VIII-Subjective Assessment test-Solutions (26/09/2015)

Physics VIII

Class 8

Subjective Question Paper

Heat

Q.1 Define specific heat, latent heat of any substance.

Q.2 The temperature of an iron block is 140°F. What is its temperature on the Celsius scale?

Q.3 Answer the following:
I) You can bring water in a paper cup to a boil by placing it over a hot flame. Why doesn't the paper cup burn?
II) Water will boil spontaneously in a vaccum; for example, on the moon. Could you cook an egg in this boiling water? Explain.

Q.4 500g of water at 100°C is mixed with 300g at 30°C. Find the temperature of the mixture. (Specific heat of water = 42 J)

Q.5 What do you mean by heat and temperature? Write them S.I. units. Which instruments are used to measure them.

Ans.1 Specific heat: The specific heat of any substance is defined as the quantity of heat required to change the temperature of a unit mass of the substance by 1 degree Celsius.

\[ q = \frac{Q}{m \Delta T} \]

Latent heat: The latent heat of a substance is defined as the quantity of heat required to change the unit mass of the substance completely from its one state to another.
constant temperature.

\[ \text{Fahrenheit scale is:} \]
\[ F = \frac{9}{5}C + 32 \]
\[ 140 = \frac{9}{5}C + 32 \]
\[ 108 = \frac{9}{5}C \]
\[ C = \frac{5 \times 108}{9} \]
\[ C = 60^\circ C \]
\[ \text{Ans.} \]

Ans. 3

I. Water is a good conductor of heat as compared to paper. It has a higher specific heat. If we take water in a paper cup and place it over a hot flame, water in the paper cup will not attain heat energy as quickly as a paper cup. So paper cup does not burn.

II. An egg can not be cooked in the boiling water on the surface of moon because here the boiling point of water is much lower than the boiling point of water that we use in our daily life.

Solving

Heat loss by \( 100^\circ C \) water = Heat gain by \( 30^\circ C \) water

Formula for heat gain or loss: \( m \times c \times \Delta t \)

\[ 500 \times 4.1 (100 - t) = 360 \times 4.2 \times (t - 30) \]

\[ 500 - 5t = 3t - 90 \]

\[ 8t = 590 \]

\[ t = 73.75^\circ C \]
\[ \text{Ans.} \]
Heat: It is defined as the thermal energy transferred from one thing to another due to a temperature difference. Its unit is calorie Joule in S.I. system. It is measured using the principle of calorimeter.

Temperature: The degree of hotness or coldness of an object with respect to some standard is called temperature. Its S.I. unit is Kelvin. It is measured by thermometer.
Chemistry VIII

Ans. 1. Molecular formulae.

@ \( \text{Al}_2\text{Cr}_2\text{O}_7 \rightarrow \text{Al}_2(\text{Cr}_2\text{O}_7)_3 \)

@ \( \text{Cu}_2\text{NO}_3 \rightarrow \text{Cu(NO}_3)_2 \)

@ \( \text{Pb}_2\text{CO}_3 \rightarrow \text{Pb} (\text{CO}_3)_2 \)

@ \( \text{Ag}_2\text{N} \rightarrow \text{Ag}_3\text{N}_2 \)

Ans. 2.

@ \( \frac{1}{2} \text{B}_2\text{Br}_6 + \frac{6}{2} \text{HNO}_3 \rightarrow \text{B(NO}_3)_3 + \frac{6}{2} \text{HBr} \)

@ \( \frac{1}{4} (\text{NH}_4)_2\text{PO}_4 + \frac{3}{4} \text{Pb(NO}_3)_4 \rightarrow \frac{1}{4} \text{Pb}_3(\text{PO}_4)_4 + \frac{12}{4} \text{NH}_4\text{NO}_3 \)

@ \( 4 \text{C}_7\text{H}_17 + 45 \text{O}_2 \rightarrow 28 \text{CO}_2 + 35 \text{H}_2\text{O} \)

Ans. 3.

@ F.A. is maximum for 'E' since electronegativity increases from left to right in a period and decreases from top to bottom in a group.

@ 'F' has largest atomic size.

@ 'C'

@ Period number: 2; Group no.: IVA or 15.
Ans. 4.

@ \(2\text{KNO}_3 \rightarrow \text{KNO}_2 + \text{O}_2\).

(b) Calcium Silicate.

(c) Goldstein discovered protons.

The pressure inside the tube was reduced so that the gas molecules would get ionized.

Ans. 5.

Experiment - 1.

Observation: - The paddle wheel started moving.
Conclusion: - Cathode rays have some kinetic energy.

Experiment - 2.

Observation: - Cathode rays moved towards the positive terminal when kept in an electric field.
Conclusion: - They are negatively charged particles.
Q.1 Find area of a triangle whose sides are 5, 6 and \(\sqrt{61}\).

Q.2 A ladder 40 m long is placed so as to reach a window 24 m high on one side of a street, and on turning the ladder over the other side of the street, it reaches a window 32 m high. Find the breadth of the street.

Q.3 What is the perimeter of a square, if the length of its diagonal is 12.5 cm?

Q.4 The dimensions of a rectangle are increased by 20% each. Find V. increase in the area.

Q.5 Find the area of the following figure:

Q.6 Find the area of a ring whose outer diameter is 40 cm & inner diameter is 30 cm.
Q.7 A four corners of a square are \((x,0)\), 
\((0,y)\) then find the area of the circle 
which touches its four sides.

Q.8 Find the nature of the figure formed by 
points \(A(1,2), B(2,4), C(6,12)\)?

Q.9 Find distance between \(A(-2,4)\) and \(B(-5,8)\).

Q.10 A rectangular lawn 60m by 40m has 
two roads, each 5m wide running in the middle 
of it, one parallel to length and the other parallel to 
breadth as shown. Find cost of graveling the roads 
at Rs 3.8 per m².
Class 8th Subtective solution (20th Sept)

Sol. 1

Let \( a = 5 \), \( b = 5 \), \( c = \sqrt{61} \)

\[ a^2 + b^2 = c^2 \quad \therefore \quad \text{Right angle triangle} \]

Area = \( \frac{1}{2} \times 5 \times 8 = 15 \text{ sq. units} \)

Sol. 2

Let \( AC \) be width, \( AC = n + a \)

\[ CD, \, BC^2 = CD^2 + AB^2 \]

\[ 40^2 = 24^2 + n^2 \]

\[ n^2 = 40^2 - 24^2 = 1624 = (32)^2 \]

\[ \therefore \quad n = 32 \text{ m} \]

Again,

\[ \omega_1^2 = BC^2 + CD^2 \]

\[ 40^2 = a^2 + (32)^2 \]

\[ a^2 = 40^2 - 32^2 = 56c = 24^2 \]

\[ \therefore \quad a = 24 \text{ m} \]

Width = \( n + a = 32 + 24 = 56 \text{ m} \)
Sol. 3  
Let side = a  
\[ \sqrt{a} = 12 \times \frac{1}{2} \]
\[ a = 12 \]

\[ \therefore \text{Area} = 4 \times 12 = 48 \text{cm}^2 \]

Sol. 4  
Let length be \( l \), breadth = \( b \)  
New length = \( \frac{l + 20l}{100} \), New Breadth = \( 1.2b \)
\[ = 1.2b \]
Old Area = \( lb \)
New Area = \( 1.2l \times 1.2b \)
\[ = 1.44lb \]
\[ \frac{\text{Increase}}{\text{Old}} \times 100 = \frac{1.44lb - lb}{lb} \times 100 \]
\[ = \frac{0.44lb}{lb} \times 100 = 44\% \]

Sol. 5  
In the diagram, CE = \( \sqrt{EB^2 - EB^2} \)
\[ = \sqrt{6.5^2 - 6^2} \]
\[ = \sqrt{42.25 - 36} \]
\[ = \sqrt{6.25} \]
\[ = 2.5 \text{ cm} \]
Area of trapezium \[ = \frac{1}{2} (7 + 13) \times 2.5 \]
\[ = 10 \times 2.5 \]
\[ = 25 \text{ cm}^2 \]

Solu 6

\[ A = \pi (R^2 - r^2) \]
\[ = \frac{22}{7} (20^2 - 15^2) \]
\[ = \frac{22}{7} \times 5 \times 25 \]
\[ = 550 \text{ cm}^2 \]

Solu 7

Let radius be \( r \)

Side of square \( b \) by

Pythagoras \[ = \sqrt{a^2 + a^2} \]
\[ = a \sqrt{2} \]

Radius \[ = \frac{a}{\sqrt{2}} \]

Area of circle \[ = \pi \left( \frac{a}{\sqrt{2}} \right)^2 \]
\[ = \frac{\pi a^2}{2} \]
Sol. 8

\[ AB = \sqrt{(x-2)^2 + (y-1)^2} = \sqrt{5} \text{ units} \]

\[ BC = \sqrt{(x-4)^2 + (y-6)^2} = \sqrt{80} \]

\[ CA = \sqrt{(x-2)^2 + (y-1)^2} = \sqrt{125} \]

\[ AB \neq BC \neq CA \]

\[ AB + BC = \sqrt{5} + \sqrt{80} \]

\[ = 5\sqrt{5} = AC \]

They are collinear points.

Sol. 9

\[ AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \]

\[ AB = \sqrt{(-1-(-5))^2 + (8 - 3)^2} \]

\[ = \sqrt{4^2 + 5^2} = \sqrt{41} \]

\[ AB = 5 \text{ units} \]

Area of 1st road = 60 \times 5 = 300 \text{ m}^2

Area of 2nd road = 40 \times 5 = 200 \text{ m}^2

Total area of roads = 300 + 200 = 500 \text{ m}^2.
For Biology, teacher will discuss in the class.