DELHI PUBLIC SCHOOL, CHANDIGARH

Periodic Test - 2, Session 2024-25

Class: X Subject: Maths (Set 1)

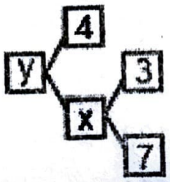
Time: 3:00 hrs Aashita MM: 80

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 source based/case based / passage based/integrated units of assessment (4 marks each) with sub parts.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided.

Section - A

1. The values of x and y in the given figure are:



a) x = 10, y = 14
c) x = 21, y = 84
b) x = 21, y = 25
d) x = 10, y = 40

2. If two positive integers a and b are written as $a = p^3q^4r^6$ and $b = p^6q^2r^4$, where p, q, r are prime numbers, then the result obtained by dividing the product of the positive integers by the LCM (a, b) is:

a) $p^3q^4r^4$
c) $p^3q^2r^4$
b) $p^3q^4r^2$
d) $p^6q^4r^6$

3. The greatest number which divides 87 and 97 leaving 7 as remainder is

a) 10
c) 87×97
b) 1
d) 6300

4. If one zero of the polynomial $p(x) = x^2 - 3kx + 4k$ be twice the other, then the value of k is:

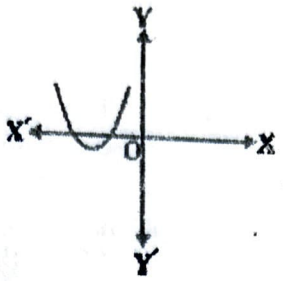
a) −2
c) 2
b) $\frac{1}{2}$
d) $\frac{-1}{2}$

5. If α, β are the zeroes of the polynomial $x^2 - 1$, then the value of $(\alpha + \beta)$ is:

a) − 1
c) 1
b) 0
d) 2

6. The number of zeroes of p(x) in the given figure is:

a) one
b) two
c) three
d) four



7. The pair of equations y = 0 and y = –7 has:

a) one solution
b) infinitely many solutions
c) two solutions
d) no solution

8. 3 chairs and 1 table cost ₹ 900, whereas 5 chairs and 3 tables cost ₹ 2100. If the cost of 1 chair is ₹ x and the cost of 1 table is ₹ y, then the situation can be represented algebraically as

a) $3x + y = 900, 3x + 5y = 2100$
b) $x + 3y = 900, 3x + 5y = 2100$
c) $3x + y = 900, 5x + 3y = 2100$
d) $x + 3y = 900, 5x + 3y = 2100$

9. The ratio of the sum and product of the roots of the equation $7x^2 - 12x + 18$ is:

a) 7 : 12
b) 3 : 2
c) 7 : 18
d) 2 : 3

10. If the quadratic equation $ax^2 + bx + c = 0$ has two real and equal roots, then the value of 'c' is:

a) $\frac{-b}{2a}$
b) $\frac{b}{2a}$
c) $\frac{-b^2}{4a}$
d) $\frac{b^2}{4a}$

11. If p – 1, p + 1 and 2p + 3 are in A.P., then the value of p is:

a) 0
b) 2
c) –2
d) 4

12. $\frac{cos^2\theta}{sin^2\theta} - \frac{1}{sin^2\theta}$, in simplified form is

a) $sec^2\theta$
b) 1
c) $tan^2\theta$
d) –1

13. The common difference of the A.P. whose nth term is given by $a_n = 3n + 7$, is:

a) 7
b) 3n
c) 3
d) 1

14. If the height of a vertical pole is equal to the length of its shadow on the ground, then the angle of elevation of the sun is

a) 0° c) 30°

b) 45° d) 60°

15. If the angle of depression of an object from a 75m high tower is 30°, then the distance of the object from the base of tower is:

a) 150m c) $75\sqrt{3}$

b) $50\sqrt{3}$ d) $25\sqrt{3}$

16. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought?

a) 40 c) 240

b) 480 d) 750

17. In the following frequency distribution, the sum of the lower limit of the modal class and the upper limit of the median class is:

Height (in cm)	100 – 115	115 – 130	130 – 145	145 – 160	160 – 175
No. of Students	15	13	11	10	11

a) 230 c) 260

b) 245 d) 275

18. If the value of each observation of a statistical data is increased by 3, then the mean of the data:

a) remains unchanged c) increases by 3

b) increases by 6 d) increases by 3n

Assertion-Reasoning based MCQs:

Read the following statements carefully to mark the correct option out of the options given below.

(a) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1.

(b) Statement 1 is true, statement 2 is true; statement 2 is not a correct explanation for statement 1.

(c) Statement 1 is true, statement 2 is false.

(d) Statement 1 is false, statement 2 is true.

19. **Assertion:** The probability that a leap year has 53 Sundays is $\frac{2}{7}$.

Reasoning: The probability that a non-leap year has 53 Sundays is $\frac{5}{7}$

20. **Assertion:** For $0 < \theta \leq 90°$, $\operatorname{cosec}\theta - \cot\theta$ and $\operatorname{cosec}\theta + \cot\theta$ are reciprocal of each other.

Reasoning: $\operatorname{cosec}^2\theta - \cot^2\theta = 1$

Section - B

21. For what values of k does the pair of equations given below have a unique solution?

$$6x + ky + 9 = 0$$
$$2x + 3y + 4 = 0$$

OR

Solve the following pair of linear equations by elimination method:

$$7x - 2y = 3$$
$$11x - \frac{3}{2}y = 8$$

22. A bag contains 4 red, 3 blue and 2 yellow balls. One ball is drawn at random from the bag. Find the probability that ball drawn is

a) red

b) yellow

23. If $4\cot^2 45° - \sec^2 60° + \sin^2 60° + p = \frac{3}{4}$, then find the value of p.

OR

If $\cos A + \cos^2 A = 1$, then find the value of $\sin^2 A + \sin^4 A$.

24. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household:

Family Size	1 – 3	3 – 5	5 – 7	7 – 9	9 – 11
No. of families	7	8	2	2	1

Find the mode.

25. Find the discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$ and hence find the nature of its roots.

Section - C

26. Prove that $2 + \sqrt{5}$ is an irrational number.

27. Find the zeroes of the quadratic polynomial $x^2 - 3$ and verify the relationship between the zeroes and the coefficients.

28. Determine the AP whose third term is 16 and 7^{th} term exceeds the 5^{th} term by 12.

OR

How many terms of the AP: 24, 21, 18, ... must be taken so that their sum is 78?

29. From the top of a 7m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.

30. If $\sec\theta = \frac{13}{12}$, then find $\sin\theta$ and $\cot\theta$.

OR

Prove that $\sec A\,(1 - \sin A)(\sec A + \tan A) = 1$

31. One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting

a) a red face card $\frac{6}{52}$

b) The queen of diamonds $\frac{1}{52}$

c) a spade $\frac{13}{52}$

Section - D

32. A train travels at a certain average speed for a distance of 54km and then travels a distance of 63km at an average speed of 6km/hr more than the first speed. If it takes 3 hours to complete the journey, what was its first average speed? 36 km/hr

33. A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Anu paid ₹27 for a book kept for seven days, while Neeru paid ₹ 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day. 15, 3

34. Prove that $\frac{\cos\theta - \sin\theta + 1}{\cos\theta + \sin\theta - 1} = \operatorname{cosec}\theta + \cot\theta$

OR

Prove that $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \sec A.\operatorname{cosec} A$

35. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is ₹18. Find the missing frequency f. → 20

Daily pocket allowance (in ₹)	11 – 13	13 – 15	15 – 17	17 – 19	19 – 21	21 – 23	23 - 25
No. of children	7 10	6 9	9 12	13 16	f 23	5 8	4 7

OR

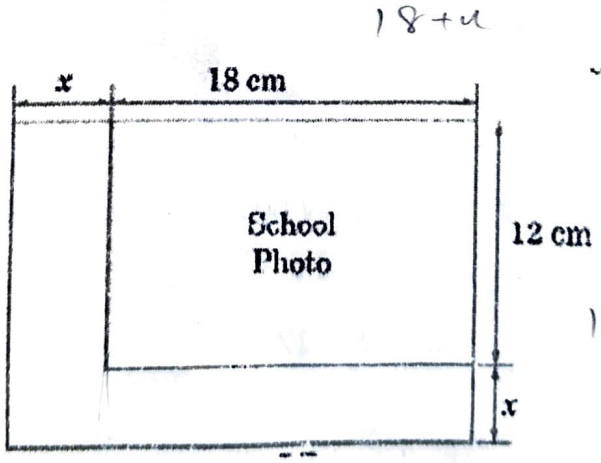
The median of the following data is 525. Find the missing frequencies x and y, if the total of the frequencies is 100.

Class Intervals	Frequency
0 – 100	2
100 – 200	5
200 – 300	x
300 – 400	12
400 – 500	17
500 – 600	20
600 – 700	y
700 – 800	9
800 – 900	7
900 – 1000	4

Section – E

36. **Case Study 1:** While designing the school year book, a teacher asked the student that the length and width of a particular photo is increased by x units each to double the area of the photo. The original photo is 18cm long and 12cm wide.

Based on the above information, answer the following questions:



i) Write an algebraic equation depicting the above information. $x^2+30x-216$ (1)

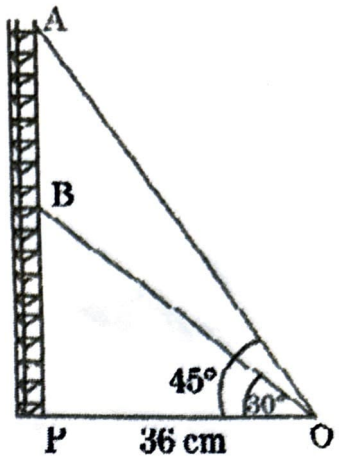
ii) Write the corresponding quadratic equation in standard form. $x^2+30x-216$ (1)

iii) What should be the new dimensions of the enlarged photo? 24, 18.

OR

Can any rational value x make the new area equal to 220 cm^2? (2)

37. **Case Study 2:** Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure. On a similar concept, a radio station tower was built in two Sections A and B. Tower is supported by wires from a point O.



Distance between the base of the tower and the point o is 36cm. From point O, the angle of elevation of the top of the Section B is 30° and the angle of elevation of the top of Section A is 45°.

Based on the above information, answer the following questions:

i) Find the length of the wire from the point O to the top of Section B. 24√3 (1)

ii) Find the height of the Section A from the base of the tower. 36 (1)

iii) Find the distance AB. 12(3-√3)

OR

Find the area of ΔOPB. (2)

38. **Case Study 3:** In the month of April to June 2022, the exports of passenger cars from India increased by 26% in the corresponding quarter 0f 2021-22, as per a report. A car manufacturing company planned to produce 1800 cars in 4th year and 2600 cars in 8th year. Assuming that the production increase uniformly by a fixed number every year.

Based on the above information, answer the following questions:

i) Find the production in the 1st year. 1200 (1)

ii) Find the production in the 12th year. 3400 (1)

iii) Find the total production in first 10 years. 21,000

OR

In how many years will the total production reach 31200 cars? (2)