

Seat No. : _____

DD-158

December-2018

S.Y. M.B.A., Integrated

Business Mathematics

Time : 2:30 Hours]

[Max. Marks : 70

Note : Statistical table will be provided on demand and use of scientific calculator is permitted.

1. (A) Explain the terms “Permutations and Combinations”. 4
(B) Solve the following : (any **one**) 5
 - (1) Find the dictionary rank of the word ZENITH.
 - (2) How many combinations are possible by taking the 4 letters of the word “COMBINATION” ?
- (C) Solve the following : (any **one**) 5
 - (1) If ${}^{12}C_5 + 2[{}^{12}C_4] + {}^{12}C_3 = {}^{14}C_x$, then find x .
 - (2) Find ‘ k ’ if ${}^8P_5 = {}^7P_5 + k {}^7P_4$
2. (A) Explain the following terms : 4
 - (1) Sample Space
 - (2) Event
 - (3) Random Experiment
 - (4) Independent Events
- (B) Solve the following : (any **two**) 10
 - (1) Two cards are drawn randomly from a pack of 52 cards. Find the probabilities that (i) one is king and other is queen (ii) both are spades (iii) both are of the same suit.
 - (2) There are 5 red and 7 black balls in an urn. Two balls are drawn at random one after the other. If they are drawn first with replacement and then without replacement, find the probability that both the balls are red.
 - (3) If $P(A_1) = 2 P(A_2) = P(A_1/A_2) = 0.4$, find the following probabilities :
 - (i) Both A_1 and A_2 happen
 - (ii) Only A_2 happens.
 - (iii) At least one happens.
 - (iv) Neither of A_1 and A_2 happens.

3. (A) Write the general formula of Binomial Theorem. Also give its properties and uses. 4

- (B) Answer the following : (any **two**) 10

- (1) Using the principle of mathematical induction, prove that

$$2 + 5 + 8 + \dots + (3n - 1) = \frac{n(3n + 1)}{2}$$

- (2) Find the value of $(\sqrt{3} + 1)^6 + (\sqrt{3} - 1)^6$.

- (3) Obtain the middle term in the expansion of $\left(\frac{a}{x} - \frac{x}{a}\right)^{10}$.

4. (A) Explain the following terms : 4

- (1) Arithmetic Progression
(2) Geometric Progression

- (B) Answer the following : (any **two**) 10

- (1) Three numbers are in A.P. Their sum and product are 39 and 2080 respectively. Find those numbers.
(2) The fourth and seventh terms of a G.P. are 72 and 576 respectively. Find the sum of first 'n' terms.
(3) The arithmetic mean of the two numbers exceeds their positive geometric mean by 10 and the first number is 9 times the second number. Find those two numbers.

5. (A) Explain the terms "Interpolation and Extrapolation". 4

- (B) Solve the following : (any **two**) 10

- (1) Find the missing value in the following table :

| | | | | |
|-------------------|------|------|------|------|
| Year | 1971 | 1975 | 1976 | 1980 |
| Population | 12 | (?) | 15 | 20 |

- (2) Find the premium at 26 years using interpolation method for the given data :

| | | | | | |
|-----------------------|----|----|----|----|----|
| Age | 20 | 25 | 30 | 35 | 40 |
| Premium (in ₹) | 23 | 26 | 30 | 35 | 42 |

- (3) If $u_x = x^2 + 1$, then find $\Delta^2 u_x$.