

JEE MAIN Physics Sample Paper 03

Subject: Physics

Structure: 20 MCQs + 5 Numerical Type Questions

Marking Scheme: Correct (+4) | Incorrect MCQ (-1) | Incorrect NVT (0)

Section A: Multiple Choice Questions (1-20)

1. Power delivered in circular motion $a_c = k^2 R t^2$:

- A. $mk^2 R^2 t$
- B. $mk^2 R t^2$
- C. Zero
- D. $mk R t$

2. Elongation of $(2L, 2r)$ with $2W$ if (L, r) with W is ℓ :

- A. ℓ
- B. 2ℓ
- C. 0.5ℓ
- D. 4ℓ

3. Intensity in YDSE at point in front of slit:

- A. $I_0/2$
- B. $I_0/4$
- C. I_0
- D. $3I_0/4$

4. Escape velocity planet mass 9, radius 4:

- A. 16.8
- B. 33.6
- C. 11.2
- D. 22.4

5. Resistance % error $V = 50 \pm 2$, $I = 20 \pm 0.2$:

- A. 5%
- B. 4%
- C. 1%
- D. 6%

6. Reimer-Tiemann phenol product:

- A. Salicylaldehyde
- B. Benzoic Acid

C. Benzene

D. Phenol

7. Bond order O_2^+ :

A. 2.5

B. 2.0

C. 1.5

D. 3.0

8. Correct IE1 order N, O, F:

A. $O < N < F$

B. $N < O < F$

C. $F < N < O$

D. $O < F < N$

9. Shielding effect order:

A. $s > p > d > f$

B. $f > d > p > s$

C. $s > f > d > p$

D. $p > s > d > f$

10. 2-bromobutane with alc KOH major product:

A. trans-but-2-ene

B. but-1-ene

C. cis-but-2-ene

D. but-2-yne

11. Benzaldehyde lacks:

A. alpha-H

B. Oxygen

C. Benzene ring

D. Aldehyde group

12. Range of det matrix $\begin{bmatrix} 1 & \sin \\ -\sin & 1 \end{bmatrix}$:

A. $[1, 2]$

B. $[0, 1]$

C. $[1, 3]$

D. Zero

13. Lyman series min wavelength transition:

A. $\infty \rightarrow 1$

B. $2 \rightarrow 1$

C. $3 \rightarrow 1$

D. $4 \rightarrow 1$

14. Stability of carbocation $3^\circ > 2^\circ > 1^\circ$:

A. True

B. False

C. Depends

D. None

15. $\cos^{-1}(\cos(210^\circ))$ evaluation:

A. 150°

B. 210°

C. 30°

D. -30°

16. The workdone $W = \alpha\beta^2e^{-x^2/\alpha kT}$. Dimension of α :

A. $M^{-1}T^2$

B. MLT^{-2}

C. L^2

D. None

17. Zener voltage beyond breakdown:

A. Increases

B. Constant

C. Zero

D. Oscillates

18. Natural Rubber monomer:

A. Chloroprene

B. Isoprene

C. Styrene

D. Neoprene

19. Unit of rate constant zero order:

A. s^{-1}

B. $mol\ L^{-1}\ s^{-1}$

C. $L\ mol^{-1}\ s^{-1}$

D. None

20. Which gas used in MRI?

- | | |
|-------|-------|
| A. He | B. Ne |
| C. Ar | D. Kr |

Section B: Numerical Value Questions (21-25)

21. FP drop (10^{-2}) for 0.2m ionized acid: _____

22. Sum of S oxidation states in Caro's and Marshall's acids: _____

23. Min elements in symmetric closure of $2x=3y$ on $\{1..100\}$: _____

24. Probability $p+q$ for ball drawing problem: _____

25. Constant term in expansion of power 10: _____

ANSWER KEY & DETAILED EXPLANATION

1. [A] $P = mk^2R^2t$ based on velocity and force components.

2. [C] Elongation ratio results in 0.5l.

3. [B] Intensity is $I_0/2$.

4. [A] Escape velocity is 16.8 km/s.

5. [A] 5%.

6. [A] Salicylaldehyde.

7. [A] 2.5.

8. [A] $O < N < F$.

9. [A] $s > p > d > f$.

10. [A] trans-but-2-ene.

11. [A] alpha-H.

12. [A] [1, 2].

13. [A] $\infty \rightarrow 1$.

14. [A] True.

15. [A] 150° .

16. [A] $M^{-1}T^2$.

17. [B] Constant.

18. [B] Isoprene.

19. [B] $\text{mol L}^{-1} \text{s}^{-1}$.

20. [A] Helium.

21. [74] 74.

22. [12] 12.

23. [66] 66.

24. [1] 1.

25. [252] 252.