

PARUL UNIVERSITY
FACULTY OF COMMERCE
B.Com.(Hons) Summer 2018 – 19 Examination

Semester: 1

Subject Code: 16100106

Subject Name: Business Maths

Date: 24/04/2019

Time: 10.30am to 1.00pm

Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Do as directed.**A) Chose the most appropriate answer from the given options.****(06)**

1. Which of the following is not a subset of the set of natural numbers.
 (a) $\{2x|x \in \mathbb{N}\}$ (b) $\{x|x \in \mathbb{N}\}$
 (c) $\{x-1|x \in \mathbb{N}\}$ (d) $\{3x|x > 0, x \in \mathbb{Z}\}$
2. Which of the following matrices is/are symmetric? Choose the most appropriate answer.
 (a) $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 6 \\ 3 & 6 & 0 \end{bmatrix}$ (b) $B = \begin{bmatrix} 0 & -1.2 & -3 \\ -1.2 & 0 & 5 \\ -3 & 5 & 0 \end{bmatrix}$
 (c) both A and B (d) neither A nor B
3. For two square matrices A, B , which of the following is not true?
 (a) $(A+B)^T = A^T + B^T$ (b) $tr(A+B) = tr(A) + tr(B)$
 (c) $\det(A+B) = \det A + \det B$ (d) C is not true.
4. Which of the following events has probability $\frac{1}{2}$?
 (a) Getting an odd number when a cubic die is thrown.
 (b) Getting a head when an unbiased coin is tossed.
 (c) Getting a card of red colour from a pack of 52 playing cards.
 (d) Getting 20 marks in an examination of 40 marks.
5. A bullet is to be fired to hit a target. If target is hit it is known as success. What is the probability of getting success in all the trials?
 (a) 0 (b) 0.5 (c) 1 (d) 2
6. What is the probability of getting a red ball out of a bag containing 2 white, 2 black, 3 pink and 3 yellow balls?
 (a) 1.0 (b) 0.3 (c) 0.2 (d) 0.0

B) Do as directed.**(06)**

1. Define Empty set.
2. Define singleton set.
3. Define Cardinality of a set.
4. Define independent events.

5. What is the trace of matrix $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 0 & 1 & 2 \\ 3 & 4 & 5 & 6 \end{bmatrix}$?

6. Two events A and B are exhaustive then what is the probability of happening of $A \cup B$?

Q.2 Answer the following.**(12)**

1. Two cards are drawn at random from a pack of 52 playing cards. Find the probability that (i) none of them is a face card (ii) exactly one of them is a face card (iii) both of them are face cards (iv) both of them are cards of heart.
2. (i) Find simple interest on Rs. 3000 at % rate of interest for one year.
 (ii) Find the compound amount, which would be obtained from an interest of Rs.2000 at 6% compounded quarterly for 5 years.

3. Express $A = \begin{bmatrix} 1 & 2 & 3 \\ -2 & 0 & 1 \\ -3 & -2 & 1 \end{bmatrix}$ as a sum of a symmetric and a skew-symmetric matrix.

Q.3 Answer the following. (Any Three)**(18)**

1. Let $U = \{0,1,2,3,4,5,6,7,8,9\}$, $A = \{0,2,4,6,8\}$, $B' = \{0,1,2,4,8,9\}$, $C = \{3,7\}$.
Find (i) $B \cup C$ (ii) $(B \cup C) \cap A'$ (iii) $U - (B \cap C)$
2. Solve using inverse matrix: $3x + 2y = 10$; $5x + 4y = 8$
3. Three bags B_1 , B_2 and B_3 are given. B_1 contains three red and four yellow balls. B_2 contains one red and six yellow balls. B_3 contains three yellow and four red balls. A bag was selected randomly and two balls are drawn randomly. They are found to be yellow. Find the probability that they are drawn from bag B_2 .
4. Calculate Effective rate of interest if the rate of interest is 10% in each of the following.
 - (a) When interest is compounded half yearly
 - (b) When interest is compounded quarterly
 - (c) When interest is compounded monthly.

Q.4 Answer the following. (Any two)

1. (a) In a class of 60 students, 25 play chess, 25 play scrabble and 24 play carom. 10 play chess and scrabble, 11 play scrabble and carom, 3 play chess, carom and scrabble. 12 students play none of these indoor games. Find the number of students who play (i) chess and carom. (ii) chess, carom but not scrabble (iii) at least two games (iv) exactly two games (v) at least one game. **(05)**
- (b) For $U = \{10,11,12,13,14,15,16,17\}$, $A = \{10,12,14,16,17\}$, $B = \{10,11,14,15,17\}$, verify $(A \cup B)' = A' \cap B'$. **(04)**
2. (a) Using Crammer's rule solve **(05)**
$$\begin{aligned}x + 2y + 3z &= 14 \\3x + y + 2z &= 11 \\2x + 3y + z &= 11\end{aligned}$$
- (b) How much amount is required to be invested in the beginning of every year so as to accumulate Rs. 7,11,500 at the end of 5 years if the effective rate of interest is 12% per annum? **(04)**
3. (a) In a group of 2000 persons, there are 1300 who can speak Hindi, 800 can speak English, 300 can speak both Hindi and English. If a person is selected at random, what is the probability that he speaks (i) Hindi only, (ii) English only, (iii) only one of the two languages (iv) at least one of the two languages? **(05)**
- (b) Determine the present value of an annuity of Rs. 2,00,000 receivable for 4 years at an effective rate of interest of 10% p.a.? **(04)**