KULACHI HANSRAJ MODEL SCHOOL
REVISION TEST
CLASS XI (2023-24)
MATHEMATICS

Time allowed: 3 hrs Maximum Marks:80

General Instructions:
1. This Question Paper contains- five Sections A, B, C, D and E. Each section is compulsory.There is no overall choice. However, internal choice is given two questions of 2 marks, three questions of 3 marks and two questions of 5 marks.
2. Section A has 18 MCQs and 02 Assertion-Reasoning 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 (04 marks each) with sub-parts.

Section A

1. In a school, 500 students like coffee and 300 students like juice and 120 students like both coffee and juice. The students liking coffee or juice are
a. 380 b. 420 c. 680 d. 800

2. If A = (4, 6) and B = [5, 7) , then A ∩ B is
a. [5, 6] b. (5, 6] c. (5, 6) d. [5, 6)

3. The domain of the function f is given by $f(x) = \frac{x^3 + 2x^2 - 4x + 5}{x^2 - 2x - 3}$ is

a. R - {1, 3} b. R - (-1, -3) c. R - {-1, 3} d. R - {1, -3}

4. The value of $\cos(45° - \theta) - \sin(45° + \theta)$ is
a. 0 b. 1 c. -1 d. $\frac{1}{2}$

5. If $a + ib = c + id$, then
a. $a^2 + c^2 = 0$ b. $b^2 + c^2 = 0$
c. $b^2 + d^2 = 0$ d. $a^2 + b^2 = c^2 + d^2$

6. Conjugate of complex number $(-a, b)$ is
a. (-a, b) b. (a, b) c. (-a, -b) d. (a, -b)

7. If ${}^{(y^2-y)}C_2 = {}^{(y^2-y)}C_4$, then value of y is :
a. 2 b. 3 c. 3, -2 d. 6

8. If ${}^nP_3 : {}^nP_4 = 1 : 5$, then value of n is:
a. 8 b. 9 c. $\frac{1}{8}$ d. $\frac{1}{9}$

9. The total number of terms in the expansion of $(a^2 + 2ab + b^2)^{101}$ is:
a. 102 b. 203 c. 204 d. 101

10. A rational number is $0.4\overline{3}$ in $\frac{p}{q}$, $q \neq 0$, $p, q \in z$, form is
a. $\frac{13}{30}$ b. $\frac{13}{99}$ c. $\frac{13}{90}$ d. $\frac{13}{60}$

11. The equation of the straight line which passes through the point (1, 2) and cuts off equal intercepts from the axes is
a. x + y + 3 = 0 b. x + y = 3
c. x -y = 3 d. x - y + 3 = 0

12. The centre of the circle $x^2 + y^2 + 6x + 2y = 0$ is
a. (3, 1) b. (3, -1) c. (-3, 1) d. (-3, -1)

13. The distance of the point $(x, y, \sqrt{1 - x^2 - y^2})$ from the origin is:
a. 1 unit b. x units c. y units d. (x -y) units

14. If $y = \sin a \cos x$, then $\frac{dy}{dx}$ is
a. $\cos x \sin a + \sin x \cos a$ b. $\cos a \sin x$
c. $-\sin a \sin x$ d. $-\sin x \cos a$

15. $\lim_{x \to 0} \frac{\sin ax}{\sin bx}$ is equal to
a. $\frac{b}{a}$ b. $\frac{a}{b}$ c. ab d. a + b

16. Variance of the data 2, 4, 5, 6, 8, 17 is 23.33. Then variance of 4, 8, 10, 12, 16, 34 will be
a. 23 .33 b. 46 .66 c. 25.33 d. 93.32

17. Mean deviation from median of first five natural numbers is
a. 1.1 b. 1.2 c. 1.3 d. 1.02

18. If seven people are to be seated in a row, then the probability that two particular people sit next to each other is
a. $\frac{1}{3}$ b. $\frac{2}{7}$ c. $\frac{1}{6}$ d. $\frac{1}{2}$

ASSERTION-REASONING BASED QUESTIONS

In the following questions, a statement of assertion(A) is followed by a statement of Reason(R). Choose the correct answer out of the following choices
a. Both A and R, are true and R is the correct explanation of A
b. Both A and R, are true but R is not the correct explanation of A
c. A is true but R is false
d. A is false but R is true

19. Assertion (A): $\lim_{x \to -1} \frac{x^3 + 1}{x + 1} = 3$

Reason (R): $\lim_{x \to a} \frac{x^n - a^n}{x - a} = na^{n-1}$

20. Assertion(A): If E and G are two events associated with a random experiment such that P(G) = 0.35 ; P(E or G) = 0.85 and P(E and G) = 0.15, then P(E) = 0.65

Reason(R): In case of mutually exclusive events E_1 and E_2, $P(E_1 \text{ or } E_2) = P(E_1) + P(E_2)$

Section B

21. Let A = {2, 3, 4, 5, 6, 7, 8, 9}. Let R be the relation on A defined by {(x, y): x, y ∈ A, x is multiple of y and x ≠ y}.
a. find the relation R.
b. find the domain of R.
c. find the range of R.

OR

Find the domain and range of the real function:

$$f(x) = \frac{x^2 - 16}{x - 4}$$

22. Solve the inequality $\frac{(2x-1)}{3} \geq \frac{3x-2}{4} - \frac{(2-x)}{5}$ for real x.

23. Evaluate : $\lim_{x \to 0} \frac{\sin^2 4x^2}{x^4}$

24. Prove that: $\cos 4x = 1 - 8\sin^2 x \cos^2 x$

25. Find the two numbers whose arithmetic mean is 34 and the geometric mean is 16.

OR

The sum of first two terms of a G.P. is $-\frac{1}{64}$ and the sum of first three terms is $\frac{3}{64}$. What is the seventh term?

Section C

26. If $f(x) = \frac{1}{1-x}$ then show that f[f{f(x)}] = x

27. Prove that : $\frac{\sin 3x + \sin 5x + \sin 7x + \sin 9x}{\cos 3x + \cos 5x + \cos 7x + \cos 9x} = \tan 6x$

OR

Prove that : $\frac{\sin A \sin 2A + \sin 3A \sin 6A}{\sin A \cos 2A + \sin 3A \cos 6A} = \tan 5A$

28. Evaluate : $\sqrt{-7 + 24i}$

OR

Evaluate $\left[\frac{1}{1-4i} - \frac{2}{1+i}\right]\left[\frac{3-4i}{5+i}\right]$ to the standard form.

29. A committee of 6 is to be chosen from 10 men and 7 women, so as to contain at least 3 men and 2 women. In how many different ways can this be done if two particular women refuse to serve on the same committee.

30. Find the derivative of $f(x)$ from the first principle where $f(x) = \sin x + \cos x$.

OR

Differentiate $\frac{x+1}{x-1}$ using first principle.

31. Two students Mohak and Maan appeared in the examination.The probability that Mohak will qualify the examination is 0.05 and Maan will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02, find the probability that
a. both Mohak and Maan will not qualify the examination
b. at least one of them will not qualify the examination.

Section D

32. If $\tan x = \frac{3}{4}$ and x lies in the third quadrant, find the values of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $\tan\frac{x}{2}$.

33. Expand using binomial expression $(1 - x + x^2)^4$.

34. Calculate mean, variance and standard deviation of the following frequency distribution:

Class	1 - 10	11 - 20	21 - 30	31 - 40	41 - 50	51- 60
Frequencies	11	29	18	4	5	3

OR

From a frequency distribution consisting of 18 observations, the mean and the standard deviation were found to be 7 and 4 respectively. But on comparison of the original data, it was found that a figure 12 was missed as 21 in calculations. Calculate the correct mean and standard deviation.

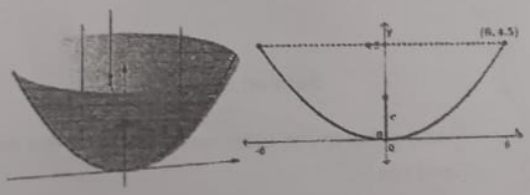
35. Find the equation of the lines which pass through the point(4, 5) and make equal angles with the lines $5x - 12y + 6 = 0$ and $3x = 4y + 7$.

OR

Find the equations of the lines passing through point (3, -2) and inclined at an angle of 60° to the line $\sqrt{3}x + y = 1$.

Section E

36. A satellite dish has a shape like a parabola, where each cross section is parabola. Since radio signals (parallel to axis) will bounce off the surface of the dish to the focus, the receiver should be placed at the focus. The dish is 12 feet across, and 4.5 feet deep at the vertex.



a. Find the equation of the curve.

b. Find the area of triangle formed the vertex and ends of latus rectum of the above curve.

c. Find the focus, length of latus rectum and equation of directrix of the parabola $x^2 = 16y$.

OR

Find the equation of parabola whose vertex is (0,0) and is passing through (2,3) and axis is along x-axis and also find the length of latus rectum.

37. Trees and plants are a vital part of Earth's ecosystem. They provide oxygen for sustenance of life, clean the air by absorbing dust and pollutants, and provide products like rubber and wax that are used commercially. Planting trees is a crucial habit that helps mankind by creating a clean and healthy environment.
Rahul, being a plant lover, decides to open a nursery and he bought few plants and pots.He wants to place pots in such a way that the number of pots in the first row is 2, in the second row is 4, in the third row is 8, and so on...

a. What is the constant multiple by which the number of pots is increasing in every row?

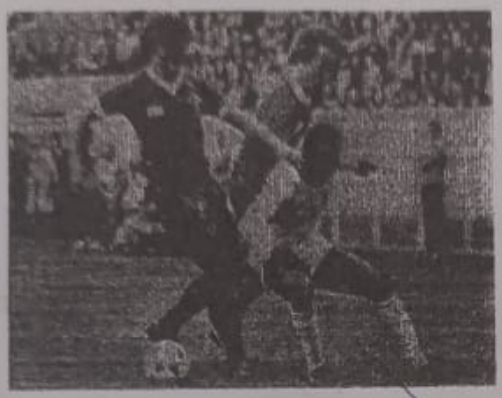
b. Find the difference in number of pots placed in seventh row and fifth row.

c. Find the total number of pots upto tenth row.

OR

If Rahul wants to place 510 pots in total, then how many total number of rows will be formed in this arrangement?

38. From ancient times, physical sports have been considered important for the well-being of a person's mind and body. Not only that, competitive games inculcate a spirit of teamwork and sportsmanship that build a person's character. From a young age, schools make it a point to encourage students to take part in physical sports and tournaments.



In a class of 50 students, 20 students play football and 16 students play hockey. It is found that 10 students play both games.

a. Find the number of students who play hockey only.

b. Find the number of students who play football only.

c. Find the number of students who play at least one of these games

OR

Find the number of students who neither play football nor hockey.