RANKERS
JEE | NEET | FOUNDATION

RGP – RANKERS GENIUS PROGRAM

Set **A**

(SCIENCE, MATH, MAT)

Time: 1 Hour | **Moving to 10th** | **Marks: 120**

(Paper Code: 1001)

1. General Instructions:

- *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 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/-

** 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

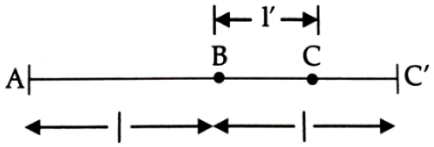
Result Date: 12th Feb 2025
Check Your Result at: www.myrankers.com
Reward Ceremony Date: 16th Feb 2025

Student's Name: - .....

SCIENCE (SECTION – A)

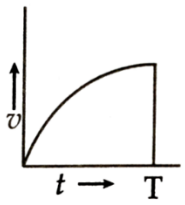
1. A stone dropped from the roof of a building of height h falls through $7\frac{h}{16}$ during its last second. Find the height of building: (take g = 9.8 m/s^2)
(A) 44.6 m (B) 36.4 m (C) 78.4 m (D) 39.2 m

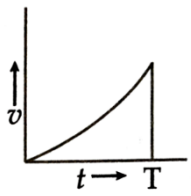
2. A body travels the distance $AB = l$ with a speed 2 m/s. Thereafter, it travels $BC = l'$ with speed 1.5 m/s and the remaining $CC' = (l - l')$ with 0.5 m/s. Calculate the average speed for this journey assuming that the body takes same time in traveling distances BC and CC'.

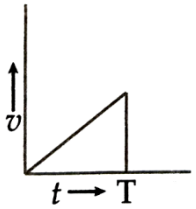


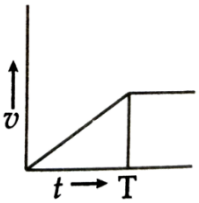
(A) 2 m/s (B) 1.33 m/s (C) 0.66 m/s (D) 0.8 m/s

3. A body initially at rest starts moving when a constant external force F is applied on it. The force F is applied for time $t = 0$ to time $t =$ T. which of the following graph represents the variation of the speed (v) of the body with time (t)?

(A) 

(B) 

(C) 

(D) 

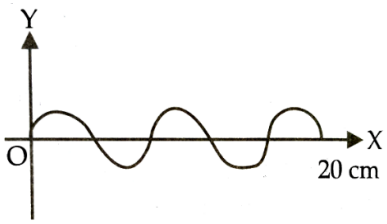
4. A toy of 1.0 kg mass acquires a speed of 5.0 m/s, when pushed forward, calculate the impulse given to the toy:
(A) 0.20 N (B) 500 N (C) 50 N (D) 5.0 N

5. A body moving along a straight line at 20 m/s undergoes an acceleration of 4 m/s^2. After two seconds its speed will be:
(A) 10 m/s (B) 18 m/s (C) 2.8 m/s (D) 28 m/s

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

6. Which will be required a greater force to accelerate a 10 gram mass at $50\ \mathrm{m/s^2}$ or a 20 g mass at $2\ \mathrm{m/s^2}$?
(A) 10 g at $50\ \mathrm{m/s^2}$ (B) 20 g at $2\ \mathrm{m/s^2}$
(C) Equal force (D) none of the above

7. For the wave shown in figure, calculate the frequency and wave length of the wave if its speed is 320 $\mathrm{ms^{-1}}$.



(A) 80 cm, 4000 Hz (B) 8 cm, 4000 Hz (C) 80 cm, 40 Hz (D) 8 cm, 40 Hz

8. In a simple pendulum, mass of bob is m and effective length is L. Work done on the pendulum in one complete oscillation in gravitational field of earth is
(A) $\frac{1}{4}mgL$ (B) $\frac{1}{2}mgL$ (C) zero (D) mgL

9. A bomb of mass 3m kg explodes into two pieces of mass m kg and 2m kg. If the velocity of m kg mass is $16\ \mathrm{ms^{-1}}$, the total kinetic energy released in the explosion is
(A) $192\ m$J (B) $96\ m$J (C) $384\ m$J (D) $768\ m$J

10. If a body is in equilibrium under the effect of some non-collinear forces, then the minimum number of such forces acting upon the body are
(A) 3 (B) 2 (C) 5 (D) 4

11. An element X with atomic number 13 combines with another element Y of atomic number 17. The formula of the compound formed and nature of bond will be:
(A) XY_3, ionic (B) XY_3, covalent (C) X_3Y, ionic (D) X_3Y, covalent

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

12. Identify the incorrect statement for the reaction:
$H_2S + SO_2 \rightarrow 3S + 2H_2O$ is: (Atomic mass of S = 32)
(A) 1 mol H_2O is produced per mole of H_2S consumed.
(B) 3 g of S is produced for every gram of SO_2 consumed.
(C) Two-thirds of the S produced comes from H_2S.
(D) The number of moles of various atoms present before and after the reaction is the same.

13. Select the correct options from the following statements:
I. $^{12}_{6}C$ and $^{14}_{6}C$ are isobars of each other.
II. $^{12}_{6}C$ reacts with $^{16}_{8}O$ to form a product which contains ionic bonds.
III. $^{40}_{20}Ca$ and $^{40}_{18}Ar$ are isobars of each other.
IV. $^{40}_{20}Ca$ reacts with $^{16}_{8}O$ to form a compound whose aqueous solution is known as lime water.
(A) I and II (B) II and III (C) III and IV (D) I and IV

14. Two samples A and B of a pure substance containing elements Y and Z are obtained from two different sources. 5g of sample A contains 1.25 g of Z. Sample B is made of 75% of Y by weight. This is an illustration of which of the following laws?
(A) Law of constant proportion (B) Law of multiple proportion
(C) Law of mass conservation (D) Avogadro's Law

15. Atomic number of an element Z is 16. Element Z has two isotopes Z_1 and Z_2 with 16 and 18 neutrons, respectively. The average atomic mass of a sample of the element Z is 32.1 μ.
Which one of the following percentage of Z_1 and Z_2 in the sample is correct?

	Z_1	Z_2		Z_1	Z_2
(A)	95%	5%	(B)	5%	95%
(C)	8%	92%	(D)	92%	8%

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

16. Let T = Temperature; H = Humidity and v = Wind speed Which of the following are the best suited conditions for drying up of clothes?
(A) T = 40°C, H = 10%, v = 45 m/s (B) T = 28°C, H = 20%, v = 35 m/s
(C) T = 20°C, H = 30%, v = 25 m/s (D) T = 15°C, H = 40%, v = 15 m/s

17. Consider the elements A, B, C and D with atomic numbers 11, 12, 16 and 17, respectively. Which among the following statements regarding these elements are correct?
I. The element C will gain electron more easily than element D.
II. The element B tends to lose electron more readily than C.
III. The oxide of A will be least basic while that of D will be most basic.
IV. The energy required to remove an electron from outermost shell from A will be minimum while that from D will be maximum.
(A) I and III only (B) I and IV only (C) II and III only (D) II and IV only

18. You are provided with 18 g each of O_2, N_2, CH_4 and H_2O. Which of the following is the correct decreasing order of number of atoms present in these samples?
(A) $CH_4 > H_2O > N_2 > O_2$ (B) $O_2 > N_2 > H_2O > CH_4$
(C) $CH_4 > N_2 > O_2 > H_2O$ (D) $N_2 > H_2O > O_2 > CH_4$

19. How many atoms are present in 1 kg of silver? (Atomic mass of silver = 108)
(A) 2.03×10^{23} atoms (B) 5.57×10^{24} atoms
(C) 4.27×10^{-23} atoms (D) 6.23×10^{23} atoms

20. The mass of sodium chloride formed when 5.3 g of sodium carbonate is dissolved in 250 ml of $\frac{1}{2}$ molar HCl solution will be:
(A) 5.85 g (B) 7.32 g (C) 11.7 g (D) 58.5 g

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

21. What is the reason for the cardiac muscle not getting fatigued?
(A) Presence of single nucleus in cells of cardiac muscles
(B) Cylindrical cells protect the cardiac muscles from wear and tear
(C) Because of branching in the cells
(D) Presence of large number of mitochondria

22. What will happen to cells of cyanobacteria if they are placed in purified water
(A) Cell will swell up and burst (B) They will shrink
(C) They will swell and but not burst (D) They will not show any changes

23. In adjacent agricultural lands of nearly equal dimensions, two farmers A and B had cultivated crops of their choice and observed standard practices. A pathogen attacked the crops and destroyed it in the land belonging to farmer A, as a result of which he suffered complete loss. Although the pathogen attacked the adjacent A and belonging to farmer B, he was able to earn some money by selling the yield. The possible explanation for the above is:
(A) Farmer A must have cultivated only one crop whereas farmer B must have cultivated two crops
(B) Farmers A and B must have cultivated the same crop with a fence between the two agricultural lands.
(C) Farmer A over irrigated the crop due to which it attracted the pathogen.
(D) Farmer B removed weeds from the cultivated land.

24. The presence of specific molecule (called markers) in an organelle can be used to identify the presence of that organelle. A researcher has three test tubes with organelles A, B and C, each of which shows the presence of one marker as shown below:

Organelle	**Marker**	**Function of the marker**
1.	Cytochrome oxidase	Involved in ATP synthesis
2.	Ribosomal RNA	Part of ribosome
3.	Acid hydrolyase	Degrades different molecules

Based on the information given in the table, identify the organelles A, B and C.
(A) 1 - Plastids; 2 - Rough Endoplasmic Reticulum (RER); 3 – Lysosomes
(B) 1 - Mitochondria; 2 - Rough Endoplasmic Reticulum (RER); 3 – Lysosomes
(C) 1 - Mitochondria; 2 - Smooth Endoplasmic Reticulum (SER); 3 – Golgi apparatus
(D) 1 - Plastids; 2 - Smooth Endoplasmic Reticulum (SER); 3 – Golgi apparatus

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

25. Which of the following organism is used as a biopesticide?
(A) Azolla (B) Anabaena (C) Rhizobium (D) Trichoderma

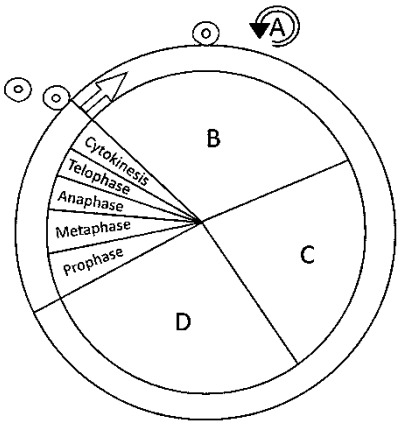
26. Which one of the following demonstrates the characteristics of cardiac muscles cells?
(A) Involuntary and multinucleated (B) Unbranched and uninucleated
(C) Cylindrical and uninucleated (D) Branched and involuntary

27. Which of the following are characteristics feature of cells of meristematic tissues?
(A) Actively dividing cells with dense cytoplasm, thick cell walls and prominent nuclei
(B) Actively dividing cells with thin cytoplasm thick cell walls and prominent nuclei
(C) Actively dividing cells with dense cytoplasm, thin cell walls and no vacuoles
(D) Actively dividing cells with thin cytoplasm thin cell walls and no vacuoles

28. Which of the following is not a part of epidermal tissue system
(A) Companion cells (B) Trichomes (C) Root hair (D) Guard cells

29. Collenchyma is
(A) Living and contains protoplasm (B) Dead and hollow
(C) Dead and filled with reserve food (D) Living but lack cytoplasm

30. Identify A, B, C and D in the given figure



	A	B	C	D
(A)	G_0	G_1	S	G_2
(B)	G_1	S	G_2	G_0
(C)	G_1	G_0	S	G_2
(D)	S	G_0	G_1	G_2

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

MATH (SECTION – B)

31. If $\frac{2^{m+n}}{2^{m-n}} = 16$ and $a = 2^{\frac{1}{10}}$, then $\frac{(a^{2m+n-p})^2}{(a^{m-2n+2p})^{-1}} =$ ____.

(A) 2 (B) $\frac{1}{4}$ (C) 9 (D) $\frac{1}{8}$

32. Find the square root of the expression $\frac{1}{xyz}(x^2 + y^2 + z^2) + 2\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right)$.

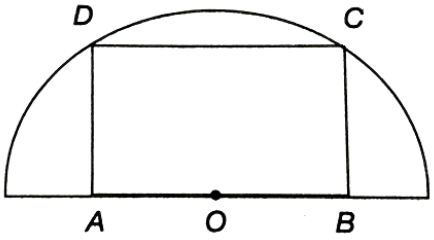
(A) $\frac{x+y+z}{xyz}$ (B) $\sqrt{\frac{yz}{x}} + \sqrt{\frac{zx}{y}} + \sqrt{\frac{xy}{z}}$

(C) $\sqrt{x} + \sqrt{y} + \sqrt{z}$ (D) $\sqrt{\frac{x}{yz}} + \sqrt{\frac{y}{xz}} + \sqrt{\frac{z}{xy}}$

33. The number of possible pairs of successive prime numbers, such that each of them is greater than 40 and their sum is utmost 100, is

(A) 3 (B) 2 (C) 4 (D) 1

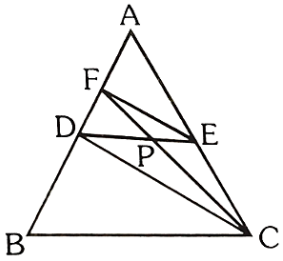
34. In the given figure, ABCD is a rectangle inscribed in a semi-circle. If the length and the breadth of the rectangle are in the ration 2 : 1. What is the ratio of the perimeter of the rectangle to the diameter of the semicircle?



(A) $3 : \sqrt{2}$ (B) $2 : \sqrt{3}$ (C) $2 : \sqrt{5}$ (D) $3 : \sqrt{5}$

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

35. In the figure above (not to scale), $\overline{DE} \parallel \overline{BC}$, $\overline{EF} \parallel \overline{DC}$, $\angle EFC = 30°$ and $\angle FED = 40°$. Find $\angle BCF$.

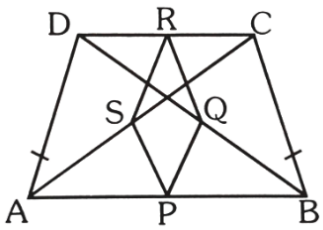


(A) 45° (B) 50° (C) 60° (D) 70°

36. If the difference between an angle and its supplement is 100°, then find the ratio of the larger and the smaller angles.
(A) 3 : 2 (B) 7 : 1
(C) Both (A) and (B) (D) None of the above

37. The ratio of the measure of an angle of a regular octagon to the measure of its exterior angle is
(A) 1 : 2 (B) 1 : 3 (C) 2 : 3 (D) 3 : 1

38. ABCD is a trapezium in which AB | | DC and AD = BC. If P, Q, R, S be respectively the mid-points of BA, BD and CD, CA. Then PQRS is a

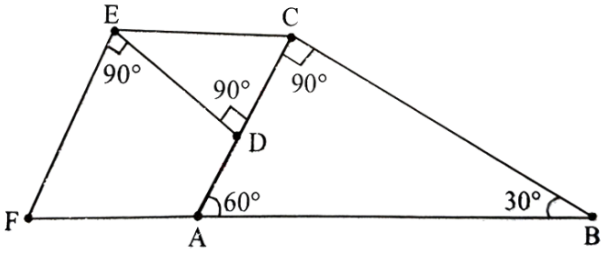


(A) Rhombus (B) Rectangle (C) Parallelogram (D) Square

39. Incentre of a triangle lies in the interior of
(A) an isosceles triangle only (B) a right-angled triangle only
(C) any equilateral triangle only (D) any triangle

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

40. In the adjoining figure, BAC is a 30° - 60° - 90° triangle with AB = 20. D is the midpoint of AC. The perpendicular at D to AC meets the line parallel to AB through C at E. The line through E perpendicular to DE meets BA produced at F. If DF = $5\sqrt{x}$ the x =



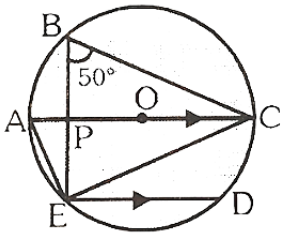
(A) 6 (B) 14 (C) 7 (D) 10

41. If AB is a chord of a circle, P and Q are two points on the circle different from A and B, then
(A) The angle subtended by AB at P and Q are either equal or supplementary.
(B) The sum of the angles subtended by AB at P and Q is always equal two right angles.
(C) The angles subtended at P and Q by AB are always equal.
(D) The sum of the angles subtended at P and Q is equal to four right angles.

42. The number of bricks, each of dimensions 25 cm × 12.5 cm × 7.5 cm, required to construct a wall 6 m long, 5 m high and 0.5 m thick, while the mortar occupies 5% of the volume of the wall, is
(A) 3040 (B) 5740 (C) 6080 (D) 8120

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

43. The chord ED is parallel to the diameter AC, as shown in the figure. The value of ∠CED is equal to



(A) 30° (B) 40° (C) 50° (D) 60°

44. Four horses are tied on the four corners of a square field of 14 m length so that each horse can touch the other two horses. They were able to graze in the area accessible to them for 11 days. For how many days is the ungrazed area sufficient for them?
(A) 3 days (B) 4 days (C) 5 days (D) 2 days

45. If the mean of n observations $ax_1, ax_2, ax_3, \ldots, ax_n$ is $a\bar{x}$ then, $(ax_1 - a\bar{x}) + (ax_2 - a\bar{x}) + \cdots + (ax_n - a\bar{x})$ is
(A) $a\bar{x}$ (B) $-a\bar{x}$ (C) 0 (D) $ax_1 + ax_n$

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

MAT (SECTION – C)

46. India became a republic on 26th January, 1950. Which day of the week was it?
(A) Monday (B) Tuesday (C) Thursday (D) Saturday

47. At what angle (larger) are two hands of a clock inclined at 48 minute past 12?
(A) 264° (B) 263° (C) 265° (D) 266°

48. A clock is set right at 4 am. The clock loses 20 minutes in 24 hours. What will be the time, when the clock indicate 3 am on 4th day?
(A) 5 am (B) 4 am (C) 3 am (D) 4 pm

49. At what time between 3 PM and 4 PM the angle between the minute and hour hands be nine degrees, the minute hand being ahead of the hour hand?
(A) 3 h 15 m 45 s (B) 3 h 16 m (C) 3 h 16 m 30 s (D) 3 h 18 m

50. If TEACHER is coded as KBADFBM, MATURE is coded as ALONEG, then the code of BOARD will be _____.
(A) AMDJC (B) MADKC (C) MACKD (D) AMCJD

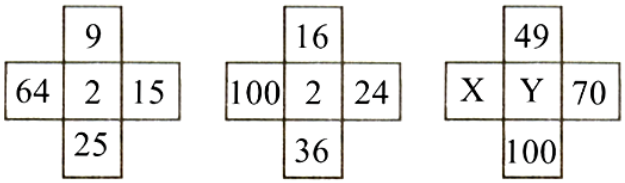
51. Find the missing number in the given sequence.
2, 12, 30, ? , 90, 120
(A) 48 (B) 56 (C) 63 (D) 72

52. Which is the missing term of the following sequence?
002 B, 009 I, 028 J, ____ , 1261
(A) 048 L (B) 065 K (C) 172 G (D) 186 N

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

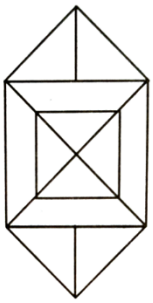
53. Given below are three statements followed by four alternatives. Select the alternative which follows logically, from the given statements.
I. Only boys can register for a competition.
II. Many of the competitors are toppers.
III. All the name of toppers are market with green colour.
(A) All toppers are competitors
(B) Some of the competitors are boys
(C) Some of the competitors are marked with green colour
(D) Only the names of boys are market with green colour

54. Find the value of X and Y.



(A) 289, 3 (B) 289, 5 (C) 121, 7 (D) 121, 4

55. How many triangles are there in the given figure.

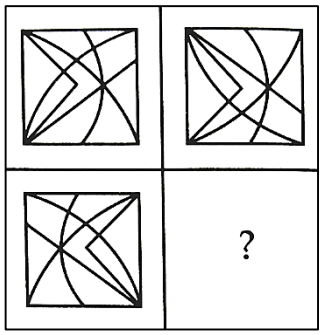


(A) 21 (B) 22 (C) 23 (D) 24

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

56. In a class of 60 students, where girls and boys are in the ratio 2 : 3, the boy 'Kartik' is ranked 17th from the top. If there are 9 girls ahead of Kartik, what is the ratio of number of girls and boys after the rank position of Kartik?
(A) 9 : 27 (B) 15 : 28
(C) 16 : 27 (D) 16 : 28

57. The problem figure given below is a figure matrix. Complete the matrix with suitable option figure.

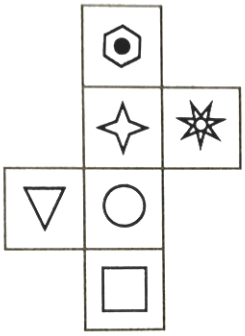


(A)  (B)  (C)  (D) 

58. Each vowel in the word KILOMETER is replaced by the previous letter in the English alphabet & each consonant is replaced by the next letter in the English alphabet, then the substituted letters are arranged in alphabetical order, which will be the fifth from the left end?
(A) D (B) L (C) M (D) N

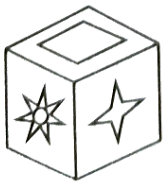
---------- *Rough Work* ----------

59. A problem figure is given below. When it is folded into a cube, which one of the cubes will be formed from the given alternatives?



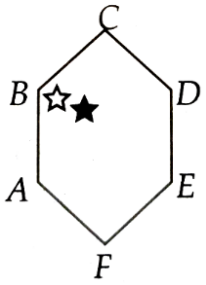
(A) 

(B) 

(C) 

(D) 

60. The black star moves one position at a time anti-clockwise. The white star moves two positions at a time clockwise. In how many moves will they be together again?



(A) 4^{th} (B) 6^{th} (C) 8^{th} (D) 10^{th}

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