

Dear Parents/Students,

- ✓ Thank you for participating in the **STAR (Student Talent academic Reward) Exam**.
- ✓ All attempts have been made in making sure that you experience an **error-free** exam. However, in case if you find any discrepancy in any question/option, feel free to inform us through message on our Whatsapp No. **7976711979**. Our Expert panel will surely review your suggestions.

Regards,

**Shubham Galav**

Head, Young Scholar's Programme and STAR Cell  
The Radiant Academy Udaipur

**CLASS : XI**

**PHYSICS, CHEMISTRY & MATHEMATICS**

**SAMPLE PAPER**

**ANSWER KEY**

|       |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Ques. | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
| Ans.  | A  | D  | D  | D  | D  | C  | A  | B  | D  | C  | A  | C  | B  | A  | B  |
| Ques. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans.  | B  | D  | B  | A  | B  | D  | C  | C  | B  | C  | B  | B  | D  | D  | B  |
| Ques. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| Ans.  | A  | B  | A  | B  | D  | C  | C  | C  | C  | C  | B  | B  | C  | B  | A  |
| Ques. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| Ans.  | C  | C  | A  | A  | A  | B  | C  | A  | A  | B  | A  | A  | B  | D  | B  |

**SOLUTIONS**

4.  $R = \frac{u^2 \sin 2\theta}{g}$

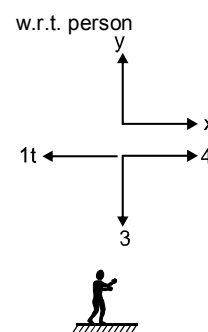
$R \propto u^2$

8.  $y = x^3 - 2x + 1$   
 $\frac{dy}{dx} = 3x^2 - 2$

slope at  $x = 1$  is  $\left. \frac{dy}{dx} \right|_{x=1} = 3(1^2) - 2 = 1$

9.  $30 - 20 = 2a$   
 $a = 5 \text{ m/s}^2$   
 $F - 70 = 7 \times 5$   
 $F_{\text{max}} = 105 \text{ N.}$

11.



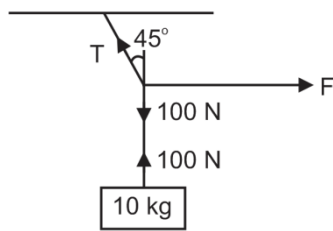
$\pm \tan 45^\circ = \frac{4 - 1t}{3}$

$\frac{4 - 1t}{3} = \pm 1$

$t = 1, 7$

$\Delta t = 7 - 1 = 6.$

12.



$$\frac{T}{\sqrt{2}} = 100$$

$$\frac{T}{\sqrt{2}} = F$$

$$F = 100 \text{ N}$$

13.

$$\vec{V} = \vec{\omega} \times \vec{r}$$

$$= 3\hat{i} + 8\hat{j} + 10\hat{k}$$

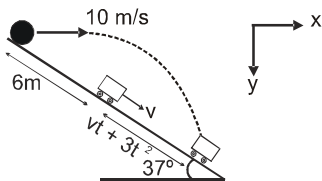
$$\Rightarrow k = \left( \frac{\mu g}{v_0} \right)^2 (m + M)$$

14. Because the collision is perfectly inelastic, hence the two blocks stick together. By conservation of linear momentum,

$$2mV = mv \text{ or } V = v/2 \text{ by conservation of energy}$$

$$2mgh = 1/2 \cdot 2m (V/2)^2 \text{ or } h = v^2/8g$$

15.



$$\text{time taken for collision (T)} = \frac{2 \times 10 \times \sin 37^\circ}{g \cos 37^\circ} \Rightarrow$$

time of flight of ball

$$\text{along the inclined} \Rightarrow u_{\text{rel.}} = 8 - v$$

$$\Rightarrow a_{\text{rel.}} = 0$$

$$\Rightarrow s_{\text{rel.}} = 6$$

$$s_{\text{rel.}} = u_{\text{rel.}} \times T$$

$$6 = (8 - v) \times 1.5$$

$$v = 4 \text{ m/s}$$

16. according to the question

$$\alpha = v \frac{dv}{dx} = v \left( \frac{d}{dx} \beta x^{-2n} \right)$$

$$= (-2n\beta x^{-2n-1}) \beta x^{-2n}$$

$$= -2n\beta^2 x^{-4n-1}$$

17.

Using  $v = u + at$  or  $v - u = at$ , we find that if  $|\vec{a}|$  is doubled,  $t$  will be halved. If  $t$  is the time for accelerations, then  $t/2$  is the time for retardation.

$$\text{Now, } t + t/2 = 3$$

$$\text{or } 3t/2 = 3$$

$$t = 2 \text{ s}$$

$$S = 1/2 \times 2 \times 2 \times 2 + 1/2 \times 4 \times 1 \times 1 = (4 + 2) \text{ m} = 6 \text{ m}$$

20.

Case (i)

$$a = \frac{F}{m_1 + m_2}$$

$$T_1 = \frac{m_1 F}{m_1 + m_2} \quad \text{--- (1)}$$

Now

Case (ii)

$$a = \frac{F}{m_1 + m_2}$$

$$T_2 = \frac{m_2 F}{m_1 + m_2} \quad \text{--- (2)}$$

$$\frac{T_1}{T_2} = \frac{m_1}{m_2}$$

So,  
 $T_1 < T_2$ 

21.

(A)  $0.2 \times 22.4 \text{ L}$ (B)  $0.1 \times 22.4 \text{ L}$ (C)  $0.5 \times 22.4 \text{ L}$ (D)  $1 \times 22.4 \text{ L}$ 

22.

Mass No. = no. of protons + no. of neutrons

At. No. = no. of protons

23.

$$\text{No. of moles of Na} = \frac{115}{23} = 5 \text{ mol}$$

No. of atoms of Na =  $5 N_A$ 

27.

Compound is homocyclic aromatic containing 10

31.

Due to inert pair effect T is stable in +1 state

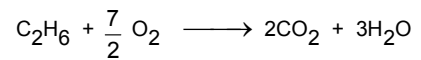
32.

General formula of alkane =  $C_n H_{2n+2}$ If 1 molecule contains 6 H-atoms, then  $2n + 2 = 6$ 

$$\therefore n = 2$$

$$\therefore \text{Alkane} = C_2 H_6$$

Combustion reaction is :



$$\text{mole} \frac{5.6}{22.4} \left( \frac{20}{100} \times 80 \right) = 0.25 = 0.5$$

$$\frac{\text{mole}}{\text{st. coeff.}} \frac{0.25}{1} \frac{0.5}{7/2} = \frac{1}{7}$$

(LR)

$$\therefore \text{Moles of } CO_2 \text{ produced} = \frac{0.5 \times 2}{7/2} = \frac{2}{7}$$

$$\therefore \text{Mass of } CO_2 \text{ produced} = \frac{2}{7} \times 44 = 12.57 \text{ g.}$$

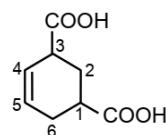
33.

$$\% \text{ As} = \frac{75 \times 1}{\text{Min molar mass}} \times 100$$

35.

$$\text{R.D.} = \frac{M_{SO_3}}{M_{CH_4}} = \frac{80}{16} = 5.$$

36.



Cyclohex-4-ene-1,3-dicarboxylic acid.

40.

