

Semester: Level 3, Sem I

Branch: DVOC (Ref. & Air Cond., Auto. Servicing, ITM, PT, SD, AMT, FP, EMS)

Subject Name: Applied Mathematics-I

Time Allowed : 2 Hrs.

MM:50

Section A**Note: Very short answer type questions. Attempt all ten questions.****10X2=20**Q.1. The roster form of the set $\{x : x \text{ is an integer and } -2 \leq x < 4\}$ is

- (a) $\{-2, -1, 0, 1, 2, 3, 4\}$ (b) $\{-2, -1, 0, 1, 2, 3\}$
 (c) $\{-1, 0, 1, 2, 3\}$ (d) None of these

Q.2. If $A = \{a, b\}$, then the set $A \times A$ is equal to _____.

- (a) $\{a^2, b^2\}$ (b) $\{a^2 + b^2 + 2ab\}$
 (c) $\{a^2 + b^2 - 2ab\}$ (d) None of these

Q.3. What is the arithmetic mean of 7 and 9 ?

- (a) 8 (b) 16
 (c) 7 (d) None of these

Q.4. The missing term in the G.P. 2, 6, 18, ___, 162 is _____.

- (a) 54 (b) 36
 (c) 9 (d) None of these

Q.5. $i^6 = \text{_____}$.

- (a) 1 (b) -1
 (c) i (d) $-i$

Q.6. ${}^8C_1 = \text{_____}$.

- (a) 1 (b) 7 (c) 8 (d) 0

Q.7. The slope of the straight line which passes through the two points (x_1, y_1) and (x_2, y_2) is _____.

- (a) 0 (b) 1
 (c) $\frac{y_2+y_1}{x_2+x_1}$ (d) $\frac{y_2-y_1}{x_2-x_1}$

Q.8. If the centre of a circle is (h, k) and radius is r , then the equation of the circle is _____.

- (a) $(x - h)^2 + (y - k)^2 = r^2$ (b) $(x + h)^2 + (y + k)^2 = r^2$
 (c) $(x - h)^2 + (y - k)^2 + r^2 = 0$ (d) none of these

Q.9. If M is the maximum value and m is the minimum value of a given data, then range of the given data is _____.

- (a) $M + m$ (b) $M - m$
(c) Both of these (d) None of these

Q.10. If a coin is tossed two times, then the sample space S associated with this experiment is _____.

- (a) $\{H, T\}$ (b) $\{H, H\}$
 (c) $\{H, H\}$ (d) $\{HH, HT, TH, TT\}$

Section B

Note: Short answer type questions. Attempt any four questions out of eight questions.

$$4 \times 5 = 20$$

Q.11. In a committee, 50 people speak French, 20 speak Spanish and 10 speak both Spanish and French. How many speak at least one of these two languages?

Q.12. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real functions. Find

$(f + g)(x), (f - g)(x), (fg)(x)$ and $\left(\frac{f}{g}\right)(x)$.

Q.13. In a G.P., the 3rd term is 24 and the 6th term is 192. Find its 9th term.

Q.14. Find the sum of the n terms of the series whose n^{th} term is $(n + 1)^2$.

Q.15. Using Binomial theorem to evaluate $(96)^3$.

Q.16. (i) Find the equation of the straight line which passes through the point $(3, -1)$ with slope -6 .

(ii) A coin is tossed and then a die is rolled only in case a head is shown on the coin. Describe the Sample Space of this experiment.

Q.17. Find the mean deviation about the mean for the following data:

4, 7, 8, 9, 10, 12, 13, 17

Q.18. A and B are events such that $P(A) = 0.42$, $P(B) = 0.48$ and $P(A \text{ and } B) = 0.16$. Determine the following: (i) $P(\text{not } A)$, (ii) $P(\text{not } B)$ and (iii) $P(A \text{ or } B)$.

Section C

Note: Long answer type questions. Attempt any one question out of two questions.

$$1 \times 10 = 10$$

Q.19. Use the principle of mathematical induction to prove that

$$1^2 + 2^2 + \dots + n^2 > \frac{n^3}{3} \text{ for all natural numbers } n, \text{ i.e. } n \in N.$$

Q.20. Find the equation of the parabola whose vertex is $(0,0)$, passing through $(5,2)$ and symmetric with respect to y -axis.