RANKERS
JEE | NEET | FOUNDATION

RGP – RANKERS GENIUS PROGRAM

(Phase - 02)

(Physics, Chemistry and Mathematics)

Set **A**

Time: 1 Hour | **Moving to Target (JEE)** | **Marks: 120**

1. General Instructions: (Paper Code: 1301)

* *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 XIth, XIIth, Dropper JEE /NEET)		JUNIOR WING (Student's Moving to Class IXth & Xth)	
Overall 1st Topper	₹ 21,000/-	Overall 1st Topper	₹ 5,100/-
Overall 2nd Topper	₹ 11,000/-	Overall 2nd Topper	₹ 3,100/-
Overall 3rd Topper	₹ 5,100/-	Overall 3rd Topper	₹ 2,100/-
Overall 4th – 8th Topper	₹ 2,100/-	Overall 4th – 8th Topper	₹ 1,100/-
Overall 9th – 15th Topper	₹ 1,100/-	Overall 9th – 15th Topper	₹ 500/-

- ✓ Candidate who got 1st Rank in junior or senior wing in RGP (Phase – 01) will not be eligible for any cash Reward in RGP (Phase – 02).

** 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

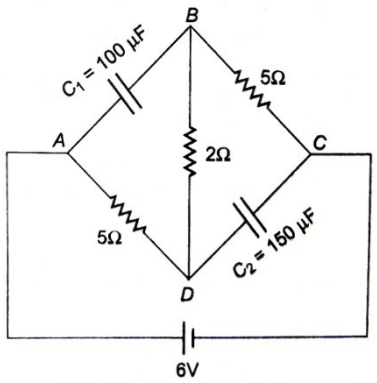
RGP RESULT & REWARD CEREMONY

Result Date: 26th March 2025
Check Your Result at: www.myrankers.com
Reward Ceremony Date: 27th March 2025

Student's Name: - .....

Physics (Section – A)

1. In the circuit shown in Fig. when the steady state is reached, the energy stored in C_1 is E_1 and that stored in C_2 is E_2. The ratio E_2/E_1 is



(A) 1.5 (B) 1.25 (C) 0.75 (D) 0.5

2. Two identical thin rings, each of radius R are coaxially placed a distance R apart. If Q_1 and Q_2 are respectively the charges uniformly spread on the two rings, the work done in moving a charge q from the centre of one ring to the centre of the other is

(A) zero

(B) $\frac{q}{4\pi\varepsilon_0\sqrt{2}\,R}(Q_1 - Q_2)(\sqrt{2}-1)$

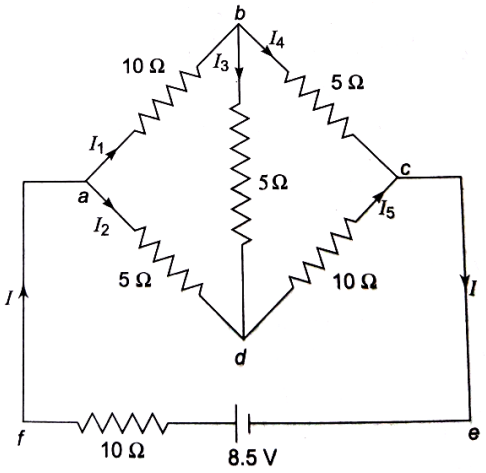
(C) $\frac{q\sqrt{2}}{4\pi\varepsilon_0\,R}(Q_1 + Q_2)$

(D) $\frac{(\sqrt{2}+1)q\,(Q_1+Q_2)}{\sqrt{2}\,4\pi\varepsilon_0\,R}$

---------- *Rough Work* ----------

3. Figure shows a network of six resistors connected a battery of emf 8.5 V and of negligible internal resistance. In branch ab, the current i_1 is

(A) 0.1 A flowing from a to b
(B) 0.1 A flowing from b to a
(C) 0.2 A flowing from a to b
(D) 0.2 A flowing from b to a



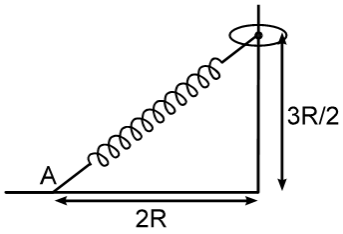
4. A ring of mass 'm' can slide along a fixed smooth vertical rod as shown in fig. The ring is connected by a spring of spring constant $k = \frac{4mg}{R}$ where 2 R is the natural length of spring. The other end of spring is fixed to the ground at point A at a horizontal distance of 2 R from the base of the rod. If the ring is released from a height of **3R/2**. Then it will reach the ground with a speed.

(A) $2\sqrt{gR}$

(B) $\sqrt{2gR}$

(C) $\sqrt{gR}$

(D) $\sqrt{3gR}$

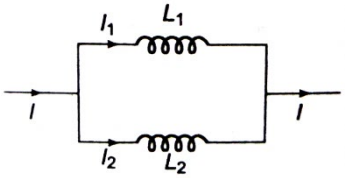


---------- *Rough Work* ----------

5. A proton with kinetic energy K describes a circle of radius r in a uniform magnetic field. An α −particle with kinetic energy K moving in the same magnetic field will describe a circle of radius

(A) $\frac{r}{2}$ (B) r (C) $2\,r$ (D) $4\,r$

6. Two ideal inductors are connected in parallel as shown in fig. A time-varying current flows as shown. The ratio I_1/I_2 at any time t is



(A) $\frac{L_1}{L_2}$ (B) $\frac{L_2}{L_1}$ (C) $\sqrt{\frac{L_1}{L_2}}$ (D) $\sqrt{\frac{L_2}{L_1}}$

7. In a series LCR circuit, the voltage across resistance, capacitance and inductance is the same, each equal to 80 V. If the capacitor is short circuited, the voltage across the inductor becomes

(A) zero (B) 40 V (C) 80 V (D) $40\sqrt{2}$ V

---------- *Rough Work* ----------

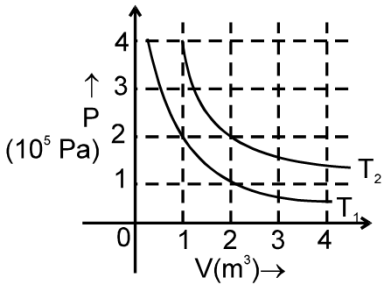
8. Young's double slit experiment is first performed in air and then in a liquid. It is observed that the 10^{th} bright fringe in liquid is replaced by 8^{th} dark fringe in air. The refractive index of the liquid is

(A) $\frac{3}{2}$ (B) $\frac{4}{3}$ (C) $\frac{5}{3}$ (D) $\frac{20}{17}$

9. When a radiation of energy 5 eV falls on a surface, the emitted photoelectrons have maximum kinetic energy of 3 eV. The stopping potential is

(A) 2 V (B) 3 V (C) 5 V (D) 8 V

10. The following graph shows two isotherms for a fixed mass of an ideal gas. Find the ratio of r.m.s. speed of the molecules at temperatures T_1 and T_2?



(A) $1 : \sqrt{2}$

(B) $1 : 2$

(C) $\sqrt{2} : 1$

(D) $2 : 1$

---------- *Rough Work* ----------

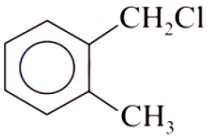
Chemistry (Section – B)

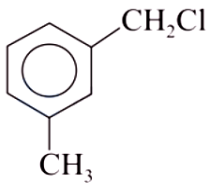
11. When phosphate radical react with ammonium molybdate, the colour of precipitate obtained is
(A) Green (B) Pink
(C) Canary yellow (D) Violet

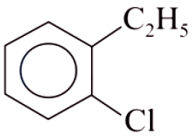
12. What are X and Y in the following reactions?
(i) $MnO_4^- + I^- \xrightarrow{H^+} X$ (ii) $MnO_4^- + I^- \xrightarrow{H_2O} Y$
(A) I_2, IO_4^- (B) I_2, IO_3^- (C) IO_3^-, IO_3^- (D) IO_3^-, I_2

13. Compound (A), C_8H_9Cl, gives a white precipitate when warmed with alcoholic $AgNO_3$. Oxidation of (A) gives an acid (B), $C_8H_6O_4$. (B) easily forms anhydride on heating. Identify the compound (A).

(A) 

(B) 

(C) 

(D) 

14. For the homogenous reaction,
$4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO(g) + 6H_2O(g)$ the equilibrium constant K_c has the units
(A) conc.$^{+10}$ (B) conc.$^{+1}$ (C) conc.$^{-1}$ (D) It is dimensionless

---------- *Rough Work* ----------

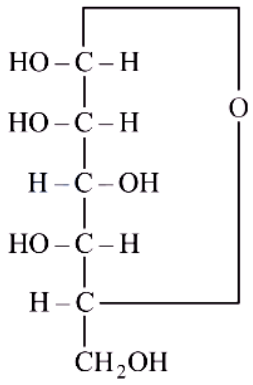
15. The first $(\Delta_i H_1)$ and second $(\Delta_i H_2)$ ionization enthalpies (in kJ mol^{-1}) and the electron enthalpy $(\Delta_{eg} H)$ (in kJ mol^{-1}) of the elements I, II, III, IV and V are given below

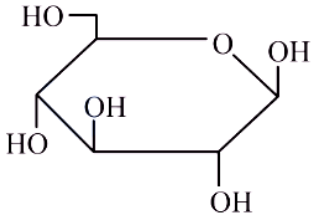
Element	$\Delta_i H_1$	$\Delta_i H_2$	$\Delta_{eg} H$
I	520	7300	– 60
II	419	3051	– 48
III	1681	3374	– 328
IV	1008	1846	– 295
V	2372	5251	+ 48

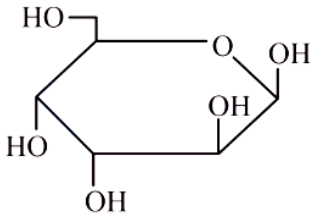
The least reactive non-metal and the most reactive metal of these are respectively

(A) IV and V (B) II and V (C) V and III (D) V and II

16. For the below given cyclic hemiacetal (X), the correct pyranose structure is



(A)


(B)


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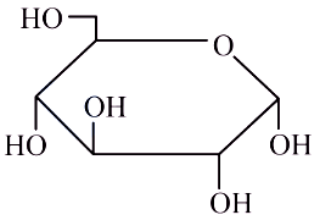
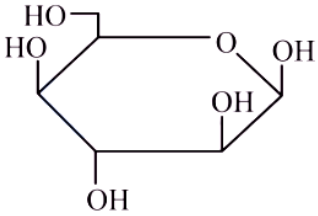
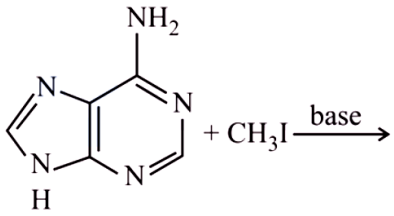


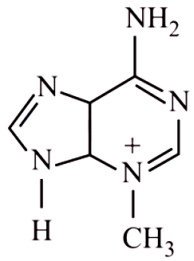
(D)


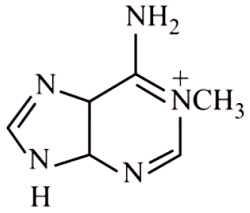
---------- *Rough Work* ----------

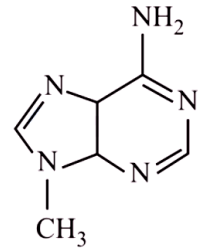
17. 250 g solution of D-glucose in water contains 10.8% of carbon by weight. The molality of the solution is nearest to (Given: Atomic Weights are H = 1u; C = 12 u; O = 16 u)
(A) 1.03 (B) 2.06 (C) 3.09 (D) 5.40

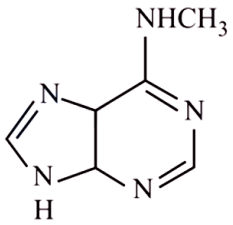
18. The major product in the following reaction is:



(A)


(B)


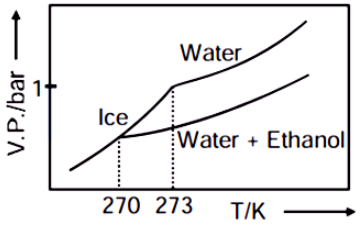
(C)


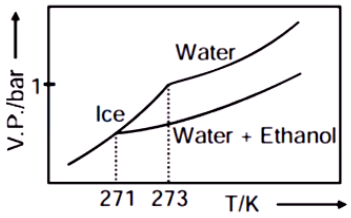
(D)


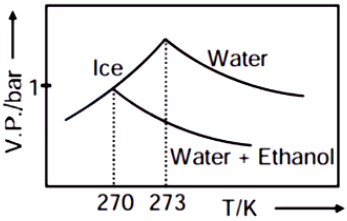
---------- *Rough Work* ----------

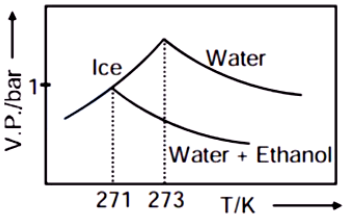
19. The degree of ionization of 0.4M acetic acid will be ($K_a = 1.8 \times 10^{-5}$)
(A) 6.71×10^{-3} (B) 1.6×10^{-3} (C) $0.4 \times 1.8 \times 10^{-5}$ (D) 1.8×10^{-5}

20. Pure water freezes at 273 K and 1 bar. The addition of 34.5 g of ethanol to 500 g of water changes the freezing point of the solution. Use the freezing point depression constant of water as 2 K kg mol^{-1}. The figures shown below represent plots of vapour pressure (V.P.) versus temperature (T). [molecular weight of ethanol is 46 g mol^{-1}]
Among the following, the option representing change in the freezing point is

(A) 

(B) 

(C) 

(D) 

---------- *Rough Work* ----------

Math (Section – C)

21. In a survey it is to be found that 70% of employees like bananas and 64% like apples. If x% like both bananas and apples, then
(A) $x \geq 34$ (B) $x \leq 64$ (C) $34 \leq x \leq 64$ (D) all of these

22. The Cartesian product of A×A has 9 elements two of which are $(-1, 0)$ and $(0, 1)$. The remaining elements of $A \times A$ is given by
(A) $\{(-1, 1), (0, 0), (-1, -1), (1, -1), (0, -1)\}$
(B) $\{(-1, -1), (0, 0), (-1, 1), (1, -1), (1, 0), (1, 1), (0, -1)\}$
(C) $\{1, 0, -1\}$
(D) none of these

23. If $0 < x < \pi$ and $\cos x + \sin x = 1/2$, then $\tan x$ is
(A) $\frac{(1-\sqrt{7})}{4}$ (B) $\frac{(4-\sqrt{7})}{3}$ (C) $-\frac{(4+\sqrt{7})}{3}$ (D) $\frac{(1+\sqrt{7})}{4}$

---------- *Rough Work* ----------

24. The equations $x + 2y + 3z = 1, 2x + y + 3z = 2, 5x + 5y + 9z = 4$ have
(A) unique solution (B) infinite many solutions
(C) no solution (D) none of these

25. If $z\,\overline{z} + (3 - 4i)z + (3 + 4i) = 0$ represent a circle then area of the circle in square units is
(A) 5π (B) 10π (C) $25\pi^2$ (D) 25π

26. Let $f(x) = \frac{x-|x|}{x}$. Then $f(x)$, is
(A) discontinuous everywhere
(B) continuous everywhere
(C) continuous for all x except $x = 1$
(D) continuous for all x except $x = 0$

---------- *Rough Work* ----------

27. The condition that $f(x) = ax^3 + bx^2 + cx + d$ has no extreme value is
(A) $b^2 = 4ac$ (B) $b^2 = 3ac$ (C) $b^2 < 3ac$ (D) $b^2 > 3ac$

28. If P be the sum of odd terms and Q that of even terms in the expansion of $(x + a)^n$, then the value of $[(x + a)^{2n} - (x - a)^{2n}]$ equals
(A) PQ (B) 2 PQ (C) 4 PQ (D) none of these

29. The tangent at (1, 1) to the curve $y^2 = x(2 - x)^2$ meets the curve again at
(A) (9/4, 3/8) (B) (2, 0) (C) (4, 4) (D) (–1, 3)

30. If $a_1, a_2, \ldots, a_n$ are in H.P., then the expression $a_1a_2 + a_2a_3 + \ldots + a_{n-1}a_n$ is equal to
(A) $n(a_1 - a_n)$ (B) $(n - 1)(a_1 - a_n)$
(C) na_1a_n (D) $(n - 1)a_1a_n$

---------- *Rough Work* ----------