

MARKING SCHEME
COMMON ANNUAL SCHOOL EXAMINATION (2023-24)
CLASS : XI
SUBJECT: PHYSICS (042)

समय : 3 घंटे

Time Allowed : 3 hours

अधिकतम अंक - 70

Maximum Marks : 70

SECTION-A

- | | | | |
|-----|-----|---------------------------|---|
| 1. | (c) | L^3 | 1 |
| 2. | (b) | AB | 1 |
| 3. | (a) | $\pi \text{ rad/s}$ | 1 |
| 4. | (a) | I-law | 1 |
| 5. | (d) | 6mg | 1 |
| 6. | (c) | 200 cm | 1 |
| 7. | (d) | 875 J | 1 |
| 8. | (b) | $\frac{1}{2}(MR^2)$ | 1 |
| 9. | (c) | L Nm | 1 |
| 10. | (a) | Bulk modulus | 1 |
| 11. | (b) | 25 W | 1 |
| 12. | (d) | $\sqrt{\frac{3k_B T}{m}}$ | 1 |

13. (a) Both Assertion (A) and Reason (R) are true and (R) is the correct explanation of Assertion (A). 1
14. (c) Assertion (A) is true and Reason (R) is false. 1
15. (b) Both Assertion (A) and Reason (R) are true and (R) is the not correct explanation of Assertion (A). 1

SECTION-B

17. Calculation of surface area 1
- Correction number of significant figure 37.53 cm^2 1
18. Conservation of angular momentum $\frac{1}{2}$
- Calculation 1
- Correct answer ($v = 3 \text{ m/s}$) $\frac{1}{2}$
19. Correct derivation $g' = g \left(1 - \frac{d}{R} \right)$ 2
20. (i) elastic limit – B $\frac{1}{2}$
- (ii) ultimate strength – H $\frac{1}{2}$
- Ductile material has a large plastic range $\frac{1}{2}$
- Brittle material has small plastic range $\frac{1}{2}$

21. Correct statement 1
- (i) monoatomic gas $= C_p/C_v =$ $\frac{1}{2}$
- (ii) diatomic gas $= C_p/C_v =$ $\frac{1}{2}$

SECTION-C

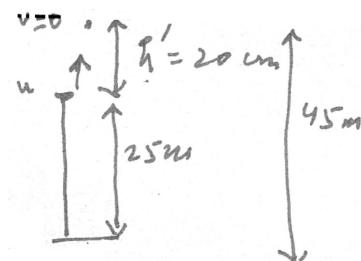
22. Correct derivation $U = \frac{1}{2}kx^2$ 3

23. (i) $v^2 - u^2 = 2as$ $\frac{1}{2}$

Calculation $\frac{1}{2}$

Correct answer = 20m $\frac{1}{2}$

From ground $H = h + h' = 25 + 20 = 45 \text{ m}$



- (ii) $S = ut + \frac{1}{2}at^2$ $\frac{1}{2}$

Calculation $\frac{1}{2}$

Correct answer = 5 sec $\frac{1}{2}$

24. Correct derivation $v = \sqrt{\mu rg}$ 3

25. Correct definition 1/2

Formula $X = \frac{m_1 x_1 + m_2 x_2}{m_1 + m_2}$ 1/2

$$Y = \frac{m_2 y_1 + m_2 y_2}{m_1 + m_2} \quad \text{1/2}$$

Calculation 1

Correct answer ($X = 0, Y = 0$) 1/2

26. Correct definition 1/2

Correct derivation = $W = 2.303nRT \log_{10} \frac{V_2}{V_1}$ 2 1/2

27. Correct definition 1

$$P = \frac{P_o}{1 + Y\Delta T} \quad \text{1/2}$$

Calculation 1

Correct answer = 0.0147 1/2

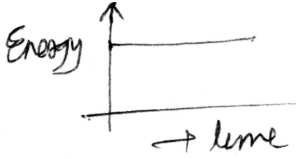
OR

Statement 1

Formula = $\lambda mT = b$ 1/2

Calculation 1

Correct answer $\lambda_m = 1.4 \times 10^{-5} \text{ m}$ 1/2

28. (a) (i) (a) 1/2
- (ii) (b) 1/2
- (b)  1/2
- (c) $W\sqrt{A^2 - Y^2} = \frac{WA}{4}$ 1/2
- Calculation 1/2
- $Y = \frac{\sqrt{15}}{4} \cdot A$ 1/2

SECTION-D

29. (i) (a) Gravitational force 1
- (ii) (d) 200 N 1
- (iii) (b) 105 kg 1
- (iv) (a) 0.05 N, downwards 1

OR

- (a) 1 N
30. (i) (c) 1 : 1 1
- (ii) (b) $v_e = \sqrt{2}v_o$ 1
- (iii) (d) all three will have equal escape speed 1
- (iv) (c) $\sqrt{3} v_e$ 1

OR

(c) $2v_e$

SECTION-E

31. Derivation of equation of trajectory 2

Derivation of time of flight $1\frac{1}{2}$

Derivation of horizontal range $1\frac{1}{2}$

OR

Statement 1

Magnitude of resultant $R = \sqrt{A^2 + B^2 + 2AB\cos\theta}$ 3

Direction $= \beta = \tan^{-1}\left(\frac{B\sin\theta}{A + B\cos\theta}\right)$ with vector $\vec{A}$ 1

32. (a) Correct derivation $p = 25/R$ 3

(b) $p = \frac{4S}{R}$ $\frac{1}{2}$

Calculation 1

Correct answer $p = 20 \text{ Pa}$ $\frac{1}{2}$

OR

	(a)	Statement	$\frac{1}{2}$
		Proof	$2\frac{1}{2}$
	(b)	Formula $av = \text{volume} / \text{sec}$	$\frac{1}{2}$
		Calculation	1
33.		Correct answer $v = 10 \text{ cm/s}$	$\frac{1}{2}$
	(a)	$y = a \sin wt$	$\frac{1}{2}$
		$V = aw \cos wt$	$\frac{1}{2}$
		$A = -Aw^2 \sin wt$	$\frac{1}{2}$
		Phase relation between displacement and velocity	
		: velocity leads displacement by $\pi/2$	$\frac{1}{2} + \frac{1}{2}$
		: Acceleration leads displacement by π	$\frac{1}{2} + \frac{1}{2}$
	(b)	Calculation	1
		Correct answer amplitude = $\sqrt{2}$	$\frac{1}{2}$
		OR	
	(a)	Correct definitions	$\frac{1}{2} + \frac{1}{2}$
	(b)	Correct derivation	$2\frac{1}{2}$

(c)	$v = n \cdot \frac{v}{2L}$	$\frac{1}{2}$
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Calculation	$\frac{1}{2}$
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Correct answer (n = 1)	$\frac{1}{2}$
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(Fundamental mode)	$\frac{1}{2}S$
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