



RGP – RANKERS GENIUS PROGRAM

Set

B

(Physics, Chemistry and Mathematics)

Time: 1 Hour

Moving to 12th (JEE)

Marks: 120

1. General Instructions:

(Paper Code: 1202)

- * This test paper consists of 30 question in 3 section (A, B, C)

Marking Scheme:

- ✓ Full marks: + 4 if answered correctly.
- ✓ Zero marks: 0 if not attempted or incorrect.

2. RGP College Grant Criteria:

- ✓ Students must score a minimum of 70% positive marks in RGP.
- ✓ Student must get under AIR 5,000 in JEE/NEET Examination.

3. Cash Reward Criteria:

- ✓ Exciting Cash Rewards for RGP Toppers

SENIOR WING (Student's Moving to Class XI th , XII th , Dropper JEE /NEET)		JUNIOR WING (Student's Moving to Class IX th & X th)	
Overall 1 st Topper	₹ 21,000/-	Overall 1 st Topper	₹ 5,100/-
Overall 2 nd Topper	₹ 11,000/-	Overall 2 nd Topper	₹ 3,100/-
Overall 3 rd Topper	₹ 5,100/-	Overall 3 rd Topper	₹ 2,100/-
Overall 4 th – 8 th Topper	₹ 2,100/-	Overall 4 th – 8 th Topper	₹ 1,100/-
Overall 9 th – 15 th Topper	₹ 1,100/-	Overall 9 th – 15 th Topper	₹ 500/-

** Rankings from 1 to 20 are determined based on the specific criteria outlined in the FAQ section of our website, www.myrankers.com.

4. Scholarship Criteria in Rankers Offline Classroom Program:

- ✓ 100% Fee Waiver – Student Scoring 90% and Above
- ✓ 80% Fee Waiver – Student Scoring 85% to 89.999%
- ✓ 60% Fee Waiver – Student Scoring 75% to 84.999%
- ✓ 50% Fee Waiver – Student Scoring 70% to 74.999%
- ✓ 40% Fee Waiver – Student Scoring 60% to 69.999%
- ✓ 20% Fee Waiver – Student Scoring 40 % to 59.999%
- ✓ 10% Fee Waiver – Student Scoring 30% to 39.999%
- ✓ 5% Fee Waiver – All the Aspirants Appearing in RGP

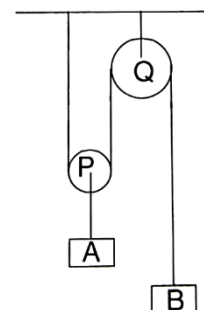
RGP RESULT & REWARD CEREMONY

Result Date: 12th Feb 2025Check Your Result at: www.myrankers.comReward Ceremony Date: 16th Feb 2025

Student's Name: -

Physics (Section – A)

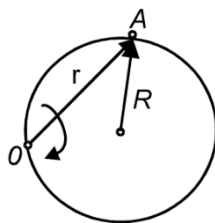
- Two blocks of mass 2kg and 3kg are connected to a spring of force constant 120 N/m. If both the blocks are given a velocity 1.0 m/s each directed away from each other then find the maximum elongation in spring.
(A) 20cm (B) 10cm (C) 5cm (D) 15cm
- What amount of heat must be given to a sample of nitrogen gas at constant pressure so that it performs 2J of work?
(A) 2 J (B) 3 J (C) 5 J (D) 7 J
- A ball of mass 100 gm is dropped from height 5m. If the ball bounces back to a height 1.25m and ball remains in contact with the floor for 10^{-2} seconds what is the average force exerted by the floor on the ball is ____ ($g = 10 \text{ m/s}^2$)
(A) 50N (B) 100 N (C) 150 N (D) 200 N
- In figure the mass of body A is four times as great as that of body B. The system is released from rest find acceleration of block B. ($g = 10 \text{ m/s}^2$)
(A) 2.5 m/s^2
(B) 3.75 m/s^2
(C) 5 m/s^2
(D) 7.5 m/s^2
- With what minimum speed, a particle must be projected in order to acquire a horizontal range of 40 m. ($g = 10 \text{ m/s}^2$)
(A) 10 m/s (B) 20 m/s (C) 30 m/s (D) 40 m/s
- A rocket is launched vertically upward from surface of earth with a velocity equal to the orbital velocity of a satellite revolving around earth near its surface. Find the maximum height reached (above surface of earth) by the rocket ($g = 10 \text{ m/s}^2$, Radius of earth = 6400 km)
(A) 3200 km (B) 6400 km (C) 12800 km (D) ∞



----- Rough Work -----

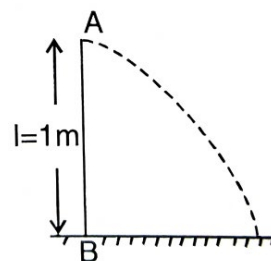
7. A particle A moves along a circle of radius $R = 50$ cm so that its radius vector r relative to the fixed point O (Figure) rotates with the constant angular velocity $\omega = 0.40$ rad/s. Then velocity of the particle will be –

- (A) $v = 0.4$ m/s
 (B) $v = 0.8$ m/s
 (C) $v = 0.2$ m/s
 (D) $v = 1.6$ m/s



8. A one-meter long stick (rod) is held vertically with one of its ends on a rough horizontal surface, while its other end is allowed to fall. Assuming that its end on the floor does not slip, find the angular speed of the stick when it hits the surface. ($g = 10$ m/s²)

- (A) 2.7 rad/s
 (B) 5.4 rad/s
 (C) 8.1 rad/s
 (D) 10.8 rad/s



9. A block of mass 1 kg connected with a spring of spring constant 4 N/m lies on a smooth horizontal surface. The block is compressed by 20 cm and then released. Find the minimum time after which the elongation in spring becomes 10 cm.

- (A) π sec (B) $\frac{\pi}{2}$ sec (C) $\frac{\pi}{3}$ sec (D) $\frac{\pi}{4}$ sec

10. A cubical block of copper (density = 9×10^3 kg/m³) of side 12 cm floats in mercury (density = 13.5×10^3 kg/m³). What is the height of the block above mercury level?

- (A) 2 cm (B) 3 cm (C) 4 cm (D) It will not float

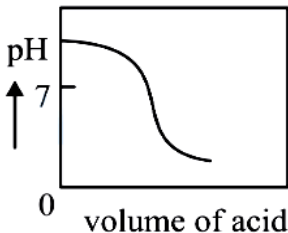
----- Rough Work -----

Chemistry (Section – B)

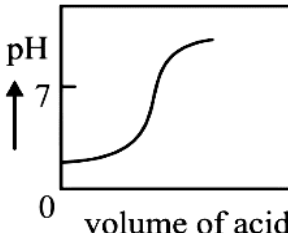
11. The element that does not show catenation is
 (A) Sn (B) Si (C) Ge (D) Pb
12. Consider the following reaction:

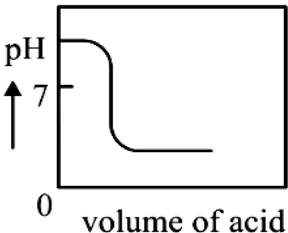
$$x \text{MnO}_4^- + y \text{C}_2\text{O}_4^{2-} + z\text{H}^+ \rightarrow x \text{Mn}^{2+} + 2y \text{CO}_2 + \frac{z}{2} \text{H}_2\text{O}$$

 The values of x, y and z in the reaction are, respectively:
 (A) 2, 5 and 16 (B) 5, 2 and 8 (C) 5, 2 and 16 (D) 2, 5 and 8
13. The Plot of pH-metric titration of weak base NH_4OH vs strong acid HCl looks like
- (A)

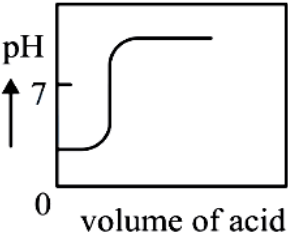


(B)


- (C)

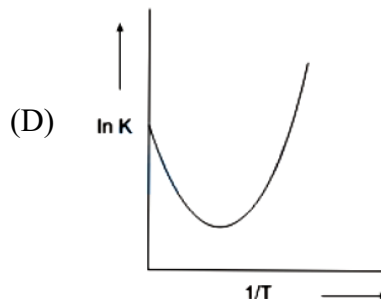
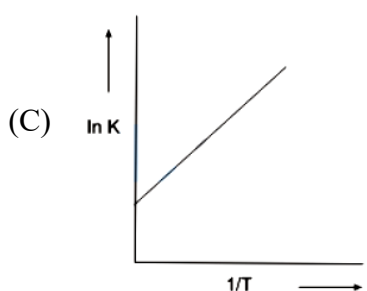
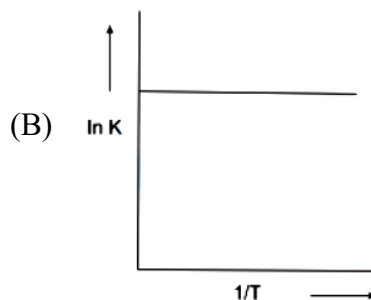
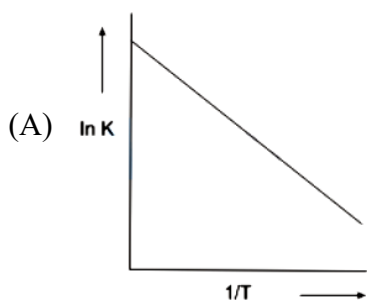


(D)


14. Assuming fully decomposed, the volume of CO_2 released at STP on heating 9.85 g of BaCO_3 (Atomic mass of Ba = 137) will be
 (A) 0.84L (B) 2.24L (C) 4.06L (D) 1.12L

----- Rough Work -----

15. Which $\ln K$ vs $1/T$ plot is correct for an equilibrium that shifts towards reactants at higher temperatures?



16. Given below are two statements:

Statement I: In an organic compound, when inductive and electromeric effects operate in opposite directions, the inductive effect predominates.

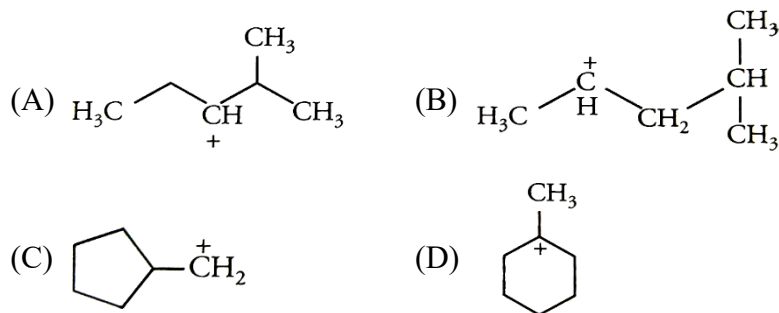
Statement II: Hyperconjugation is observed in *o*-xylene.

In the light of the above statements, choose the correct answer from the options given below:

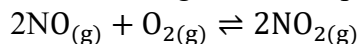
- (A) Statement I is true but Statement II is false.
 (B) Statement I is false but Statement II is true.
 (C) Both Statement I and Statement II are true.
 (D) Both Statement I and Statement II are false.
17. The energy of one mole of photons of radiation of wavelength 300 nm is
 (Given: $h = 6.63 \times 10^{-34}$ J s, $N_A = 6.02 \times 10^{23}$ mol⁻¹, $c = 3 \times 10^8$ ms⁻¹)
 (A) 235 kJ mol⁻¹ (B) 325 kJ mol⁻¹ (C) 399 kJ mol⁻¹ (D) 435 kJ mol⁻¹

----- Rough Work -----

18. The most stable carbocation among the following is



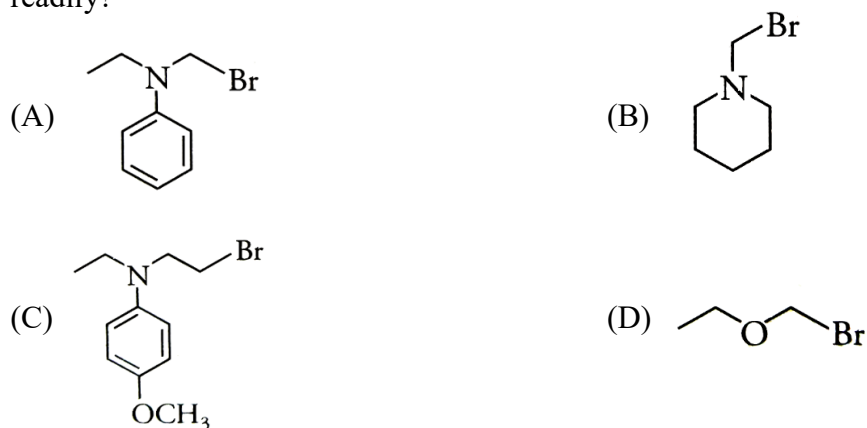
19. The following reaction is performed at 298K.



The standard free energy of formation of $\text{NO}_{(g)}$ is 86.6 kJ/mol at 298 K. What is the standard free energy of formation of $\text{NO}_{2(g)}$ at 298 K? ($K_p = 1.6 \times 10^{12}$)

- (A) $8660 - \frac{\ln(1.6 \times 10^{12})}{R(298)}$
 (B) $0.5[2 \times 86,600 - R(298) \ln(1.6 \times 10^{12})]$
 (C) $R(298) \ln(1.6 \times 10^{12}) - 86600$
 (D) $86600 + R(298) \ln(1.6 \times 10^{12})$

20. Which of the following compounds will form the precipitate with aq. AgNO_3 solution most readily?



----- Rough Work -----

Math (Section – C)

21. If the coefficients of x^7 in $\left(ax^2 + \frac{1}{2bx}\right)^{11}$ and x^{-7} in $\left(ax - \frac{1}{3bx^2}\right)^{11}$ are equal, then
 (A) $64ab = 243$ (B) $729ab = 32$ (C) $32ab = 729$ (D) $243ab = 64$
22. A man X has 7 friends, 4 of them are ladies and 3 are men. His wife Y also has 7 friends, 3 of them are ladies and 4 are men. Assume X and Y have no common friends. Then the total number of ways in which X and Y together can throw a party inviting 3 ladies and 3 men, so that 3 friends of each of X and Y are in this party, is
 (A) 468 (B) 469 (C) 484 (D) 485
23. If x satisfies the inequality $\log_{25}x^2 + (\log_5x)^2 < 2$, then x belongs to
 (A) $\left(\frac{1}{5}, 5\right)$ (B) $\left(\frac{1}{25}, 5\right)$ (C) $\left(\frac{1}{5}, 25\right)$ (D) $\left(\frac{1}{25}, 25\right)$
24. The sum of all the solutions of the equation $(8)^{2x} - 16 \cdot (8)^x + 48 = 0$ is:
 (A) $1 + \log_6(8)$ (B) $\log_8(6)$ (C) $1 + \log_8(6)$ (D) $\log_8(4)$
25. The value of $\operatorname{cosec} 20^\circ \tan 60^\circ - \sec 20^\circ$ is
 (A) 0 (B) 1 (C) 2 (D) 4

----- Rough Work -----

26. Let the mean and the variance of 5 observations x_1, x_2, x_3, x_4, x_5 be $\frac{24}{5}$ and $\frac{194}{25}$ respectively. If the mean and variance of the first 4 observation are $\frac{7}{2}$ and a respectively, then $(4a + x_5)$ is equal to:
(A) 13 (B) 15 (C) 17 (D) 18
27. Number of common tangents of $y = x^2$ and $y = -x^2 + 4x - 4$ is
(A) 1 (B) 2 (C) 3 (D) 4
28. If one of the diameters of the curve $x^2 + y^2 - 4x - 6y + 9 = 0$ is a chord of a circle with centre $(1, 1)$, the radius of the circle is
(A) 3 (B) 2 (C) $\sqrt{2}$ (D) 1
29. The foot of the perpendicular drawn from the origin on the line, $3x + y = \lambda (\lambda \neq 0)$ is P . If the line meets x -axis at A and y -axis at B, then the ratio $BP : PA$ is
(A) 9 : 1 (B) 1 : 3 (C) 3 : 1 (D) 1 : 9
30. Let $a_1, a_2, a_3, \dots, a_n, \dots$ be in A.P. If $a_3 + a_7 + a_{11} + a_{15} = 72$, then the sum of its first 17 terms is equal to
(A) 306 (B) 204 (C) 153 (D) 612

----- Rough Work -----