



RGP – RANKERS GENIUS PROGRAM

(SCIENCE, MATH, MAT)

Set

A

Time: 1 Hour

Moving to 11th (MATH)

Marks: 120

1. General Instructions:

(Paper Code: 1101)

- * This test paper consists of 60 questions in 3 sections (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 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 2025

Check Your Result at: www.myrankers.com

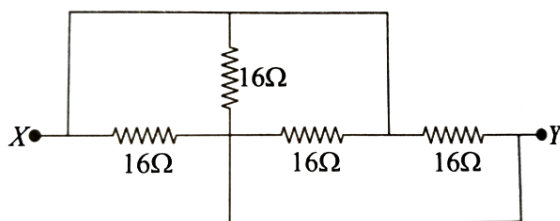
Reward Ceremony Date: 16th Feb 2025

Student's Name: -

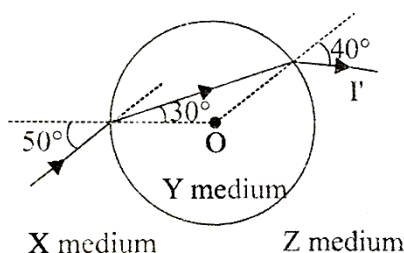
SCIENCE (SECTION – A)

1. A light bulb is placed between two plane mirrors inclined at an angle of 60° . Number of images formed are
 (A) 2 (B) 4 (C) 5 (D) 6

2. What is effective resistance between X – Y?



- (A) 4Ω (B) 6Ω (C) 8Ω (D) 10Ω
3. A point object is placed mid-way between two plane mirrors distance '20 cm' apart. The plane mirror forms an infinite number of images due to multiple reflections. The distance between the 2nd order image formed in the two mirrors is
 (A) Can't find (B) 40 cm (C) 60 cm (D) 80 cm
4. Spherical Y medium with centre O is one side X and the other side is Z environment. The I beam coming to the intersection surface of the X medium and the Y medium passes as an I beam to the Z medium as a result of the refractions.



Accordingly, what is the relationship between the sizes of the refractive indices μ_X , μ_Y , μ_Z , of the X, Y and Z medium?

- (A) $\mu_Y > \mu_X > \mu_Z$ (B) $\mu_Y > \mu_Z > \mu_X$ (C) $\mu_X > \mu_Y > \mu_Z$ (D) $\mu_Z > \mu_Y > \mu_X$

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

5. Nethra, who is a back-bencher, discovers one day in the class that she is unable to discern the details on the blackboard very well. When she visits an optician, he prescribes glasses for her. Which of the following statement(s) is/are false?

I. She suffers from myopia where the far point is nearer than the blackboard.

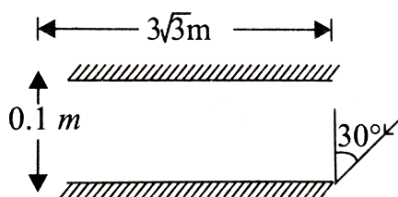
II. A concave lens with a suitable power can help correct her vision.

III. Her eye is defective and is forming images in front of the retina.

IV. A concave lens or a convex lens may be used to correct her vision.

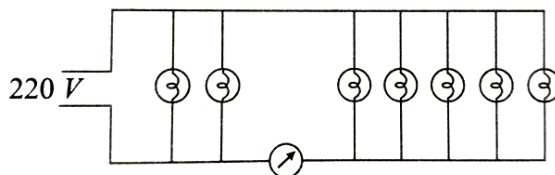
(A) Only I (B) I, II and III (C) I, II and IV (D) Only IV

6. Two plane mirrors are aligned parallel to each other, as shown in the figure. A light ray is incident at an angle of 30° at a point just inside one end of a mirror. The maximum number of times the ray undergoes reflection (including the first one) before it emerges out is



(A) 62 (B) 90 (C) 92 (D) 96

7. Seven identical lamps of resistance 220Ω each are connected to a 220 V line as shown in Figure. Then the reading in the ammeter will be



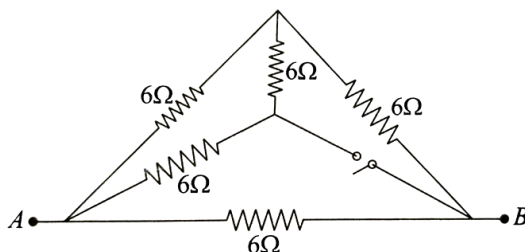
(A) $\frac{1}{10}$ A (B) 2A (C) $\frac{3}{10}$ A (D) 5A

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

8. A rectangular conducting cube (resistivity ρ) has dimensions $l \times b \times h$. When current is passed through the length side, the resistance offered by the cube is

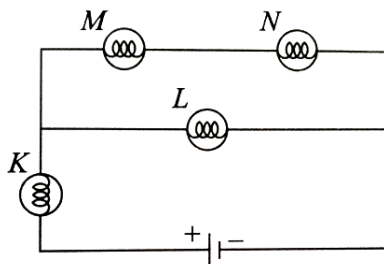
(A) $\frac{\rho l}{bh}$ (B) $\frac{\rho b}{hl}$ (C) $\frac{\rho h}{lb}$ (D) $\rho \frac{lb}{h^2}$

9. R_1 is effective resistance between A – B when the key is open and R_2 is effective resistance when key is closed. What is the value of $\frac{R_1}{R_2}$?



(A) $\frac{2}{3}$ (B) 1 (C) $\frac{4}{3}$ (D) $\frac{5}{3}$

10. All lamps in the figure are identical.

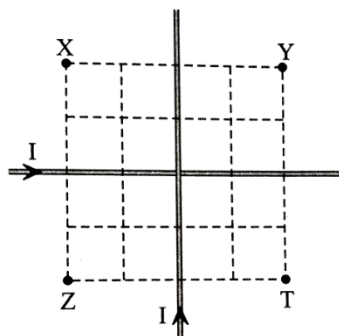


What is the order of intensity of the light given by the lamps?

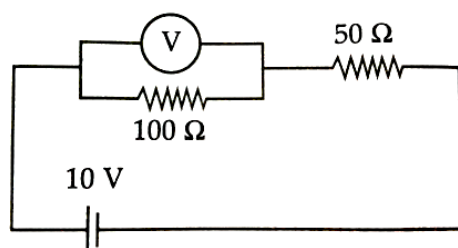
- (A) $M = N > L > K$ (B) $K > L > M > N$
 (C) $K > L > M = N$ (D) $K > M = N > L$

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

11. At which of the point net Magnetic effect due to two wires is zero.



- (A) Y and T (B) Z and T (C) Y and Z (D) X and Z
12. In the given circuit the voltmeter reads 5 V. The resistance of the voltmeter in Ohm is

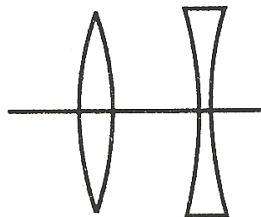


- (A) 200 (B) 100 (C) 10 (D) 50
13. When a charged particle moves in a magnetic field, its kinetic energy always
 (A) decreases (B) increases
 (C) remains constant (D) nothing can be decided
14. An electric bulb marked 40 W – 220 V is connected with an electric supply of 110 V. Its electric power is
 (A) 100 W (B) 40 W (C) 20 W (D) 10 W

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

15. A convex lens and a concave lens, each of focal length 10 cm, are kept separated by a distance of 2 cm as shown in the figure. If the light is incident from left, the combinations of lenses will be _____.

(A) Converging
 (B) Diverging
 (C) Behaving like a glass slab
 (D) Converging or diverging
 depending on whether the lenses are arranged
 as shown in the figure or in the reverse order



16. In which of the following chemical equations, the abbreviations represent the correct state of the reactants and products involved at reaction temperature?
 (A) $2\text{H}_2(l) + \text{O}_2(l) \rightarrow 2\text{H}_2\text{O}(g)$ (B) $2\text{H}_2(g) + \text{O}_2(l) \rightarrow 2\text{H}_2\text{O}(g)$
 (C) $2\text{H}_2(g) + \text{O}_2(g) \rightarrow 2\text{H}_2\text{O}(l)$ (D) $2\text{H}_2(g) + \text{O}_2(g) \rightarrow 2\text{H}_2\text{O}(g)$
17. In the chemical equation representing the reaction between barium chloride and aluminium sulphate solutions, the total sum of all stoichiometric coefficients is equal to
 (A) 7 (B) 9 (C) 6 (D) 10
18. How many grams of oxygen gas will be needed for complete combustion of 2 moles of 3rd member of alkyne series?
 (A) 186 g (B) 256 g (C) 352 g (D) 372 g
19. The final product of prolonged chlorination of methane in the sunlight is
 (A) CH_3Cl (B) CH_2Cl_2 (C) CHCl_3 (D) CCl_4
20. The number of single and double bonds present in the structural formula of benzene is:
 (A) 9, 2 (B) 3, 3 (C) 6, 6 (D) 9, 3

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

21. Which salts are responsible for yellow colour of Taj Mahal in Agra due to Acid rain:
(A) CaCl_2 and CaSO_4 (B) $\text{Ca}(\text{NO}_3)_2$ and CaSO_4
(C) $\text{Ca}(\text{NO}_3)_2$ and BaSO_4 (D) CaSO_4 and BaCl_2
22. The number of carbon atoms present in the fourth member of ketone homologous series is
(A) 4 (B) 5 (C) 6 (D) 7
23. The following observations are given for four metals:
I. Metal H does not react with dilute HCl.
II. Metal K reacts with warm water.
III. Metal L does not react with water but displaces metal H from its aqueous salt solution.
IV. Metal M reacts with cold water.
Choose the correct decreasing order of reactivity of these metals amongst the following:
(A) $M > L > H > K$ (B) $K > M > H > L$
(C) $M > K > L > H$ (D) $L > H > K > M$
24. pH is define as:
(A) $-\log[\text{H}_3\text{O}^+]$ (B) $-\log[\text{H}_2\text{O}]$ (C) $-\log[\text{OH}^-]$ (D) $-\log[\text{H}^+][\text{OH}^-]$
25. What happens when calcium is treated with water?
(i) No reaction occurs
(ii) It reacts violently with water
(iii) It reacts less violently with water
(iv) Bubbles of hydrogen gas formed stick to the surface of calcium
Codes:
(A) (i) and (iv) (B) (ii) and (iv) (C) (i) and (ii) (D) (iii) and (iv)
26. On oxidation with alkaline KMnO_4 followed by acidification of the reaction mixture, which one of the following alcohols would produce an acid having three structural isomers?
(A) Propanol (B) Butanol (C) Pentanol (D) Hexanol

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

27. The product of neutralisation reaction of aqueous sodium carbonate Na_2CO_3 and aqueous HCl are
 (A) NaOH , H_2 (g) and CO_2 (g) (B) NaCl , H_2O and CO_2 (g)
 (C) NaHCO_3 , H_2 (g) and CO_2 (g) (D) NaHCO_3 , H_2O and CO_2 (g)
28. Equal volumes of solutions containing 1 mole of an acid and 1 mole of a base respectively are mixed. Which of this mixture will give pH more than 7 ?
 (A) Sodium hydroxide + Acetic acid
 (B) Potassium hydroxide + Sulphuric acid
 (C) Ammonium hydroxide + Sulphuric acid
 (D) Sodium hydroxide + Hydrochloric acid
29. Which of the following phenomena occur, when a small amount of an acid is added to water?
 (i) Ionisation (ii) Neutralisation
 (iii) Dilution (iv) Salt formation

Codes:

- (A) (i) and (ii) (B) (i) and (iii) (C) (ii) and (iii) (D) (ii) and (iv)

30. Match the chemical substances given in Column I with their appropriate application given in Column II:

Column I

1. Bleaching powder
2. Baking soda
3. Washing soda
4. Sodium chloride

Column II

- (i) Preparation of glass
- (ii) Production of H_2 and Cl_2
- (iii) Decolourisation
- (iv) Antacid

Codes:

- (A) 1 – (i), 2 – (ii), 3 – (iv), 4 – (iii)
 (B) 1 – (iii), 2 – (ii), 3 – (iv), 4 – (i)
 (C) 1 – (iii), 2 – (iv), 3 – (i), 4 – (ii)
 (D) 1 – (ii), 2 – (iv), 3 – (i), 4 – (iii)

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

MATH (SECTION – B)

31. A square is inscribed in a circle of radius 'a'. Another circle is inscribed in the square and again a square is inscribed in this circle. The side of this square is:

(A) $2a$ (B) $\frac{a}{2}$ (C) $\frac{a}{\sqrt{2}}$ (D) a

32. If $a \cos \theta - b \sin \theta = c$, then $a \sin \theta + b \cos \theta = ?$

(A) $\pm \sqrt{a^2 + b^2 + c^2}$ (B) $\pm \sqrt{a^2 + b^2 - c^2}$
 (C) $\pm \sqrt{a^2 - b^2 + c^2}$ (D) $\pm \sqrt{a^2 - b^2 - c^2}$

33. If $x^2 - 3x + 2$ is a factor of $x^4 - px^2 + q$, then the value of p and q respectively are:

(A) $-5, 4$ (B) $-5, -5$ (C) $5, 4$ (D) $5, -4$

34. If $x_1, x_2, x_3, \dots, x_n$ are in A.P. then the value of: $\frac{1}{x_1 x_2} + \frac{1}{x_2 x_3} + \frac{1}{x_3 x_4} + \dots + \frac{1}{x_{n-1} x_n}$ is

(A) $\frac{n-1}{x_1 x_n}$ (B) $\frac{n-1}{x_2 x_{n-1}}$ (C) $\frac{n}{x_1 x_n}$ (D) $\frac{n+1}{x_1 x_n}$

35. If $x^2 + y^2 + \frac{1}{x^2} + \frac{1}{y^2} = 4$, then the value of $x^2 + y^2$ is

(A) 2 (B) 4 (C) 8 (D) 16

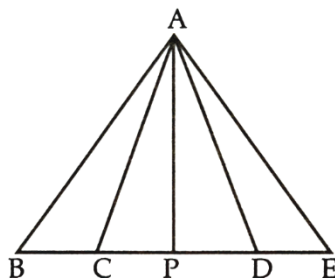
36. If the figure, $BC = CD = DE$ and P is mid-point of CD. The area of ΔAPC is

(A) $\frac{1}{3} \text{ar}(\Delta ABC)$

(B) $\frac{1}{2} \text{ar}(\Delta ABD)$

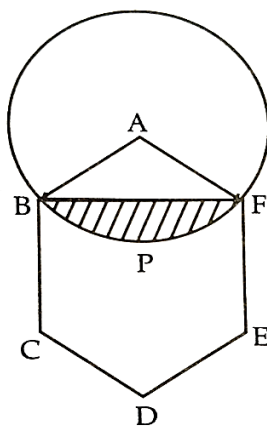
(C) $\frac{1}{6} \text{ar}(\Delta ABC)$

(D) $\frac{1}{4} \text{ar}(\Delta ABD)$



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

37. If x, y and z are positive real numbers and a, b and c are rational numbers, then value of $\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{b-c}+x^{a-c}}$
- (A) -1 (B) 1 (C) 0 (D) 2
38. If the height of right circular cylinder is increased by 10% while radius of base is decreased by 10% then curved surface area of cylinder
- (A) Remains same (B) Decreases by 1%
(C) Increases by 1% (D) Increases by 0.1%
39. Three circles touch each other externally and all the three touch a line. If two of them are equal and radius of third circle is 4 cm then radius of equal circles is:
- (A) 12 cm (B) 8 cm (C) 16 cm (D) 20 cm
40. In the given figure, the centre of the circle is A and ABCDEF is a regular hexagon of side 6 cm. The approximate area of segment BPF is. (Take $\pi = 3.14$)



- (A) 25 cm^2 (B) 22 cm^2 (C) 32 cm^2 (D) 30 cm^2

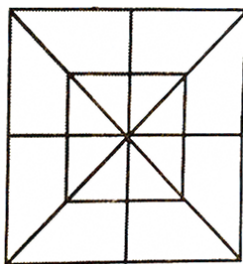
----- Rough Work -----

41. If α, β, γ are the roots of the equation $x^3 + 4x + 1 = 0$, the $(\alpha + \beta)^{-1} + (\beta + \gamma)^{-1} + (\gamma + \alpha)^{-1}$ is
(A) 2 (B) 4 (C) 3 (D) 5
42. The volume of a cube is numerically equal to sum of the length of its edges. The total surface area of cube in square units is
(A) 12 (B) 36 (C) 72 (D) 144
43. The expression $14^m - 6^m$ will always divisible by
(A) 8 (B) 20 (C) 14 (D) 6
44. If $12 \cot^2 \theta - 31 \operatorname{cosec} \theta + 32 = 0$, then value of $\sin \theta$ is:
(A) $\frac{3}{5}$ or 1 (B) $\frac{2}{3}$ or $\frac{-2}{3}$ (C) $\frac{4}{5}$ or $\frac{3}{4}$ (D) $\pm \frac{1}{2}$
45. When 10 is subtracted from each of the given observations, the mean is reduced to 60%. If 5 is added to all the given observation, the mean will be:
(A) 25 (B) 30 (C) 30 (D) 65

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

MAT (SECTION – C)

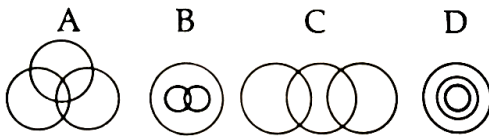
46. If RESPOND is coded as EMPOTDS and SENSE is coded as FRODT, then CLARIFY will be coded as:
 (A) EDTOJME (B) ZEJSBMD (C) ZEJQBKD (D) ZDKSBKD
47. Madhu walks 15 metres towards north, then she turns left at 90° and walks 30 metres, then turns right at 90° and walks 25 metres. How far, she is from the starting point and in which direction?
 (A) 55 mt., North-East (B) 50 mt., North-West
 (C) 60 mt., North (D) 50 mt., West
48. Five friends A, B, C, D and E are standing in a row facing south but not necessarily in the same order. Only B is between A and E, C is immediate right to E and, D is immediate left to A. On the basis of above information, which of the following statement is definitely true?
 (A) B is to the left of A (B) B is to the right of E
 (C) A is second to the left of C (D) D is third to the left of E
49. What is the total number of triangles and total numbers of squares in the given figure?



- (A) 28 triangles, 10 squares (B) 28 triangles, 8 squares
 (C) 32 triangles, 10 squares (D) 32 triangles, 8 squares

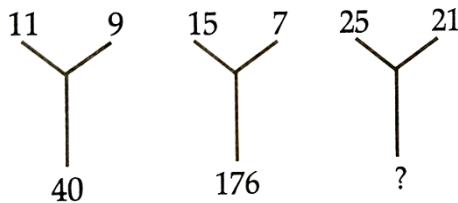
----- *Rough Work* -----

50. A cube whose two adjacent faces are coloured is cut into 64 identical small cubes. How many of those small cubes are not coloured at all?
 (A) 24 (B) 32 (C) 36 (D) 48
51. In a certain code language, 'po ki top ma' means 'Usha is playing cards' 'kop ja ki ma' means 'Asha is playing tennis', 'ki top sop ho' means 'They are playing football' and 'po sur kop' means 'Cards and tennis'. Which word in this language means 'Asha'?
 (A) ja (B) ma (C) kop (D) top
52. Four diagrams marked A, B, C and D are given below. The one that best illustrates the relationship among three given classes:
 Women, Teachers, Doctors



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

53. Select the missing number

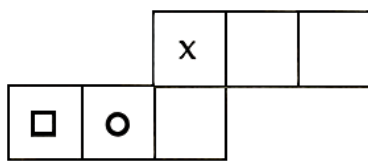


- (A) 184 (B) 210 (C) 241 (D) 425

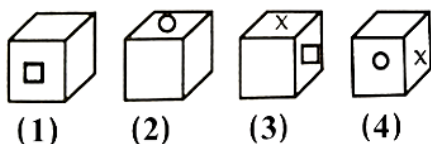
----- Rough Work -----

54. Find the number that does not belong to the group:
111, 331, 482, 551, 263, 383, 362, 284
(A) 263 (B) 331 (C) 383 (D) 551
55. Renu went to the market between 7 am and 8 am. The angle between the hour-hand and the minute-hand was 90° . She returned home between 7 am and 8 am. Then also the angle between the minute-hand and hour-hand was 90° . At what time (nearest to second) did Renu leave and return home?
(A) 7h 18 m 35 s and 7h 51 m 24 s (B) 7 h 19 m 24 s and 7 h 52 m 14s
(C) 7h 20 m 42 s and 7 h 53 m 11 s (D) 7 h 21 m 49 s and 7 h 54 m 33 s
56. Choose the correct mirror-image most closely resemble the word-source, from the four given alternatives.
(A) 2 O U 1 5 9 (B) ə ɔ ɪ n o s
(C) 9 ɔ ɪ u o 2 (D) e c r u o s
57. In the problem figure an unfolded cuboid is given. Choose from the four given alternatives the box that will be formed when problem figure is folded.

Problem figure:



Answer figure:



- (A) (1) only (B) (1) and (2) only
(C) (1), (2) and (3) only (D) (2) and (3) only

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

58. If 25th December of 2008 was Thursday, what will be the day on 1st January of 2010?
(A) Friday (B) Monday (C) Wednesday (D) Sunday
59. During a military training Ashu is seventh from the left and Puru is twelfth from the right in a row. If they interchange their positions, Ashu becomes twenty second from the left. How many candidates are there in the row?
(A) 31 (B) 32 (C) 33 (D) 49
60. If $1 \times 2 = 32$, $4 \times 3 = 712$, $4 \times 7 = 1128$ then 5×1 will be equal to
(A) 63 (B) 64 (C) 65 (D) 66

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