ARYAN INSTITUTE

CLASS-11TH
SUBJECT-MATHS
SAMPLE PAPER -01

TIME:3hr **M:M-80**

General Instructions:

1. All questions are compulsory. There are 36 questions in all.
2. This question paper has four sections: Section A, Section B, Section C and Section D.
3. Section A contains twenty questions of one mark each, Section B contains six questions of two marks each, Section C contains six questions of four marks each, and Section D contains four questions of six marks each.
4. There is no overall choice. However, internal choices have been provided in three questions of 1 mark each, two questions of 2 marks each, two questions of 4 marks each, and two question of 6 marks each. You have to attempt only one of the alternatives in all such question.
5. Use of calculates is not permitted.

SECTION-A

Q1. Let S be the set of all real numbers. Then the relation $R = \{(a, b): 1 + ab > 0\}$ on S is
(a) reflexive symmetric and transitive
(b) reflexive and symmetric but not transitive
(c) reflexive and transitive but not symmetric
(d) symmetric and transitive but nor reflexive

Q2. In an examination, a candidate is required to pass at lest four different subjects out of 6. Then the number of ways in which he can fail is
(a) 12 (b) 16 (d) 24 (d) 42

Q3. Find a if the coefficient of x^2 and x^3 in the expansion of $(3 + ax)^9$ are equal
(a) $\frac{8}{5}$ (b) $\frac{9}{5}$ (c) $\frac{8}{7}$ (d) $\frac{9}{7}$

Q4. Number of divisors of n = 38808 (except 1 and n) is
(a) 74 (b) 70 (c) 68 (d) 72

Q5. In Z, the set of all integer, inverse of -7 w.r.t. ,*, defined by $a * b = a + b + 7$ for all a, b $\in Z$, is
(a) -14 (b) 14 (c) -7 (d) 7

Q6. If $x^n - 1$ is divisible by x – k for all n belong to naturals N, then the least

positive integral value of k is:
(a) 4 (b) 3 (c) 1 (d) 2

Q7. A sum of money is rounded off to the nearest rupee. The probability that the error occurred in rounding of is at least 15 paise is
(a) $\frac{29}{101}$ (b) $\frac{29}{100}$ (d) $\frac{71}{101}$ (d) $\frac{71}{100}$

Q8. The points A (5, -1, 1), B (7, -4, 7), C (1, -6, 10) and D (-1, -3, 4) are the vertices of
(a) square (b) rhombus (c) none of these (d) rectangle

Q9. Five letters are sent to different person and addresses on the five envelopes are written at random. The probability that all the letters reach correct density is
(a) none of these (b) $\frac{44}{120}$ (c) $\frac{1}{5}$ (d) $\frac{1}{120}$

Q10. In the expansion of $(1+x)^{60}$, the sum of coefficients of odd powers of x is
(a) 2^{58} (b) 2^{60} (c) 2^{61} (d) 2^{59}

Q11. If $f(1+x) = x^2 + 1,$ then $f(2-h)$ is..................................

Q12. Fill in the blanks:
The coefficient of x^5 on the expansion $(x+3)^8$ is........................

Q13. The continued product of first n natural numbers, is called the..................

Q14. Fill in the blanks:
The plane parallel to yz-plane is perpendicular to..................................

OR

If the point P lies on z-axis, then coordinates of P are of the form.........................

Q15. The value of the limit: $\lim_{z\to 3} x+3$ is ....

OR

The value of limit $\lim_{z\to 0} \frac{\sin ax}{bx}$ is ....

Q16. If A = {3, 5, 7, 9, 11}, B = {7, 9, 11, 13}, C = {11, 13, 15} and D = {15, 17} find: $(A \cap B) \cap (B \cup C)$

Q17. How many natural numbers less than 1000 can be formed with the digits 12,3,4 and 5, if repetition of digits is allowed?

Q18. Find the product of complex numbers (2 + 9i), (11 + 3i).

OR

Express $(\sin 130° - i \cos 135°)$ in polar form.

Q19. If U = {1, 2, 3, 4 } and R = {(x, y): y>x for all x, y ϵ U}, then find the domain and range or R.

Q20. In how many ways, can a cricket team of 11 players be selected out of 16 players, If two particular players are always to be included?

Q21. In a school, there are 20 teachers who teachers who teach mathematics or physics. Of these, 12 teach mathematics and 4 teach physics and mathematics. How many teach physics

OR

Find $A\Delta B$, if A = {1, 3, 4} and B = {2, 5, 9, 11}.

Q22. Two die are thrown together. What is the probability that the sum of the number on the two faces is either divisible by 3 or by 4?

Q23. Find the term independent of x in the expansion of $\left(3x - \frac{2}{x^2}\right)^{15}$.

Q24. Without using Pythagoras theorem, show that (12, 8), (-2, 6) and (6,0) are the vertices of right-angled triangle.

OR

Find the slope of a line, which passes through the origin and mid-point of the line segment joining the points P(0, -4) and B (8, 0).

Q25. Given below are two statements
P : 25 is a multiple of 5
Q :25 is multiple of 8
Write the compound. Statements connecting these two statements with "and" and "or". In both cases check the validity of the compound statement.

Q26. Solve : sin 2x + cos x =0.

Q27. In a survey of 25 students, it was found that 15 had taken mathematics, 12 had taken physics and 11 had taken chemistry, 5 had taken mathematics and chemistry, 9 had taken mathematics and physics, 4 had taken physics and chemistry and 3 had taken all the three subjects. Find the number of students who had none of the subjects.

Q28. Let A = {1, 2, 3, 4}, B = {1,5,11,15,16} and f = {(1,5), (2,9), (3,1), (4,5), (2,11)}. Are the following true?
(i) f is a relation from A to B.
(ii) f is a function from A to B. Justify.

OR

Find the domain and the range of the real function f defined by f(x) = |x-1|.

Q29. Find the derivative of the following functions (it is to be understood that a, b, c, d, p, q, r and s are fixed non-zero constants and m and n are integer):
$(ax+b)(cx+d)^2$

Q30. Solve the equation $25x^2 - 30x + 11 = 0$ by using the general expression for the roots of a quadratic equation and show that the roots are complex conjugate.

Q31. Solve the following system of inequalities graphically:
$x + y \leq 9, y > x, x \geq 0$

OR

Solve the inequalities graphically in two-dimensional plane: $-3x + 2y \geq -6$

Q32. Use the principle of Mathematics Induction to prove that $n^3 + 3n^2 + 5n + 3$ is divisible by 3, for all-natural number n.

Q33. Prove that $cos^3 A + cos^3(120° + A) + cos^3(240° + A) = \frac{3}{4} cos^3 A$.

OR

If $x \cos\theta = y \cos\left(\theta + \frac{2\pi}{3}\right) = z \cos\left(\theta + \frac{4\pi}{3}\right)$, then show that xy + yz +zx = 0.

Q34. Find the sum to n terns in each of the series $3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 +$.........

Q35. Find the equation of the whose foci are (6, 4) and (-4, 4) and eccentricity is 2.

OR

Find the equation of the ellipse, whose foci are ($\pm$3,0) and passing through (4, 1).

Q36. An original frequency table with mean 11 and variance 9.9 was lost but the following table derived from it was found. Construct the original table.

Value of deviation (d)	-2	-1	0	1	2
Frequency (f)	1	6	7	4	2