



CLASS XII

DATE : 13-06-2010

ANSWER KEY WITH SOLUTION

MATHEMATICS

SECTION - A

1. C 2. B 3. B 4. B 5. C 6. B 7. D
8. B 9. A,B,D 10. A,C 11. B,C,D 12. A,B,C,D 13. B 14. A
15. B

SECTION - B

1. (A)– Q; (B)– P, Q, R, S ; (C)– P, S (D)– P

SECTION - C

- 1.0004 2.0128

PHYSICS

SECTION - A

1. A 2. A 3. C 4. B 5. D 6. D 7. C
8. B 9. A,D 10. A,B 11. A,D 12. A,B 13. A 14. C
15. B

SECTION - (B)

1. (A) → P,S,R ; (B) →Q ; (C) → P,Q,S ; (D) → P,S,R

SECTION - (C)

1. 3 2. 8

CHEMISTRY

SECTION - A

1. C 2. B 3. B 4. D 5. D 6. C 7. C
8. A 9. A,D 10. A,B,D 11. A,B,D 12. C 13. A 14. B
15. B

SECTION - B

1. (A)–P; (B)–T (C)–Q,R (D)–Q,R

SECTION C

1. 13 2. 5

SOLUTIONS

PHYSICS

SECTION - A

1. **A**

(i) The initial phase is

$$\phi = 60^\circ = \frac{\pi}{3} \text{ rad}$$

(ii) The phase of the point after a time t is,

$$\theta = \omega t + \phi$$

Then the equation of Q is

$$x = A \cos(\omega t + \phi)$$

where $A = R = 0.5 \text{ m}$, $\omega = 10 \text{ rad/s}$ and $\phi = \frac{\pi}{3}$

or,
$$x = 0.5 \cos\left(10t + \frac{\pi}{3}\right)$$

2. **D**

3. **C**

4. **B**

Minimum time interval $\Delta t = \frac{2L}{v} = \frac{1.6}{v}$

$$v = \sqrt{\frac{T}{\mu}} = 16 \text{ ms}^{-1}$$

$$\Rightarrow \Delta t = 100 \text{ ms.}$$

5. **C**

6. **D**

7. **C**

8. **B**

9. **A,D**

10. **A,B**

11. **A,D**

Observer A cannot see the object if $\mu > \sin \pi/4$ or

$$\mu > \sqrt{2}.$$

Observer B cannot see the object if $\mu > \sin \pi/6$ or

$$\mu > 2.$$

12. **A,B**

[A] $\Delta x = d \sin \phi + d \sin \theta - (\mu - 1) t \dots(1)$

For central maximum, $\Delta x = 0$ and $\phi = 30^\circ$

$$\Rightarrow \text{by eq. (1)} \quad \theta = 30^\circ$$

[B] At C, $\theta = 0$

$$\therefore \text{By eq. (1)} \quad \Delta x = -0.025 \text{ mm} \\ = n \lambda$$

$$\Rightarrow n = 49$$

13. **A**

To dislodge bird 2 without disturbing bird 1, she needs an antinode at the position of bird 2 and a node at the position of bird 1. With a node at both ends of the wire, the longest wavelength is in the figure shown above. From the figure, $3\lambda/2 = 36 \text{ cm}$, $\lambda = 24 \text{ cm}$.

14. **C**

$$f = v/\lambda = 48 \text{ m/s}/24 \text{ m} = 2 \text{ s}^{-1}.$$

15. **B**

For a standing wave, $y(x,t) = y_m \sin 2\pi x/\lambda \cos 2\pi ft$.

$$dy/dt = -2\pi y_m \sin 2\pi x/\lambda \sin 2\pi ft.$$

$$a = d^2y/dt^2 = -(2\pi f)^2 y_m \sin 2\pi x/\lambda \cos 2\pi ft.$$

The maximum value of the sine and cosine is 1. If the maximum absolute value of the acceleration bird 2 can withstand is 48 m/s^2 , then $48 \text{ m/s}^2 = (2\pi f)^2 y_{\text{max}}$, where y_{max} is the maximum amplitude he can withstand. $y_{\text{max}} = 48 \text{ m/s}^2/(4\pi \text{s}^{-1})^2 = 0.30 \text{ m}$. Any amplitude slightly greater than this is the smallest amplitude needed to dislodge the bird.

SECTION - (B)

1. (A) → P,S,R,T ; (B) → Q ; (C) → P,Q,S ; (D) → P,S,R,T

SECTION - (C)

1. 3

2. 8 mm

CHEMISTRY

SECTION - A

1. **C**

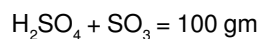
$$V_f = \frac{150 + 400}{1.25} = \frac{550}{1.25} \text{ ml}$$

$$M = \frac{0.1}{550} \times 1.25 \times 10^3 = 0.227$$

2. **B**

3. **B**

118% oleum



$$1 \text{ mole } \frac{18}{18} = 1 \text{ mole}$$

$$= 80 \text{ gm}$$

$$\text{SO}_3 = 80 \text{ gm}$$

$$\text{H}_2\text{SO}_4 = 20 \text{ gm}$$

$$\text{Mass of O in SO}_3 = 48 \text{ gm}$$

$$\text{Mass of O in H}_2\text{SO}_4 = \frac{64}{98} \times 20 = 13.06 \text{ gm}$$

$$\text{Total wt. of O in oleum} = 48 + 13.06 = 61.06 \text{ gm}$$

4. **D**

$$nC_v dT = -nC_v dT - PdV$$

$$2nC_v dT = -\frac{nRT}{V} dV$$

$$2n \times \frac{R}{\gamma-1} \times dT = -nRT \frac{dV}{V}$$

$$\int 2 \frac{dT}{T} = -\int (\gamma-1) \frac{dV}{V}$$

$$\ln T = -\frac{(\gamma-1)}{2} \ln V + \text{const.}$$

$$\ln T + \ln V^{(\gamma-1)/2} = \text{const.}$$

$$\Rightarrow TV^{(\gamma-1)/2} = \text{const.}$$

5. **D**

6. **C**

7. **C**

8. **A**

9. **A,D**

10. **A,B,D**

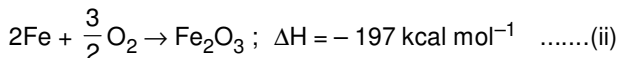
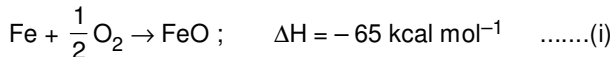
11. **A,B,D**

12. **C**

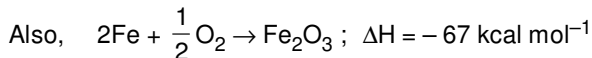
13. **A**

14. **B**

15. **B**



By Eq. (ii) - 2 × (i)

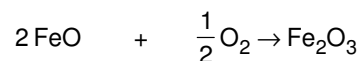


.....(iii)

Let a mole of FeO and b mole Fe₂O₃ are present such that

$$a + b = 1 \text{ and } \frac{a}{b} = 2$$

$$a = \frac{2}{3} \text{ and } b = \frac{1}{3}$$



Initial a b
After oxidation (a - 2a')b + a'

Given, $\frac{a}{b} = 2$ and $\frac{a - 2a'}{b + a'} = \frac{1}{2}$

$$\therefore \frac{a - 2a'}{2 + a'} = \frac{1}{2} \quad \therefore 2a - 4a' = \frac{a}{2} + a'$$

$$\therefore a' = \frac{3a}{10} = \frac{3 \times 2}{10 \times 3} = \frac{1}{5} \quad \therefore \text{FeO used} = \frac{2}{5}$$

∴ 2 moles FeO gives heat = 67 kcal

$$\therefore \frac{2}{5} \text{ mole FeO gives heat} = \frac{67 \times 2}{2 \times 5}$$

$$= 13.4 \text{ kcal heat}$$

SECTION - B

1. **(A)–P; (B)–T (C)–Q,R (D)–Q,R**

SECTION C

1. **13**

Hint. - Only 1^o and 2^o amides will show tautomerism.

2. **5**

Total secondary amyl alcohol = 3

Total GI = 2

Therefore x + y = 2 + 3 = 5