Solution of the day Aug 24, 2018

6th Class

- **Mathematics:**

Sol:

Let the number of 50 p, 25 p and 10 p coins be 5x, 9x and 4x respectively.

Then, $\frac{5x}{2}+\frac{9x}{4}+\frac{4x}{10}=206$

$\Leftrightarrow 50x+45x+8x=4120 \Leftrightarrow 103x=4120 \Leftrightarrow x=40$

$\therefore$ Number of 50 p coins $=(5\times 40)=200$; number of 25 p coins $=(9\times 40)=360$;

Number of 10 p coins $=(4\times 40)=160$

- **Physics:** Ans: (C)

- **Chemistry:** Ans: i-c, ii-d, iii-b, iv-a

- **Biology:** Ans: (D)

7th Class

- **Mathematics:** Ans: (C)

- **Physics:**

Sol:

(i) What is 1 M.S.D. for given height gauge?

The formula for L.C. of an apparatus $1\,\text{M.S.D.}-1\,\text{V.S.D.}=\frac{1\text{M.S.D.}}{\text{N}}$

What is the value of L.C. of given instrument?

Then what is the number of divisions present on vernier scale?

Then the value of $1\,\text{V.S.D.}=1\,\text{M.S.D.}-\text{L.C.}$

If the value of N is 50, and 1 M.S.D. =1 mm, then what is the value of L.C.?

(ii) Minimum length of the vernier scale =9.9 cm

(iii) Least count = 0.02 mm

- **Chemistry:** Ans: (D)

- **Biology:** Ans: (A)

8th class

- **Mathematics:** Ans: (D)
- **Physics:**

Sol: (i) $V_B = 20\hat{i}\ m/s;\ V_A = 5\hat{i}\ m/s;\ V_B - V_A = 15\hat{i}\ m/s$

(ii) $V_B = 20\hat{i}\ m/s;\ V_A = 5\hat{i}\ m/s;\ V_{AB} = V_A - V_B = -15\hat{i}\ m/s$

Note : $V_{BA} = -V_{AB}$

- **Chemistry:** Ans: (B)
- **Biology:** Ans: (D)

9th Class

- **Mathematics:**

Sol: $\cot\theta + \operatorname{cosec}\theta = 5$

$$\frac{\cos\theta}{\sin\theta} + \frac{1}{\sin\theta} = 5$$

Cross multiplying

$$\cos\theta + 1 = 5\sin\theta$$

$$\cos\theta + 1 = 5\sqrt{\left(1 - \cos^2\theta\right)}$$

Squaring both sides

$$\cos^2\theta + 1 + 2\cos\theta = 25\left(1 - \cos^2\theta\right)$$

$$\cos^2\theta + 1 + 2\cos\theta = 25 - 25\cos^2\theta$$

$$26\cos^2\theta + 2\cos\theta - 24 = 0$$

$$26\cos^2 + 26\cos\theta - 24\cos\theta - 24 = 0$$

$$\left(\cos\theta + 1\right)\left(26\cos\theta - 24\right) = 0$$

Now either $\cos\theta + 1 = 0$, then $\cos\theta = -1$

$26\cos\theta - 24 = 0$, then $\cos\theta = 12/13$

➢ **Physics:**

Sol: i) $\hat{A}=\frac{3\hat{i}+2\hat{j}-3\hat{k}}{\sqrt{22}}, \quad \left|\hat{A}\right|=\sqrt{22}$

ii) $\hat{A}=\frac{2\hat{i}+6\hat{j}-\hat{k}}{\sqrt{41}}, \quad \left|\hat{A}\right|=\sqrt{41}$

iii) $\hat{A}=\frac{\hat{i}+\hat{k}}{\sqrt{2}}, \quad \left|\hat{A}\right|=\sqrt{2}$

iv) $\hat{A}=\frac{3\hat{i}+\hat{j}}{\sqrt{10}}, \quad \left|\hat{A}\right|=\sqrt{10}$

v) $\hat{A}=\frac{2\hat{i}-6\hat{k}}{\sqrt{40}}, \quad \left|\hat{A}\right|=\sqrt{40}$

➢ **Chemistry:** (A)

➢ **Biology:** Ans: (C)

10th class

➢ **Mathematics:**

Hint: Divide the given equation by $\sin^2 x$ both sides

➢ **Physics:**

Sol: Heat given by 1 kg ice $=1\times\frac{1}{2}\times10=5$ kcal

$$5+1\times80+1\times T=1\times(100-T)$$

$$85=100-2T\Rightarrow 2T=15$$

$$8=152=7.5^{o}\,C, \text{water}$$

➢ **Chemistry:**

Sol : $2H_2S(g)+O_2(g)\rightarrow 2S(s)+2H_2O(l)$

(*Displacement reaction*)

➢ **Biology:** Ans: (C)

➢ **Reasoning :** Ans: (B)