

SEMESTER-TWO

MATHEMATICS

Grade-12

Sample Paper-1

Max. Marks: 50

Time Allowed: 90 minutes

General Instructions:

- (i) This question paper consists of 40 questions in 4 sections.
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- (iii) Section A consists of 10 Multiple Choice Questions carrying 1 mark each.
- (iv) Section B consists of 10 Fill in the Blank Type Questions carrying 1 mark each.
- (v) Section C consists of 10 True or False Type Questions carrying 1 mark each.
- (vi) Section D consists of 10 Very Short Answer Questions carrying 2 mark each.

Section A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 10.

1. Greatest number that can be formed using digits 6, 0, 3, 4, 2, 8 is
(a) 8,64,302 (b) 8,64,320 (c) 8,64,032 (d) 8,64,203
2. If $a * b = 2a - 3b + ab$, then $3 * 5 + 5 * 3 =$ is equal to?
(a) 22 (b) 24
(c) 26 (d) 28

3. What is the value of p for which the vector $p(2\hat{i} - \hat{j} + 2\hat{k})$ is of 3 units length?
 (a) 1 (b) 2
 (c) 3 (d) 6
4. Which of the following is not the correct formula for representing a plane?
 (a) $\vec{r} \cdot \hat{n} = d$ (b) $ax + by + cz = d$
 (c) $lx + my + nz = d$ (d) $al + mb + cn = d^2$
5. Vertices of a quadrilateral ABCD are A(0, 0), B(4, 5), C(9, 9) and D(5, 4). What is the shape of the quadrilateral.
 (a) Square (b) Rectangle but not a square
 (c) Rhombus (d) Parallelogram but not a rhombus
6. Another name for mean in statistical techniques?
 (a) Average (b) Range
 (c) Median (d) Standard deviation
7. If $f(1) = 4$, $f'(1) = 2$, the value of derivative of $\log f(e^x)$ w.r.t. at $x = 0$ is:
 (a) 1 (b) 2
 (c) $\frac{1}{2}$ (d) $\frac{1}{8}$
8. If $y = 2^x$, then $\frac{dy}{dx}$ is
 (a) $x(2^{x-1})$ (b) $\frac{2^x}{\log 2}$ (c) $2^x \log 2$ (d) None of these
9. $\int \left(x^2 + \frac{2}{x^3} - 7 \right) dx = ?$
 (a) $\frac{x^3}{3} + \frac{2}{x^2} - 7$ (b) $\frac{x^3}{3} - \frac{2}{x^2} - 7$
 (c) $\frac{x^3}{3} - \frac{1}{x^2} - 7x$ (d) $\frac{x^3}{3} - \frac{1}{x^2} - 7x + c$
10. In the exponential function with general form $y = f(x) = ae^{mx}$, the value is
 (a) 0.3182 (b) 2.71828 (c) 3.71828 (d) 3.1428

Section B

Fill in the blanks with a suitable word for each of the questions 11 – 20.

11. The second derivative of a polynomial of degree _____ is the same value at any x .
12. $\frac{d^2y}{dx^2} = \frac{d}{dx} =$ _____.
13. A square is a plane closed figure which is not bounded by _____.
14. A plane has _____ dimensions.
15. Probability of an impossible event _____.
16. Probability of a sure event _____.
17. _____ is not a rigid because the size of the figure transformed is changed.
18. _____ is an imaginary line on the globe that divides it into three equal parts.
19. If all the sides and interior angles of the polygon are equal, then it is known as a _____.
20. The sum of all the interior angles of a simple n -gon is equal to _____.

Section C

State whether the following statements are true or false for each of the questions 21–30.

21. $\log_a(xy) = \log_a x + \log_a y$.
22. $\log\left(\frac{x}{y}\right) = \log_a x - \log_a y$.
23. $A \cup (B \cap C) = (A \cap B) \cap (A \cap C)$
24. $A \cap (B \cup C) = (A \cup B) \cup (A \cap C)$
25. Surface area of a cuboid = $3(lb + bh + hl)$
26. Slant height formula is $l = \sqrt{r^2 + h^2}$.
27. Formula of surface area of a pyramid is $S = l^2 + 2lh$.
28. $n! = 1 \cdot 2 \cdot 3 \dots \dots \dots (n + 1) \cdot n$.

29. Permutation formula is equal to ${}^n P_r = \frac{n!}{(n-r)!}$.
30. $\log_n m = \log_p m / \log_p n$.

Section D

Answer each of the questions 31 – 40.

31. If Peter can do a piece of work in 10 days and Joseph can complete the same work in 12 days, in how many days will both of them together complete it?
32. If $A = \{4, 5, 7, 9, 11\}$, $B = \{7, 9, 11, 13\}$, $C = \{11, 13, 14, 15\}$ and $D = \{15, 17\}$; find
- | | |
|------------------------------------|-----------------------------------|
| (i) $A \cap B$ | (ii) $A \cap C \cap D$ |
| (iii) $A \cap (B \cup D)$ | (iv) $(A \cap B) \cap (B \cup C)$ |
| (v) $(A \cup D) \cap (B \cup C)$. | |
33. If 20% of x is equal to 30% of y , then find $x : y$.
34. Simplify: $260 \times 15 - 5 \times 20$
35. Find the unit vector \vec{p} for the given vector, $14\hat{i} - 3\hat{j} - 4\hat{k}$
36. A is the image of $A(-3, -6)$ under a reflection in the x -axis. Find the coordinates of A.
37. A polygon is an octagon and its side length is 12 cm. Calculate its perimeter and value of one interior angle.
38. The length, breadth and height of a cuboid are 20 cm, 15 cm and 25 cm respectively. Find the surface area.
39. Solve: ${}^{10}P_6 = {}^9P_6 + 6 {}^9P_2$.
40. Find the probability of the event A if (i) odds infavour of event A are $7 : 9$ (ii) odds against A are $5 : 6$.