$?
- i) temperature ii) heat capacity
iii) specific heat capacity iv) energy
- (7) How much energy is required to raise the temperature of 21 g of water by 20 K if the specific thermal capacity of water is $4200 \text{ Jkg}^{-1} \text{K}^{-1}$.
- i) 10 J ii) 40 J iii) 441 J iv) 1764 J
- (8) Convection occurs in,
- i) liquids only ii) gases only iii) liquids and gases iv) solids and liquids
- (9) In which of the following processes is most of the thermal energy transferred from its source by radiation?
- i) Boiling water in a kettle.
ii) Baking a loaf of bread.
iii) Heating a room by means of hot water pipes.
iv) Cooking rice using an electric cooker.
- (10) The specific thermal capacity of metal block depends on,
- i) Mass of the block.
ii) Volume of the block.
iii) Temperature of the block.
iv) None of the above.

Structured Essay Questions

- (1) A set up used in house to heat water using solar power is shown below.



- i) What is the type of heat energy transferring methods are used in the following instances.
- a) Transfer of heat from sun to the solar panel.

.....

- b) Transfer of heat from heater to water in tank.

.....

ii) State the advantage of having blackened surface behind the solar panel.

.....

iii) What is the most suitable tube X or Y to take hot water out of the tank.

.....

iv) Give a reason of your answer in (iii).

.....

v) The tube of the setup made of copper, why copper is more suitable than Aluminium?

.....

vi) In 5 minutes the temperature of 5 kg of water increased by 40 °C. (Specific heat capacity of water is 4200 Jkg⁻¹ °C⁻¹) Calculate heat absorbed by water in 5 minutes.

.....

vii) Define the "specific heat capacity"

.....

(2) A) i) How much heat energy is needed for each of the following?

Use the specific thermal capacities given in the table.

Substance	Specific thermal capacity (Jkg ⁻¹ °C ⁻¹)
Water	4200
Aluminium	900
Copper	390
Concrete	850

a) To raise the temperature of 1.2 kg of aluminium by 25 °C.

.....

.....

b) To raise the temperature of 0.5 m³ of water in a tank from 20 °C to 70 °C. (Density of water = 1000kgm⁻³)

.....

.....

c) To heat a 50 kg concrete in a storage heater from 20 °C to 60 °C?

.....

d) To heat 2 kg of water in a copper kettle of mass 0.8 kg from 25 °C to the boiling point.

.....

B) i) State the following temperatures in the Kelvin scale.

i) 600 °C –

ii) 37 °C –

ii) State the following temperatures in the Celcius scale.

i) – 180 K –

ii) – 4 K –

Essay Questions

(1) A) i) It is required to design a solar panel in which 250 g of water will be heated from 10 °C to 30 °C each day. A panel of 1m² absorbs 5, 000, 000 J of radiant energy each day.

(Specific heat capacity of water is 4 200 Jkg⁻¹ K⁻¹)

Calculate,

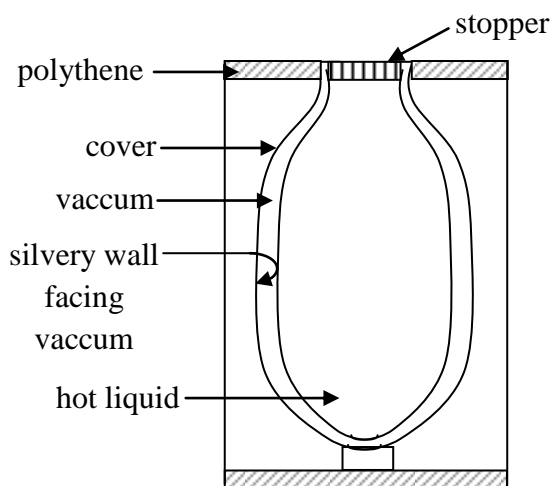
a) the required rise in temperature each day.

b) the energy that will be absorbed each day.

c) the required surface area of the solar panel.

ii) A solar panel said to be more environmentally friendly. Explain briefly what is meant by environmentally friendly?

B) Hot drinks can be kept in a vaccum flask.



The diagram shows a cross section of this type of flask.

i) Why does the inner flask have silvery surface?

ii) Polythene is used to hold the inner flask in position. Why polythene is chosen?

iii) Why it is important to keep the lid on this flask when it is filled with hot liquid?

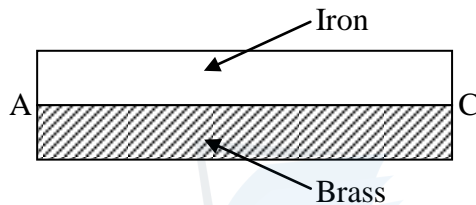
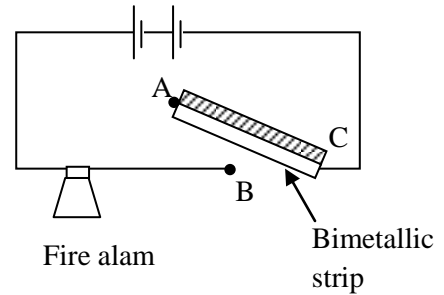
iv) This can be equally be used to keep cold thing cold. Briefly explain how this happens?

(2) Illustrated here is a rough sketch of a fire alarm system connected in a factory.

a) Have a high melting point is a property that should be possessed by a material with the outer covering of fire alarm. State one another property that it should possess.

b) Very often the heating coil of heat generating equipments are made of an alloy called "nichrome". Name the two metals used to prepare the alloy.

c) The bimetallic strip indicated by AC in the above figure is made by riveting a strip of iron and a strip of brass together.



d) Which of the above metals forms the outer curve when this metallic strip gets heated? Explain the reason.

e) What is the function shown by the ABC switch in the diagram.

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