112/2025

PART –I **(PAPER – III)**

Total Number of Questions : 48	Maximum Marks : 200	Time : 3 Hours

INSTRUCTIONS (നിർദ്ദേശങ്ങൾ)

1. Question cum Answer Booklets are processed by electronic means. The following instructions are to be strictly followed to avoid invalidation of answer scripts.
(ചോദ്യവും ഉത്തരവും അടങ്ങുന്ന ഈ ബുക്ക് ലെറ്റുകൾ ഇലക്ട്രോണിക് സാങ്കേതിക വിദ്യയുടെ സഹായത്തോടുകൂടെ മൂല്യനിർണ്ണയം നടത്തുന്നതിനാൽ ഇവ അസാധുവാകാതിരിക്കുവാൻ താഴെപ്പറയുന്ന നിർദ്ദേശങ്ങൾ പൂർണ്ണമായും പാലിക്കുക.)

2. The first page of this question cum Answer Booklet is an OMR data Sheet (Part I). All entries in the OMR sheet are to be made with blue or black ball point pen only.
(ഈ പുസ്തകത്തിന്റെ ഒന്നാമത്തെ പേജ് ഒരു ഒ.എം.ആർ. ഡാറ്റാ ഷീറ്റാണ് (പാർട്ട് I). ഇത് നീലയോ, കറുപ്പോ നിറത്തിലെ ബോൾ പോയിന്റ് പേന ഉപയോഗിച്ച് മാത്രമേ പൂരിപ്പിക്കാവൂ.)

3. Make sure that register number is bubbled correctly and completely; no correction is permitted.
(രജിസ്റ്റർ നമ്പർ രേഖപ്പെടുത്തുന്നതിനുള്ള കുമിളകൾ കൃത്യമായും പൂർണ്ണമായും കറുപ്പിച്ചിട്ടുണ്ടെന്ന് ഉറപ്പു വരുത്തുക. തിരുത്തലുകൾ അനുവദനീയമല്ല.)

4. Do not tamper the bar code printed on the OMR sheet and subsequent pages. Tampering of bar code will result in the invalidation of this booklet.
(ഈ പുസ്തകത്തിൽ എവിടെയും പ്രിന്റ് ചെയ്തിരിക്കുന്ന ബാർ കോഡിൽ ഒരു കാരണവശാലും തിരുത്തലുകളോ, മാർക്കുകളോ പാടില്ല. ഇതിനു വിരുദ്ധമായി ചെയ്യുന്ന പക്ഷം ഈ പുസ്തകം അസാധുവാകുന്നതാണ്.)

5. Answers should be written with blue or black ball point pen only.
(ഉത്തരങ്ങൾ നീലയോ, കറുപ്പോ നിറത്തിലെ ബോൾ പോയിന്റ് പേന ഉപയോഗിച്ച് മാത്രമേ എഴുതാവൂ.)

6. Do not write anything outside the margin of space provided for writing the answer and write only one line of answer between two lines.
(പുസ്തകത്തിൽ ഉത്തരം എഴുതുവാൻ നൽകിയിരിക്കുന്ന സ്ഥലത്തിനു വെളിയിൽ യാതൊന്നും തന്നെ എഴുതുവാൻ പാടില്ല. രണ്ടു വരകൾക്കിടയിൽ ഒരു വരി ഉത്തരം മാത്രമേ എഴുതുവാൻ പാടുള്ളൂ.)

7. Rough work should be done only in the specific page provided with.
(റഫ് വർക്കുകൾ ഇതിനായി നൽകിയിരിക്കുന്ന പേജിൽ മാത്രമേ ചെയ്യുവാൻ പാടുള്ളൂ.)

1. There are 312, 260 and 156 students in class X, XI and XII respectively. Buses are to be hired to take these students to a picnic. Find the maximum number of students who can sit in a bus if each bus takes equal number of students. (3 Marks)

2. Show that, if 'n' is odd, then $x+1$ is a factor of x^n+1. (3 Marks)

3. Form a quadratic equation whose one root is $3+\sqrt{2}$. (3 Marks)

4. If the linear system $\begin{matrix} x-y=1 \\ 2x+y=6 \end{matrix}$ has the solution $x=\alpha$ and $y=\beta$, then find the value of $\alpha^2+\beta^2$. (3 Marks)

5. Let $x=\sqrt{12}+3\sqrt{27}+2\sqrt{18}+4\sqrt{8}$. If $x=a\sqrt{2}+b\sqrt{3}$, then find the value of $a+b$. (3 Marks)

6. The first and last terms of an arithmetic progression are 1 and 11. If the sum of its terms is 36, then find its number of terms. (3 Marks)

7. If the cost price of 6 pencils is equal to the selling price of 5 pencils, then find the gain percent. (3 Marks)

8. If $\frac{15}{18}=\frac{x}{6}=\frac{10}{y}=\frac{z}{30}$, then find the values of x, y and z. (3 Marks)

9. Aman's income is 20% less than that of Anil. How much percent is Anil's income more than Aman's income? (3 Marks)

10. Arjun borrowed ₹16,000 from a finance company at 10% interest per annum, compounded half-yearly. What amount of money will discharge his debt after 1½ years? (3 Marks)

11. The arithmetic mean of a set of 'n' numbers is $\bar{x}$. If the sum of first $(n-1)$ terms is 'k', then find the n^{th} number. (3 Marks)

12. Jaison buys shares of face value ₹ 50 of a company that pays 10% of dividend. At what price did he buy each share from the market if his profit is 16% of his investment? (3 Marks)

13. $ABCD$ is a cyclic quadrilateral in which AC and BD are diagonals. If $\angle DBC = 55°$ and $\angle BAC = 45°$, find $\angle BCD$. (3 Marks)

14. A tree is broken at a height of 5 metre from the ground and its top touches the ground at a distance of 12 metre from the base of the tree. Find the original height of the tree. (3 Marks)

15. A cone of height 24 cm and radius of base 6 cm is made up of modeling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere. (3 Marks)

16. In triangle PQR, AB is parallel to QR, PA = 4 cm, PQ = 12 cm and PR = 24 cm. Find the value of PB. (3 Marks)

17. In a triangle ABC, right angled at B, if $\tan A = \frac{1}{\sqrt{3}}$, then find the value of $\sin A \cos C + \cos A \sin C$. (3 Marks)

18. Find a point on the y-axis which is equidistant from the points $A(6, 5)$ and $B(-4, 3)$. (3 Marks)

19. A man decided to cover a distance of 6 km in 84 minutes. He decided to cover two-thirds of the distance at 4 km/hr and the remaining at some different speed. Find the speed after the two-third distance has been covered. (3 Marks)

20. Let X and Y be the sets of all positive divisors of 400 and 1000 respectively (including 1 and the number). Find the number of elements in $X \cap Y$. (3 Marks)

21. Prove that there doesn't exist a rational number 'r' such that $r^2 = 2$. (5 Marks)

22. Show that any positive odd integer is of the form $4q+1$ or $4q+3$, where 'q' is some integer. (5 Marks)

23. Find the quotient and the remainder when x^4-3x^2+4x+5 is divided by x^2+1-x. (5 Marks)

24. Find two consecutive odd positive integers, sum of whose squares is 290. (5 Marks)

25. For which values of 'a' and 'b' does the following pair of linear equations have an infinite number of solutions?

$$2x+3y=7$$
$$(a-b)x+(a+b)y=3a+b-2$$

(5 Marks)

26. Consider the number 53240. (a) Is it a perfect cube? (b) If not, than by which smallest natural number should 53240 be divided so that the quotient is a perfect cube? Also find the perfect cube in that case. (5 Marks)

27. A polygon has 25 sides, the lengths of which starting from the smallest side are in arithmetic progression. If the perimeter of the polygon is 2100 cm and the length of the largest side is 20 times that of the smallest, then find the length of the smallest side. (5 Marks)

28. On selling a pen for ₹ 48, a shopkeeper loses 20%. In order to gain 20%, what should be the selling price? (5 Marks)

29. Arun bought 400 eggs at ₹ 54 a dozen. At what price per hundred must he sell them so as to earn a profit of 15%? (5 Marks)

30. The present age of the father is 42 years and that of his son is 14 years. Find the ratio of (5 Marks)

(a) Present age of the father to the present age of the son.

(b) Age of the father to the age of the son, when the son was 12 years old.

(c) Age of the father after 10 years to the age of the son after 10 years.

(d) Age of father to the age of son when father was 30 years old.

31. Divide ₹ 14,000 among A, B and C such that A gets 50% of what B gets and B gets 50% of what C gets. (5 Marks)

32. In a direct election between two contestants for the post of secretary, 4% of the total votes cast are declared to be illegal. One contestant secures 55% of the valid votes and wins with a majority of 240 votes. Find the total number of votes cast. (5 Marks)

33. The simple interest on a sum of money for 2 years at 8% per annum is ₹ 2,400. What will be the compound interest on that sum at the same rate and for the same period. (5 Marks)

34. The difference between the compound interest and the simple interest on a certain sum for 2 years at 6% per annum is Rs.90. Find the sum. (5 Marks)

35. The arithmetic mean of the marks of boys in a class is 52 and that of girls is 42. The arithmetic mean of marks of boys and girls combined together is 50. Find the percentage of boys in the class. (5 Marks)

36. If the arithmetic mean of the numbers $27+x, 31+x, 89+x, 107+x$ and $156+x$ is 82, then find the arithmetic mean of the numbers $130+x, 126+x, 50+x, 68+x$ and $1+x$. (5 Marks)

37. A shopkeeper sells an article at its marked price ₹ 7,500 and charges sales tax at the rate of 12% from the customer. If the shopkeeper pays a VAT of Rs.180, calculate the price inclusive of the tax paid by the shopkeeper. (5 Marks)

38. A circular part of radius 20 m is situated in a colony. Three boys Ankur, Syed and David are sitting at an equal distance on its boundary, each having a toy telephone in his hands to talk to each other. Find the length of the string of each phone. (5 Marks)

39. The cost of fencing a circular field at the rate of ₹ 24 per metre is ₹ 5,280. The field is to be ploughed at the rate of ₹ 0.50 per square metre. Find the cost of ploughing the field. (Take $\pi=\frac{22}{7}$) (5 Marks)

40. $ABCD$ is a parallelogram with $\angle A = 80^\circ$. The internal bisectors of $\angle B$ and $\angle C$ meet at O. Find the measures of the three angles of triangle BCO. (5 Marks)

41. In triangle ABC, PQ is parallel to BC and the area of the quadrilateral $PBCQ$ is 42 m^2. If $AP : PB = 2:3$, then find the area of triangle APQ. (5 Marks)

42. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water upto the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one fourth of the water flows out. Find the number of lead shots dropped in the vessel. (5 Marks)

43. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds. (5 Marks)

44. On one bank of a river, there is a tree. On another bank, an observer makes an angle of elevation of 60° at the top of the tree. The angle of elevation of the top of the tree at a distance 20 m away from the bank is 30°. Find the width of the river. (5 Marks)

45. Find the values of 'k' for which the line $(k-3)\,x-\left(4-k^2\right)y+k^2-7k+6=0$ is (5 Marks)

(a) Parallel to the x-axis
(b) Parallel to the y-axis and
(c) Passing through the origin.

46. A market research group conducted a survey of 1000 customers and reported that 720 consumers like product A and 450 consumers like product B. What is the least number that must have liked both products? (5 Marks)

47. A train can travel 50% faster than a car. Both start from point A at the same time and reach point B, which is 75 km away from A at the same time. On the way, however, the train lost about 12.5 minutes while stopping at the stations. Find the speed of the car. (5 Marks)

48. A and B can do a piece of work in 12 days; B and C can do it in 15 days while C and A can finish it in 20 days. If A, B, C work together, in how many days with they finish the work? In how many days will each one of them finish it, working done? (5 Marks)

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