DELHI PUBLIC SCHOOL, JAMMU

SAMPLE QUESTIONS FOR TERM EXAMINATION

(As per the pattern of CBSE Sample Paper)

(2019-20)

Sub: Mathematics **Class: XI**

Q1. Two finite sets have m and n elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. The values of m and n respectively are

a. 7, 6 b. 6, 3

c. 5, 1 d. 8, 7

Q2. The set $(A \cup B \cup C) \cap (A \cap B^c \cap C^c) \cap C^c$ is equal to

a. A$\cap C^c$ b. A $\cap C$

c. B $\cap C^c$ d. None of these

Q3. If A = {2,3,4,8,10}, B = {3,4,5,10,23}, C = {4,5,6,12,14} then (A $\cup B$) $\cap$ $(A \cup C)$

a. {2,3,4,5,8,10,12}
b. {2,4,8,10,12}
c. {3,8,10,12}
d. {2,8,10}

Q4. Of the members of three athletic teams in a school 21 are in the cricket team, 26 are in the hockey team and 29 are in the football team. Among them, 14 play hockey and cricket, 15 play hockey and football, and 12 play football and cricket. Eight play all the three games. The total number of members in the three athletic teams is

a. 43 b. 76 c. 49 d. None

Q5. From 50 students taking examinations in mathematics, physics and chemistry, 37 passed mathematics, 24 physics and 43 chemistry. At most 19 passed mathematics chemistry and at most 20 physics and chemistry. The largest possible number that could have passed all three exams is

a. 10 b. 12 c. 9 d. None

Q6. The term independent of x in the expansion of $\left(\frac{1-x}{1+x}\right)^2$ is

a. 4 b. 3

c. 1 d. None of these

Q7. The remainder when 27^{40} is divided by 12 –

a. 3 b. 7 c. 9 d. 11

Q8. Maximum value of $^{20}C_r$, is equal to

a. $^{20}C_{11}$ b. $^{20}C_{12}$ c. $^{20}C_{10}$ d. none of these

Q9. The middle term in the expansion of $(x + 4)^4$ is –

a. $96\ x^3$ b. $96x^2$ c. $-96x^2$ d. none of these

Q10. Equations of circles which pass through the points (1, -2) and (3, -4) and touch the x-. axis is

a. $x^2 + y^2 + 6x + 2y + 9 = 0$

b. $x^2 + y^2 + 10x + 20y + 25 = 0$

c. $x^2 + y^2 - 6x + 4y + 9 = 0$ d. none

Q11. The equation of circles passing through (3, -6) touching both the axes is

a. $x^2 + y^2 - 6x + 6y + 9 = 0$

b. $x^2 + y^2 + 6x - 6y + 9 = 0$

c. $x^2 + y^2 + 30x - 30y + 225 = 0$

d. $x^2 + y^2 - 30x + 30y + 225 = 0$

Q12. The sequences $S = i + 2i^2 + 3i^3 + 4i^4 + \ldots$upto 100 terms simplifies to, where $i = \sqrt{-1}$

a. $50(1 - i)$ b. $25i$ c. $25(1 + i)$ d. $100(1 - i)$

Q13. If $(x + iy)^{1/3} = a + ib$, then $\frac{x}{a} + \frac{y}{b}$ is equal to

a. $4(a^2 + b^2)$ b. $4(a^2 - b^2)$

c. $4(b^2 - a^2)$ d. None of these

Q14. 8 Chairs are numbered from 1 to 8. Two women & 3 men wish to occupy one chair each. First the women choose the chairs from amongst the chairs marked 1 to 4, then the men select the chairs from among the remaining. The number of possible arrangements is:

a. ${}^6C_3, {}^4C_4$ b. $P_2 . {}^4P_3$ c. ${}^4C_3 {}^4P_3$ d. ${}^4P_2 . {}^6P_3$

Q15. Number of words that can be made with the letters of the word "GENIUS" if each word neither begins with G nor ends in S, is:

a. 24 b. 240 c. 480 d. 504

Q16. 5 boys & 3 girls are sitting in a row of 8 seats. Number of ways in which they can be seated so that not all the girls sit side by side, is:

a. 36000 b. 9080 c. 3960 d. 11600

Q17. The sum of all the numbers which can be formed by using the digits 1, 3, 5, 7 all at a time which have no repeated, is

a. 16 x 4! b. 1111 x 3!

Q18. A line makes an angles 45^o with X – axis and at a distance of $\sqrt{2}$ from the origin. Its equation is

a. $x + y\sqrt{2} = 1$ b. $\sqrt{2x} + y = 1$

c. $y - x = 2$ d. $y - x = \sqrt{2}$

Q19. The equation of line on which the perpendicular from the origin makes 30^o angle with X – axis and which form a triangle of area $\frac{50}{\sqrt{3}}$ with axes, are

a. $x \pm \sqrt{3}y - 10 = 0$ b. $\sqrt{3}x + y \pm 10 = 0$

c. $x + \sqrt{3}y \pm 10 = 0$ d. None of these

Q20. A line passes through the point (1, 2) and makes 60^o angle with X- axis. A point on this line at a distance 3 from the point (1, 2), is

a. $\left(\frac{-5}{2}, 2 - \frac{3\sqrt{3}}{2}\right)$ b. $\left(\frac{3}{2}, 2 + \frac{\sqrt{3}}{2}\right)$

c. $\left(\frac{5}{2}, 2+\frac{3\sqrt{3}}{2}\right)$ d. None of these

Q21. If a line passes through the point P (1, 2) makes an angles of 45^o with the X – axis and meets the line x + 2y – 7 = 0 at Q, then PQ equals.

a. $\frac{2\sqrt{2}}{3}$ b. $\frac{3\sqrt{2}}{3}$ c. $\sqrt{3}$ d. $\sqrt{2}$

Q22. The sum of n terms of 1.2.3 + 2.3.4 + 3.4.5 +…. is

a. $\frac{1}{4}n(n+1)(n+2)$ b. $\frac{1}{4}n(n+1)(n+2)(n+3)$

c. $\frac{1}{2}(n+1)(n+2)(n+3)$ d. none of these

Q23. If a_1, a_2, a_3….a_n….are in AP such that $a_4 - a_7 + a_{10} = m$, then the sum of first 13 terms of this AP is

a. 15 m b. 10m c. 12m d. 13m

Q24. The equation of the parabola whose focus is (-3, 0) and directrix is, x + 5 = 0 is:

a. $y^2 = 4(x-4)$ b. $y^2 = 2(x+4)$ c. $y^2 = 4(x-3)$ d. $y^2 = 4(x+4)$

Q25. If (2, 0) is the vertex & y – axis the diretrix of a parabola, then its focus is:

a. (2, 0) b. (-2, 0) c. (4, 0) d. (-4, 0)

Q26. Which of the following are sets? Justify your answer.

(i) The collection of all the months of a year beginning with the letter J.

(ii) The collection of ten most talented writers of India.

(iii) A team of eleven best-cricket batsmen of the world.

(iv) The collection of all boys in your class.

(v) The collection of all natural numbers less than 100.

(vi) A collection of novels written by the writer Munshi Prem Chand.

(vii) The collection of all even integers.

(viii) The collection of questions in this chapter.

(ix) A collection of most dangerous animals of the world.

Q27. Let A = {1, 2, 3, 4, 5, 6}. Insert the appropriate symbol $\in$ or $\notin$ in the blank spaces:

(i) 5….A (ii) 8….A (iii) 0….A

(iv) 4….A (v) 2….A (vi) 10….A

Q28. Write the following sets in roster form:

(i) A = {x : x is an integer and $-3 \leq x < 7$}

(ii) B = {x : x is a natural number less than 6}

(iii) C = {x : x is a two – digit natural number such that the sum of its digits is 8}

(iv) D = {x : x is a prime number which is divisor of 60}

(v) E = The set of all letters in the word TRIGONOMETRY

(vi) F = The set of all letters in the word BETTER

Q29. Write the following sets in the set-builder form:

(i) {3, 6, 9, 12} (ii) {2, 4, 8, 16, 32) (iii) {5, 25, 125, 625}

Q30. If $\left(\frac{x}{3}+1, y-\frac{2}{3}\right)=\left(\frac{5}{3}, \frac{1}{3}\right)$, find the values of x and y.

Q31. If the set A has 3 elements and the set B = {3, 4, 5}, then find the number of elements in (A × B).

Q32. If G = {7, 8} and H = {5, 4, 2}, find G × H and H × G.

Q33. State whether each of the following statements are true or false. If the statement is false, rewrite the given statement correctly.

(i) If P = {m, n} and Q = {n, m}, then P × Q = {(m, n), (n, m)}

(ii) If A and B are – empty sets, then A × B is a non – empty set of ordered pairs (x, y) such that x $\in$ A and y $\in B$.

(iii) If A = {1, 2}, B = {3, 4}, then $A \times (B \cap \emptyset) = \emptyset$.

Q34. If A = {-1, 1}, find A × A × A.

Q35. If A × B = {(a, x), (a, y), (b, x), (b, y)}. Find A and B.

Q36. A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?

Q37. Find the degree measure of angle subtended at the centre of a circle of radius 100 cm by an arc of length 22 cm (Use $\pi = \frac{22}{7}$).

Q38. In a circle of diameter 40 cm, the length of a chord is 20 cm. Find the length of minor arc of the chord.

Q39. If in two circles arcs of the same length subtend angles 60^o and 75^o at the centre, find the radio of their radii.

Q40. Find the angle in radian through which a pendulum swings if its length is 75 cm and the tip describes an arc of length.

(i) 10 cm (ii) 15 cm (iii) 21 cm

Q41. The angle of a quadrilateral are in A.P. and the greatest angle is 120^o. Express the angles in radians.

Q42. The angles of a triangle are in A.P. and the number of degrees in the least angle is to the number of degrees in the mean angle as 1:120. Find the angles in radians.

Q43. The angle in one regular polygon is to that in another as 3:2 and the number of sides in first is twice that in the second. Determine the number of sides of two polygons.

Q44. The angles of a triangle are in A.P. such that the greatest is 5 times that least. Find the angles in radians.

Q45. Find the coefficient of x^{15} in the expansion of $(x - x^2)^{10}$.

Q46. Find the coefficient of $\frac{1}{x^{17}}$ in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$

Q47. Find the sixth term of the expansion $\left(y^{\frac{1}{2}} + x^{\frac{1}{3}}\right)^n$, if the binomial coefficient of the third term from the end is 45.

Q48. Find the value of r, if the coefficients of $(2r + 4)^{th}$ and $(r - 2)^{th}$ terms in the expansion of $(1 + x)^{18}$ are equal.

Q49. Find the equation of the circle whose centre lies on the positive direction of y-axis at a distance 6 from the origin and whose radius is 4.

Q50. If the equation of two diameters of a circle are $2x + y = 6$ and $3x + 2y = 4$ and the radius is 10, find the equation of the circle.

Q51. $\lim_{x \to -5} \frac{2x^2+9x-5}{x+5}$

Q52. $\lim_{x \to 3} \frac{x^2-4x+3}{x^2-2x-3}$

Q53. $\lim_{x \to 3} \frac{x^4-81}{x^2-9}$

Q54. $\lim_{x \to 4} \frac{x^4-7x+12}{x^2-3x-4}$

Q55. $\lim_{x \to 3} \frac{x^2-x-6}{x^3-3x^2+x-3}$

Q56. If P(9, r) = 3024, find r.

Q57. If P(n, 4) = 12. P(n, 2), find n.

Q58. If P(n – 1, 3) : P(n , 4) = 1 : 9, find n.

Q59. If P (2n – 1, n) : P(2n + 1, n – 1) = 22 : 7 find n

Q60. If P(n , 5) : P(n, 3) = 2 : 1, find n.

Q61. Prove that:

1. P(1, 1) + 2. P(2, 2) + 3. P(3, 3) +....+ n. P (n, n) = P(n + 1, n + 1) – 1

Q62. If P (15, r – 1) : P(16, r – 2) = 3 : 4, find r.

Q63. Find the sum of all integers between 50 and 500 which are divisible by 7.

Q64. Find the sum of the series 3 + 5 + 7 + 6 + 9 + 12 + 9 + 13 + 17 +…to 3n terms.

Q65. Find the sum of all those integers between 100 and 800 each of which on division by 16 leaves the remainder 7 ?

Q66. How many terms are there in the A.P. whose first and fifth terms are -14 and 2 respectively and the sum of the terms is 40?

Q67. The sum of first 7 terms of an A.P. is 10 and that of next 7 terms is 17. Find the progression.

Q68. If the G.P.'s 5, 10, 20,... and 1280, 640, 320,... have their nth terms, equal, find the value of n.

Q69. If 5^{th}, 8^{th} and 11^{th} terms of a G.P. are p.q and s respectively, prove that $q^2 = ps$.

Q70. Find three numbers in G.P. whose sum is 65 and whose product is 3375.

Q71. Find three numbers in G.P. whose sum is 38 and their product is 1728.

Q72. Find the image of the point (3, 8) with respect to the line x + 3y = 7 assuming the line to be a plane mirror.

Q73. If the lines y = 3x + 1 and 2y = x + 3 are equally inclined to the line y = mx + 4, find the value of m.

Q74. If sum of the perpendicular distances of a variable point P (x, y) from the lines x + y – 5 = 0 and 3x – 2y + 7 = 0 is always 10. Show that P must move on a line.

Q75. Find equation of the line which is equidistant from parallel lines $9x + 6y – 7 = 0$ and $3x + 2y + 6 = 0$.

Find the mean deviation about the mean for the data

.Q76.

dncome per day	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800
Number of persons	4	8	9	10	7	5	4	3

Q77.

Height in cms	95-105	105-115	115-125	125-135	135-145	145-155
Number of boys	9	13	26	30	12	10

Q78. An arch is in the form of a semi-ellipse. It is 8 m wide and 2 m high at the centre. Find the height of the arch at a point 1.5 m from one end.

Q79. A rod of length 12 cm moves with its ends always touching the coordinate axes. Determine the equation of the locus of a point P on the rod, which is 3 cm from the end in contact with the x-axis.

Q80. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum.