

HALF YEARLY EXAMINATION (2021-22)

CLASS XI

SUBJECT: MATHEMATICS (CODE-041)

MAX. TIME: 90 Minutes

MAX. MARKS: 40

GENERAL INSTRUCTIONS:

1. This question paper contains three sections- A, B and C. Each part is compulsory.
2. Section A has 20 MCQs, attempt any 16 out of 20.
3. Section B has 20 MCQs, attempt any 16 out of 20.
4. Section C has 10 MCQs, attempt any 8 out of 10.
5. There is no negative marking
6. All questions carry one mark each.

SECTION A

In this section, attempt any 16 questions out of questions 1-20. Each question carries one mark

1. Given: $n(U) = 20$, $n(A) = 12$, $n(B) = 9$, $n(A \cap B) = 4$, where U is universal set, then find $n(A \cup B)$ '
 - A) 2
 - B) 3
 - C) 4
 - D) 8
2. If sets A and B are defined as $A = \{(x, y): y = 1/x; x \neq 0, x \in \mathbb{R}\}$ and $B = \{(x, y): y = -x; x \in \mathbb{R}\}$ then which of the following is correct:
 - A) $A \cup B = A$
 - B) $A \cap B = A$
 - C) $A \cap B = B$
 - D) $A \cap B = \emptyset$
3. Let $f(x) = \sqrt{1 + x^2}$ then which of the following is correct:
 - A) $f(xy) = f(x)f(y)$
 - B) $f(xy) \geq f(x)f(y)$
 - C) $f(xy) \leq f(x)f(y)$
 - D) none of these
4. If $f(x) = ax + b$ where a and b are integers, $f(-1) = -5$ and $f(3) = 3$ then (a, b) equal to:
 - A) $(-3, -5)$
 - B) $(2, -3)$
 - C) $(0, 2)$
 - D) $(2, 3)$
5. The domain and range respectively of the function f given by $f(x) = 2 - |x-5|$ is:
 - A) $\mathbb{R}^+,]-\infty, 1[$
 - B) $\mathbb{R}^-,]-\infty, 2[$
 - C) $\mathbb{R},]-\infty, -2[$
 - D) $\mathbb{R},]-\infty, 2]$
6. If $z = (2 + 5i)^2$, then complex conjugate of z is:
 - A) $-21 - 20i$
 - B) $2 - 5i$
 - C) $-2 + 5i$
 - D) $-21 + 20i$
7. If $z = 2 + i$, then the value of $(z^3 + 3z^2 - 9z + 8)$ is:
 - A) $-1 + 14i$
 - B) $-14 - i$

- C) $1+14i$
 D) 0
8. What is the value of x for which $z = 3i^3 - 2xi^2 + (1-x)i + 5$ is a real number?
 A) 0
 B) -2
 C) 2
 D) -5
9. If the sum of n terms of an AP is given by $S_n = 3n + 2n^2$, then the common difference of the AP is:
 A) 2
 B) 3
 C) 6
 D) 4
10. The third term of a GP is 4. The product of its first five terms is:
 A) 4^3
 B) 4^2
 C) 4^5
 D) 4^4
11. Which term of the series $1 - \frac{1}{3} + \frac{1}{9} - \frac{1}{27} + \dots$ is $\frac{-1}{243}$:
 A) 6th
 B) 7th
 C) 5th
 D) Can't be found
12. The fifth term of the sequence whose first two terms are 2 and 3 respectively and $a_n = a_{n-1} + a_{n-2}$ for $n \geq 3$ is:
 A) 5
 B) 8
 C) 13
 D) 6
13. Slope of a line which cuts off the intercepts of equal length on the axis is:
 A) -1
 B) 0
 C) 2
 D) $3^{1/2}$
14. The tangent of angle between the lines whose intercepts on the x and y axes respectively are a , $-b$ and b , $-a$ is:
 A) $\frac{a^2 - b^2}{ab}$
 B) $\frac{b^2 - a^2}{2}$
 C) $\frac{b^2 - a^2}{2ab}$
 D) None of these
15. For specifying the straight line, how many geometrical patterns should be known?
 A) 1
 B) 2
 C) 4
 D) 3

16. If $y = \lim_{x \rightarrow \pi} \frac{\sin x}{x - \pi}$, then the value of y is:
 A) 1
 B) 2
 C) π
 D) -1
17. The value of the $\lim_{x \rightarrow 0} \frac{e^x - e^{\sin x}}{x - \sin x}$ is:
 A) 1
 B) -1
 C) Not defined
 D) e
18. If in a distribution, $N = 80, \sum_{i=1}^n |x - \bar{x}| = 592$, then the mean deviation from mean is:
 A) 4.7
 B) 7.4
 C) $\sqrt{7.4}$
 D) $\sqrt{4.7}$
19. In a distribution of 10 observations, variance is 225, then the standard deviation is:
 A) 225
 B) 22.5
 C) 2250
 D) 15
20. In the given distribution

| | | | | | |
|-----------|-------|-------|-------|-------|-------|
| class | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 |
| frequency | 5 | 4 | 5 | 3 | 2 |

the range is:

- A) 49
 B) 50
 C) 10
 D) None of the above

SECTION B

In this section, attempt any 16 questions out of questions 1-20. Each question carries one mark

21. If A and B are two sets such that $n(A) = 115, n(B) = 326, n(A-B) = 47$ then $n(A \cup B)$ is:
 A) 680
 B) 373
 C) 737
 D) Can't be found
22. The set $(A \cap B')' \cup (B \cap C)$ is equal to:
 A) $A' \cap B$
 B) $A' \cup B$
 C) $A' \cup B \cup C$
 D) $A' \cup B'$
23. Let R be the set of points inside a rectangle of sides a and b ($a, b > 1$) with two sides along the positive direction of x-axis and y-axis, then:
 A) $R = \{(x, y): 0 \leq x \leq a, 0 \leq y \leq b\}$
 B) $R = \{(x, y): 0 \leq x < a, 0 \leq y \leq b\}$
 C) $R = \{(x, y): 0 \leq x \leq a, 0 < y < b\}$
 D) $R = \{(x, y): 0 < x < a, 0 < y < b\}$

24. If $f(x) = \sqrt{a^2 - x^2}$ then domain of $f(x)$ is:
 A) $]-a, a[$
 B) $[-a, a]$
 C) $[0, a]$
 D) $]-a, 0]$
25. If $A = \{(1,2), (3, 4), (5, 6), (6, 6)\}$
 $B = \{(1,2), (2, 3), (3, 4), (4, 5)\}$
 $C = \{(2, 3), (4, 5), (2, 6), (1, 7)\}$
 $D = \{(1,1), (2, 2), (3, 3), (4, 4)\}$
 Then which of the following is true:
 A) A and B are not functions
 B) B and C both are functions
 C) C is a relation and D is a function
 D) A, B, C, D are all functions
26. Modulus of z if $z = \frac{1}{1+i}$ is:
 A) $\frac{1}{2}$
 B) $\frac{1}{4}$
 C) $\frac{1}{\sqrt{2}}$
 D) None of these
27. Let $z_1 = a + bi$ and $z_2 = i^{103}$ if $z_1 = z_2$ then the values of a and b respectively are:
 A) 0, -1
 B) 1, 0
 C) 0, 1
 D) 0, i
28. The value of ab where $a = \sqrt{-25}$, $b = \sqrt{-9}$ is:
 A) $\sqrt{225}$
 B) -15
 C) 15i
 D) None of these
29. If 9 times the 9th term of an AP is equal to 13 times of the 13th term, then 22nd term of this AP is:
 A) 0
 B) 22
 C) 220
 D) 198
30. The minimum value of $4^x + 4^{1-x}$, x is a real number is:
 A) 2
 B) 4
 C) 1
 D) 0
31. Fourth term from the end of the GP 8, 4, 2, $\frac{1}{128}$ is:
 A) $\frac{1}{16}$
 B) $\frac{1}{8}$
 C) 16

D) 8

32. If $S = 2+6+18+\dots\dots\dots, + 486$ then the value of S is:
A) 782
B) 278
C) 728
D) 1728
33. The equation of the straight line passing through the point (3, 2) and perpendicular to the line $y = x$ is:
A) $x - y = 5$
B) $x + y = 5$
C) $x + y = 1$
D) $x - y = 1$
34. The distance between the line $y = mx + c_1$ and $y = mx + c_2$ is:
A) $\frac{c_1 - c_2}{\sqrt{1+m^2}}$
B) $\frac{|c_1 - c_2|}{\sqrt{1+m^2}}$
C) $\frac{c_1 + c_2}{\sqrt{1+m^2}}$
D) 0
35. Find the slope of the line which passes through the origin, and the midpoint of the line segment joining (0, -4), (8, 0)
A) -1/2
B) 1/2
C) 2
D) -2
36. If $y = \lim_{x \rightarrow 1} \frac{(1+x)^n - 1}{x}$ then the value of y is:
A) 1
B) 0
C) n
D) -n
37. If $y = \lim_{x \rightarrow 0} \frac{\sin x}{\sqrt{x+2} - \sqrt{2-x}}$ then the value of y is:
A) $-\sqrt{2}$
B) $\sqrt{2}$
C) 2
D) 1
38. The mean deviation from mean of the first three natural numbers is:
A) .066
B) 6.67
C) 66
D) .667
39. If \bar{x} is the mean of the n observations $x_i, i = 1, 2, 3, \dots, n$, then the value of $\sum_{i=1}^n |x - \bar{x}|$ is equal to:
A) n
B) 1/n
C) 0
D) None of these
40. If $\sum f_i x_i^2 = 202250, \sum f_i x_i = 3100$ and $\sum f_i = 50$ then the variance is:
A) 14.18

- B) 201
- C) 4045
- D) Data is not sufficient

SECTION C

In this section, attempt any 8 questions. Each question carries 1 mark.

Questions 46-50 are based on a Case-Study

41. Two finite sets A and B are having m and n elements respectively. The number of subsets A is 112 more than that of B. The values of m and n respectively are:
- A) 4,7
 - B) 7,4
 - C) 8,3
 - D) 7,3
42. Multiplicative inverse of $(4-3i)$ is:
- A) $4+3i$
 - B) $\frac{4}{5} - i\frac{3}{5}$
 - C) $\frac{4}{25} + i\frac{3}{25}$
 - D) $4+3i$
43. If $S = 6 + 1.2 + 0.24 + \dots$ then S is equal to:
- A) 7.5
 - B) ∞
 - C) 5.7
 - D) 15
44. If the coordinate of the middle point of the portion of a line intercepted between the coordinate axes is $(3, 2)$, then the equation of the line will be:
- A) $2x+3y = 12$
 - B) $3x+2y = 12$
 - C) $4x-3y = 6$
 - D) $5x-2y = 10$
45. If $y = \lim_{x \rightarrow 0} \frac{\log(1+5x)}{3x}$ then y is equal to:
- A) $3/5$
 - B) $5/3$
 - C) 1
 - D) $1/6$



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In a school, class 1-B, is having 50 students. Out of these 50 students 20 play football and 16 play hockey, but it was found that there are 10 students playing both the games.

Based on this information answer the following:

(question46-50)

46. The number of students who play football only
 - A) 50
 - B) 10
 - C) 6
 - D) 26
47. The number of students who play hockey only
 - A) 24
 - B) 26
 - C) 10
 - D) 6
48. The number of students who play at least one of these games:
 - A) 4
 - B) 26
 - C) 24
 - D) 6
- 49.. The number of students who neither play football nor hockey:
 - A) 24
 - B) 26
 - C) 10
 - D) 6
50. The number of students playing football more than hockey:
 - A) 10
 - B) 6
 - C) 4
 - D) 24