Second Semester (NEP) Open Elective
Commercial Mathematics
Model Question Paper – I

Total Marks : 60   **Time:$2\frac{1}{2}$ Hours**

I.   **Answer any Five questions.   (5x3=15)**

1. **Define (i) Set (ii) Subset. Give an example for each**
2. **Define Venn diagram. Represent a Venn diagram for A∪B and A∩B.**
3. **If A= {1,2}, B={2,3}, C={3,4} Then find (AXB)U(AXC)**
4. **State the fundamental principle of counting with example.**
5. **Find the number of permutations of the letters of the word ALLAHABAD.**
6. **Define the occurrence of an event with example.**
7. **. How to convert fractions into percentage? Solve i) 2/5 ii) 5/8**
8. **. The sales of a company was35,000 rupees in june and 30,000 rupees in July. Find the decrease of percentage?**
9. **. 'x' gets a salary of 15,000 rupees 'y' gets a salary of 5,000 rupees. Find the   ratios of Salaries?**

II.   **Answer any Three questions: (3x5=15)**

1. **Out of 50 people, 20 people drink tea, 10 drink both tea and Coffee. How many take at least one of the two drinks? Show the result through Venn diagram.**
2. **In a class of 100 students, 35 play Football, 45 play Basket Ball, 35 play Indoor games, 10 play Football and Basket ball, 15 play basket ball and Indoor games, 5 play Football, Basket ball and Indoor games. If 15 do not play any games then find how many play Football and Indoor games? Show the result through Venn diagram.**
3. **Give an example of a relation which is (a) Reflexive but not Symmetric and not Transitive.   (b) Symmetric but not Reflexive and not Transitive.**
4. **Find the Range of the following functions: (i) $f(x) = x^2+5$, x>0   (ii) f(x) = 2x+3, x>0.**
5. **If f(x) = x-1 and g(x) = $2x^2$-3. Find (i)gof(x) (ii) gof(2).**

III. **Answer any Three questions:** **(3x5=15)**

1. How many numbers lying between 100 and 1000 can be formed with the digits 0, 1, 2, 3, 4, 5 if the repetition of the digits is not allowed.

2. Let A and B be two events with respective probabilities P(A) and P(B). Then, prove that the probability of occurrence of atleast one of these two events is P(A∪B) = P(A)+P(B)-P(A∩B).

3. The probability that India wins a cricket match is 0.52. If India plays three matches , find the probability that it wins. (i)atleast one match (ii)all the three matches.

4. The probabilities of two students A and B solving a problem are 1/2 and 3/4 respectively. If both of them independently try, what is the probability that the problem is solved?

5. A card is randomly drawn from a pack of playing cards. Find the probability that the drawn card is (i) a spade or a King (ii) a King or a Queen

IV. **Answer any Three questions:** **(3x5=15)**

1. Sanjana has a monthly salary of 20,000 rupees. She spends 4,000 rupees per month on cosmetics. What percent of her monthly salary does she spend on cosmetics?

2. Define (i)duplicate ratio. (ii) triplicate ratio. (iii) Find the Duplicate and Triplicate ratios of the following: i) 2 : 3

3. Three numbers are in the ratio 2 : 3 :4. If the sum of the squares is 1856. Find the numbers?

4. Find i) Fourth proportional of 6 : 14 :: 15 : x

      ii) The mean proportional of 9 : x :: x : 16

5. Evaluate $\dfrac{x+a}{x-a} + \dfrac{x+b}{x-b}$ where $x = \dfrac{2ab}{a+b}$

****

Total Marks : 60   **Time:2 $\frac{1}{2}$ Hours**

I.   Answer any Five questions.   (5x3=15)

1. **Define (i) Super set (ii) Power set (iii) Null set.**

2. **If A={5,6,7} find P(A).**

3. **If A= {2,3,4} Write all the proper subsets of A.**

4. **Define factorial notation. Evaluate i) 7!-5! ii) $\frac{5!}{2!(5-2)!}$**

5. **Define conditional probability. Explain with an example.**
6. **Define the axiomatic definition of probability.**
7. **How to convert percentage into ratio? Solve i) 30% ii) 20%**

8. **Write the formula to increase a number by a given percentage. And increase 30 by 10%?**

9. **Define Inverse ratio (Reciprocal ratio) and find the inverse of 2:3 and 4:5?**

II.   Answer any Three questions: (3x5=15)

1. **If A = {a,b,c}, B={d}, C={e} Verify AX(B-C) = (AXB)-(AXC)**

2. **In a group of 65 people, 40 like Cricket, 10 like Hockey and Cricket both. How many like Cricket only and not Hockey? How many like Hockey? Show the result through Venn diagram.**

3. **Out of 250 people, 160 drink Coffee, 90 drink Tea, 85 drink Milk, 45 drink Coffee and Tea, 35 drink Tea and Milk, 20 drink all the three. How many will drink Coffee and Milk? Show the result through Venn diagram.**

4. **Find the Domain and range of the Function f(x)= $\frac{x^2+2x+1}{x^2-8x-12}$, $x\epsilon R$.**

5. **If f(x) = x+1 and g(x) = x^2+1. Find (i) fog(x),   (ii) fog(2) .**

III. **Answer any Three questions:** (3x5=15)

1. Find the value of n such that

   i) $n_{P_5} = 42 \, n_{P_3}$; n>4

   ii) $\dfrac{n_{P_4}}{n-1_{P_4}} = \dfrac{5}{3}$; n>4

2. A fair coin is tossed twice. Find the probability that the tosses result in (i) two heads (ii) atleast one head.

3. If S = {1,2,3, ----10} is an equiprobable sample space of a random experiment. A ={3,6,9} AND B={2,4,6,8,10} are two events. Write down P(A), P(B), P(A'), P(AUB), (P∩B) and P(A'∩B).

4. Let A and B be two events with respective probabilities P(A) and P(B). Then, prove that the probability of occurrence of atleast one of these two events is P(AUB) = P(A)+P(B)-P(A∩B).

5. A machine has two parts. The probability of failure of one of the parts in a given period of time is 0.06. The probability of failure of the other part in the same period is 0.08. What is the probability that the machine fails in that period of time?

IV. **Answer any Three questions:** (3x5=15)

1. The original price of the shirt was 700 rupees. It is decreased by 50 rupees. What is the Percentage decrease of the price of the shirt?

2. The price of trousers was decreased by 22% to 390 rupees. What was the original price of the trousers?

3. If x : y = 2 : 3 find $\dfrac{2x^2+5y^2}{x^2+y^2}$

4. Four numbers are in proportion, the sum of the extremes is 54 and the sum of the means is 36. If the ratio of their means is 2 : 1. Find the numbers?

5. If $\dfrac{2a+2b-3c-3d}{2a-2b-3c+3d} = \dfrac{a+b-4c-4d}{a-b-4c+4d}$ Then Prove that a : b : : c : d

Second Semester (NEP) Open Elective
Commercial Mathematics
Model Question Paper – III

Total Marks : 60   **Time:**$2\frac{1}{2}$ **Hours**

I.   **Answer any Five questions.   (5x3=15)**

1.   **Define finite and infinite set. Give an example for each.**

2.   **If A has 5 elements, how many elements will P(A) have?**

3.   **If A = {c,e,f}, B={f,g,h}, C={g,h,i} Find (A∩B)X(B∩C).**

4.   **Compute i)** $\frac{7!}{5!}$ **ii)** $\frac{12!}{(10)!(2)!}$

5.   **In how many ways can 4 red, 3 yellow and 2 green discs be arranged in a row if the discs of the same colour are indistinguishable.**

6.   **Define the events i) A or B ii) A and B iii) A not B.**

7.   **How to convert ratio into percentage? Convert 4:7 into percentage.**

8.   **. In the election the winning candidate got 4,800 votes which is 80% of the total votes. Calculate the total number of votes?**

9.   **Define the compound ratio and find the compound ratio of 3:5 ?**

II.   **Answer any Three questions: (3x5=15)**

1.   **In a class of 150 students, it was found that 95 like Burgers and 79 like Pizzas. Assuming every student like at least one of the above. Find the number of students who like both Burgers and Pizzas. Show the result through Venn diagram.**

2.   **In a Survay of 100 persons it was found that 28 read Magazine A, 30 read Magazine B, 42 read Magazine C, 8 read Magazine A and B, 10 read Magazine A and C, 5 read Magazine B and C while 3 read all the three Magazines. Find (i) How many read none of the three Magazines? (ii)**

How many read only Magazine C?. Show the result through Venn diagram.

3. List all the relations on the set A={a,b}.

4. $T(F) = \frac{5}{9}(F - 32)$. The function to which maps Temprature in Fahrenheat into Temprature in degree Calsius is defined as above. Then find (i) T(32)   (ii) T(-40) .

5. A relation R is defined on the set of integers by R = {(x,y):x-y is a multiple of a non – zero integer 5}. Show that R is an equivalence relation on Z.

III.   Answer any Three questions: (3x5=15)

1. A card is randomly drawn from a pack of playing cards. Find the probability that the drawn card is (i) a spade or a King (ii) a King or a Queen

2. What is the probability that 4 cards drawn at random from a well-shuffled pack of playing cards belong to different suits (one of each suit)?

3. In a college, there are five lecturers. Among them, three are doctorates. If a committee consisting three lecturers is formed, what is the probability that atleast two of them are doctorates?

4. What is the probability that 4 cards drawn at random from a well-shuffled pack of playing cards belong to different suits (one of each suit)?

5. Let A and B be two events with respective probabilities P(A) and P(B). Then, prove that the probability of occurrence of atleast one of these two events is P(AUB) = P(A)+P(B)-P(A∩B).

IV.   Answer any Three questions: (3x5=15)

1. If a : b = 2 : 3 , x : y = 4 : 5 find 5ax + 3by = 10ax + 4by ?

2. X, Y, and Z play cricket, the runs scored by X and Y are in the ratio of 3 : 2. Y's runs and Z's runs are in the ratio 3 : 2. Together they all score 342 runs. How many runs did each score?

3. Define i) Mean Proportion ii) Simple Proportion. iii) Compound Proportion   Give an example for each.

4. An article as sold at 20% gain on the cost price. Find the ratio of the selling price and cost price?

5. . If $\frac{a}{b} = \frac{c}{d}$ Prove that $\frac{2a+7b}{2c+7d} = \frac{2a-7b}{2c-7d}$

****