RANKERS
JEE | NEET | FOUNDATION

RGP – RANKERS GENIUS PROGRAM

(Phase - 02)

(Physics, Chemistry and Biology)

Set **B**

Time: 1 Hour | **Moving to 12th (NEET)** | **Marks: 120**

1. General Instructions: **(Paper Code: 1204)**

- *This test paper consists of 60 question in 3 section (A, B, C)*

Marking Scheme:

- ***Full marks: + 2 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.**

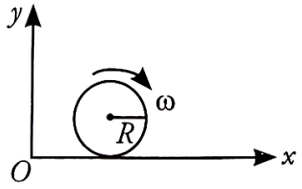
RGP RESULT & REWARD CEREMONY

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. A spherical shell of 1kg mass and radius R is rolling with angular speed ω on horizontal plane (as shown in figure). The magnitude of angular momentum of the shell about the origin O is $\frac{a}{3}R^2\omega$. The value of a will be



(A) 2 (B) 3 (C) 5 (D) 4

2. A body is projected with a velocity equal to twice the escape velocity (v_e) from the surface of earth. The velocity with which it will be travel in space is

(A) $\sqrt{\frac{3GM}{R}}$ (B) $\sqrt{\frac{6GM}{R}}$ (C) $\sqrt{\frac{5GM}{R}}$ (D) $\sqrt{\frac{GM}{R}}$

3. A ball of mass m collides with a wall with speed v and rebounds on the same line with the same speed. If the mass of the wall is taken as infinite, then the work done by the ball on the wall is

(A) mv^2 (B) $\frac{1}{2}mv^2$ (C) $2mv$ (D) zero

4. **Assertion:** As the frictional force increases, the safe velocity limit for taking a turn on an unbanked road also increases.
Reason: banking of roads will increase the value of limiting velocity.
(A) If both assertion and reason are true and reason is the correct explanation of assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of assertion.
(C) If assertion is true but reason is false.
(D) If both assertion and reason are false.

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

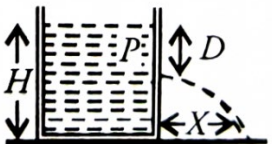
5. A tank is filled with water up to a height H. Water is allowed to come out of a hole P in one of the walls at a depth D below the surface of water. Express the horizontal distance x in terms of H and D

(A) $x = \sqrt{D(H-D)}$

(B) $x = \sqrt{\frac{D(H-D)}{2}}$

(C) $x = 2\sqrt{D(H-D)}$

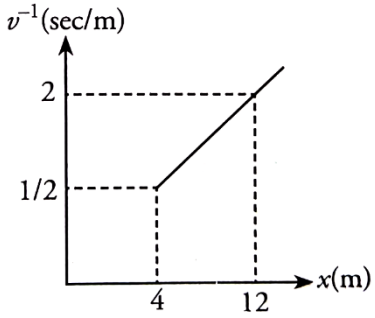
(D) $x = 4\sqrt{D(H-D)}$



6. If the linear momentum is increased by 50%, then kinetic energy will increase by

(A) 50% (B) 100% (C) 125% (D) 25%

7. Graph of $(1/v)$ vs. x for a particle under motion is as shown, where v is velocity and x is position. The time taken by particle to move from $x = 4$ m to $x = 12$ m is



(A) 16/3 sec (B) 10 sec (C) 8 sec (D) 12 sec

8. **Assertion:** The maximum height of a projectile is 25 percent of maximum range.
Reason: The maximum height is independent of initial velocity of projectile.

(A) If both assertion and reason are true and reason is the correct explanation of assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

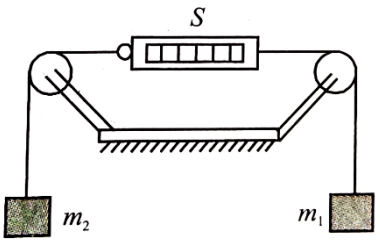
---------- *Rough Work* ----------

9. A simple harmonic oscillator has an amplitude A and time period 6π second. Assuming the oscillation starts from its mean position, the time required by it to travel from $x = A$ to $x = \frac{\sqrt{3}}{2}A$ will be $\frac{\pi}{x}s$, where $x =$ _____.
(A) 4 (B) 5 (C) 3 (D) 2

10. A source of unknown frequency gives 4 beats/s when sounded with a source of known frequency of 250 Hz. The second harmonic of the source of unknown frequency gives five beats per second when sounded with a source of frequency of 513 Hz. The unknown frequency will be:
(A) 246 Hz (B) 240 Hz (C) 260 Hz (D) 254 Hz

11. Let $[\varepsilon_0]$ denote the dimensional formula of the permittivity of vacuum. If M = mass, L = length, T = time and A = electric current, then
(A) $[\varepsilon_0] = [M^{-1}L^2T^{-1}A]$ (B) $[\varepsilon_0] = [M^{-1}L^{-3}T^2A]$
(C) $[\varepsilon_0] = [M^{-1}L^{-3}T^4A^2]$ (D) $[\varepsilon_0] = [M^{-1}L^2T^{-1}A^{-2}]$

12. In the arrangement shown, the pulleys are fixed and ideal, the strings are light, $m_1 > m_2$ and S is a spring balance which is itself massless. The reading of S (in units of mass) is



(A) $m_1 - m_2$ (B) $\frac{1}{2}(m_1 + m_2)$ (C) $\frac{m_1 m_2}{m_1 + m_2}$ (D) $\frac{2m_1 m_2}{m_1 + m_2}$

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

13. A body starts from rest and moves with constant acceleration for t s. It travels a distance x_1 in first half of time and x_2 in next half of time, then
(A) $x_2 = 3x_1$ (B) $x_2 = x_1$ (C) $x_2 = 4x_1$ (D) $x_2 = 2x_1$

14. Two identical rods of metal are welded end to end as shown in figure (i), 20 cal of heat flows through it in 4 minutes. If the rods are welded as shown in figure (ii), the same amount of heat will flow through the rods in

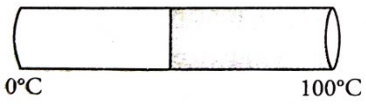


Figure (i)

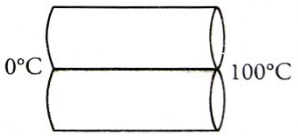
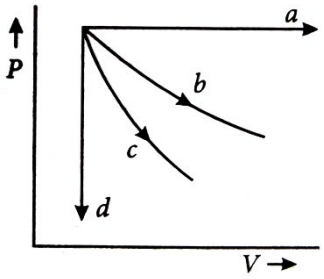


Figure (ii)

(A) 1 minute (B) 2 minutes (C) 4 minutes (D) 16 minutes

15. The given diagram shows four processes $i.e.$, isochoric, isobaric, isothermal and adiabatic. The correct assignment of the processes, in the same order is given by
(A) $d\ a\ c\ b$
(B) $d\ a\ b\ c$
(C) $a\ d\ b\ c$
(D) $a\ d\ c\ b$



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

Chemistry (Section – B)

16. Pure ammonia is placed in a vessel at temperature where its dissociation constant α is appreciable. At equilibrium
(A) K_p does not change significantly with pressure
(B) α does not change with pressure
(C) Concentration of NH_3 does not change with pressure
(D) Concentration of H_2 is less than that of N_2

17. Which compound will show optical isomerism:
(A) 2-Butanol (B) 2-Aminobutane (C) Lactic acid (D) All of these

18. What happens to the concentrations of reactants and products in a dynamic equilibrium stage?
(A) They increase continuously. (B) They decrease continuously.
(C) They fluctuate rapidly. (D) They remain constant.

19. $Br_2(aq)$ and $Fe^{2+}(aq)$
(A) Br_2 will reduce Fe^{2+} (B) Fe^{2+} will reduce Br_2
(C) The reaction is not feasible (D) Both will not react

20. 5 g of benzene on nitration gave 6.6 g of nitrobenzene. The % theoretical yield of the nitrobenzene will be
(A) 4.5 (B) 5.6 (C) 8.37 (D) 6.6

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

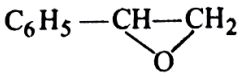
21. With respect to the conformers of ethane, which of the following statements is true?
(A) Bond angle changes but bond length remains same
(B) Both bond angle and bond length change
(C) Both bond angles and bond length remains same
(D) Bond angle remains same but bond length changes

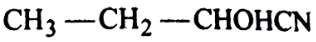
22. What effect does a catalyst have on the equilibrium of a chemical reaction?
(A) It shifts the equilibrium to the left
(B) It shifts the equilibrium to the right
(C) It does not affect the equilibrium
(D) It depends on the specific reaction

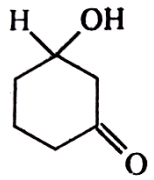
23. 0.44 g of a colourless oxide of nitrogen occupies 224 ml at STP. The molecular formula is
(A) NO (B) NO_2 (C) N_2O (D) N_2O_5

24. An unknown element forms an oxide. What will be the equivalent weight of the element if the oxygen content is 20% by weight
(A) 14 (B) 32 (C) 2 (D) 54

25. Which one of the compound is achiral:

(A) 

(B) 

(C) 

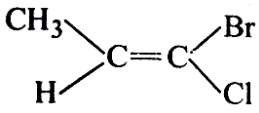
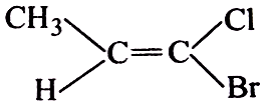
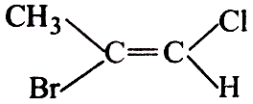
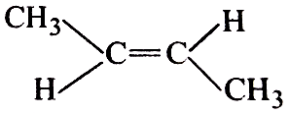
(D) 

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

26. For a given reaction, $\Delta H = 35.5\ kJ\ mol^{-1}$ and $\Delta S = 83.6\ JK^{-1}mol^{-1}$. The reaction is spontaneous at: (Assume that ΔH and ΔS do not vary with temperature)
(A) T < 425 K (B) T > 425 K (C) All temperatures (D) T > 298 K

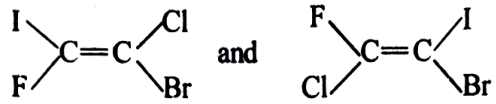
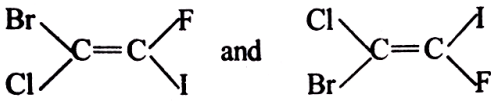
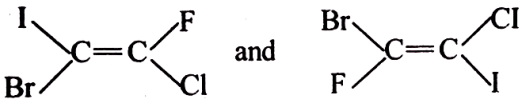
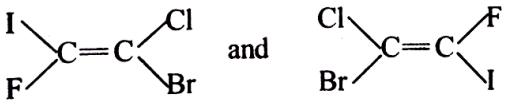
27. In hydrogen atom, the de-Broglie wavelength of an electron in the second Bohr orbit is [Given that, Bohr radius, $a_0 = 52.9\ pm$]
(A) 211.6pm (B) 211.6πpm (C) 52.9πpm (D) 105.8pm

28. Which one of the following is an *Z* isomer?

(A) 
(B) 
(C) 
(D) 

29. The degree of dissociation of 0.1MHCN solution is 0.01%. Its ionisation constant would be
(A) 10^{-3} (B) 10^{-5} (C) 10^{-7} (D) 10^{-9}

30. Which of the following pairs of compounds are geometrical isomers?

(A) 
(B) 
(C) 
(D) 

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

Biology (Section – C)

31. Following are the stages of cell division:
A. Gap 2 phase B. Cytokinesis C. Synthesis phase
D. Karyokinesis E. Gap 1 phase
Choose the correct sequence of stages from the options given below.
(A) C-E-D-A-B (B) E-B-D-A-C (C) B-D-E-A-C (D) E-C-A-D-B

32. Arrange the following events of meiosis in correct sequence
(i) Crossing over
(ii) Synapsis
(iii) Terminalisation of chiasmata
(iv) Disappearance of nucleolus
(A) (i), (ii), (iii), (iv) (B) (ii), (iii), (iv), (i)
(C) (ii), (i), (iv), (iii) (D) (ii), (i), (iii), (iv)

33. Viroids differ from viruses in having
(A) DNA molecules without protein coat
(B) RNA molecules with protein coat
(C) RNA molecules without protein coat
(D) DNA molecules with protein coat

34. Select the mismatch
(A) *Cycas* - Dioecious
(B) *Salvinia* - Heterosporous
(C) *Equisetum* - Homosporous
(D) *Pinus* - Dioecious

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

35. Match the following genera with their respective phylum.

(1) *Ophiura*	(i)	Mollusca
(2) *Physalia*	(ii)	Platyhelminthes
(3) *Pinctada*	(iii)	Echinodermata
(4) *Planaria*	(iv)	Coelenterata

Select the correct option.
(A) (1)-(iv), (2)-(i), (3)-(iii), (4)-(ii)
(B) (1)-(iii), (2)-(iv), (3)-(i), (4)-(ii)
(C) (1)-(i), (2)-(iii), (3)-(iv), (4)-(ii)
(D) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i)

36. Which of the following is characteristic of phospholipids of plasma membrane?
(A) One non-polar head and two polar tails
(B) One polar head and two non-polar tails
(C) Two non-polar heads and one polar tail
(D) Two polar heads and one non-polar tail

37. The nucleus is separated from the surrounding cytoplasm by a nuclear membrane, which is
(A) single layered with pores
(B) double layered with pores
(C) single layered without pores
(D) double layered without pores

38. Concanavalin A is
(A) a pigment (B) an alkaloid (C) an essential oil (D) a lectin

39. Inhibition of succinic dehydrogenase enzyme by malonate is a classical example of
(A) cofactor inhibition (B) feedback inhibition
(C) competitive inhibition (D) enzyme activation

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

40. When tripalmitin is used as a respiratory substrate, the value of RQ is
(A) 0.5 (B) 1.0 (C) 1.7 (D) 0.7

41. Identify the step in tricarboxylic acid cycle, which does not involve oxidation of substrate.
(A) Malic acid → Oxaloacetic acid
(B) Succinic acid → Malic acid
(C) Succinyl-CoA → Succinic acid
(D) Isocitrate → α −ketoglutaric acid

42. NaCl is returned to the interstitium by
(A) ascending limb of $vasa\ recta$
(B) ascending limb of Henle's loop
(C) collecting tubule
(D) descending limb of Henle's loop

43. The pivot joint between atlas and axis is a type of
(A) cartilaginous joint (B) synovial joint
(C) saddle joint (D) fibrous joint

44. Hormone erythropoietin is produced by ____.
(A) heart (B) kidney
(C) ovary (D) pancreas

45. Parathormone deficiency leads to:
(A) Decrease of Ca^{+2} level in blood
(B) Increase of Ca^{+2} level in blood
(C) Osteoporosis
(D) Hypercalcemia

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

46. **Assertion:** Gibberellic acid increases length of grape stalks.
Reason: Ethephon hastens fruit ripening in tomato and apple.
(A) Both assertion and reason are true and reason is the correct explanation of assetion.
(B) Both assertion and reason are true but reason is not the correct explanation of assertion.
(C) Assertion is true but reason is false.
(D) Both assertion and reason are false.

47. Which of the following stages of meiosis involves division of centromere?
(A) Telophase II (B) Metaphase I (C) Metaphase II (D) Anaphase II

48. Which of the following is not a C_4plant?
(A) Maize (B) helianthus (C) Sorghum (D) Sugarcane

49. Bundle sheath cells
(A) have RuBisCO but lack PEP case
(B) have PEP case but lack RuBisCO
(C) lack both RuBisCO and PEP case
(D) have both RuBisCO and PEP case

50. 'The law of limiting factor's was proposed by
(A) Liebig (B) Hatch and Slack (C) Blackman (D) Arnon

51. Connecting link between glycolysis and Krebs' cycle is
(A) PGA (B) aldehyde (C) ketone (D) acetyl CoA

52. Which one of these animals is not a homeotherm?
(A) *Macropus* (B) *Chelone* (C) *Camelus* (D) *Psittacula*

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

53. Consider the following statements.
(a) Ray florets of peach have half inferior ovary.
(b) Epigynous flowers are seen in rose plant.
(c) In brinjal the ovary is superior.
Of these statements,
(A) (a) and (b) are true but (c) is false.
(B) (a) and (c) are true but (b) is false.
(C) (a) and (b) are false but (c) is true.
(D) (a) and (c) are false but (b) is true.

54. Radial vascular bundles occur in
(A) Root (B) Monocot Stem (C) Dicot Stem (D) Leaf

55. Which of the following is not a connective tissue?
(A) Blood (B) Adipose tissue (C) Cartilage (D) Neuroglia

56. Which hormone promotes internode/petiole elongation in deep water rice?
(A) Ethylene (B) 2, 4-D (C) GA_3 (D) Kinetin

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

57. Arrange the following in the order of increasing volume.
I. Tidal volume
II. residual volume
III. Expiratory reserve volume
IV. Vital capacity
(A) I < II < III < IV
(B) I < III < II < IV
(C) I < IV < III < II
(D) I < IV < II < III

58. Every **A** of deoxygenated blood delivers approximately **B** of CO_2 to the alveoli.

A	**B**
(A) 100 mL	4 mL
(B) 50 mL	13 mL
(C) 70 mL	2 mL
(D) 80 mL	0.5 mL

59. What would be the heart rate of a person if the cardiac output is 5L, blood volume in the ventricles at the end of diastole is 100 mL and at the end of ventricular systole is 50 mL?
(A) 125 beats per minute
(B) 50 beats per minute
(C) 75 beats per minute
(D) 100 beats per minute

60. The QRS complex in a standard ECG represents
(A) repolarisation of auricles
(B) depolarisation of auricles
(C) depolarisation of ventricles
(D) repolarisation of ventricles

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