

16539(D) - 0 DEC 2016

**MCA 2nd Semester Examination**

**Mathematics (CBS)**

**MCA-205/MCA-F21**

**Time : 3 Hours**

**Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

**Note :** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C, D. Section E is compulsory. All section carries equal marks.

**SECTION - A**

1. (a) Show that the weighted arithmetic mean of first 'n' natural numbers whose weights are equal to the corresponding numbers is equal to  $\frac{2n+1}{3}$ . Also obtain simple arithmetic mean.

- (b) Calculate the mean deviation from the mean for the following data

Class Interval	2-4	4-6	6-8	8-10
Frequency	3	4	2	1

(12)

2. (a) Following is the distribution of marks in Law obtained by 50 students:

Marks (More than)	0	10	20	30	40	50
No of Students	50	46	40	20	10	3

Calculate the median marks. If 60% of the students pass this test, find the minimum marks obtained by a pass candidate.

- (b) The weighted geometric mean of the four numbers 8, 25, 19 and 28 is 22.15. If the weights of the first three numbers are 3, 5, 7 respectively, find the weight (positive integer) of the fourth number. (12)

**SECTION - B**

3. (a) Distinguish between Karl Pearson's and Bowley's measure of skewness. Which one of these would you prefer and why?
- (b) By using the following data,  $\Sigma X=250$ ,  $\Sigma Y=300$ ,  $\Sigma XY=7900$ ,  $\Sigma X^2=6500$ ,  $\Sigma Y^2=10000$ , and  $N=10$  find out the two lines of regression and from them compute the Karl Pearson's coefficients of correlation. (12)
4. (a) The following table gives the distribution of monthly income of 500 workers in a factory:

Monthly Income (Thous. Rs.)	Below 100-100	100-150	150-200	200-250	250-300	300-Above 300
No. of Workers	10	25	145	220	70	30

Obtain Bowley's Coefficient of Skewness.

- (b) Calculate Rank correlation coefficient between advertisement cost and sales from the following data.

Advertisement Cost (in Thousand Rs.)	39	65	62	90	82	75	25	98	36	78
Sales (lakhs Rs.)	47	53	58	86	62	68	60	91	51	84

(12)

**SECTION - C**

5. (a) Ten chips numbered 1 through 10 are mixed in a bowl. Two chips are drawn from the bowl successively and without replacement. What is the probability that their sum is 10?
- (b) In 256 sets of 12 tosses of a fair coin, in how many cases may one expect 8 head and 4 tails? (12)
6. (a) A is known to hit the target is 2 out of 5 shots, whereas B is known to hit the target is 3 out of 4 shots. Find the probability of the target being hit when they both try.
- (b) In turning out certain toys in a manufacturing process in a factory, the average number of defective toys is 10%. What is the probability of getting exactly 3 defective toys in a sample of 10 toys chosen at random by using the Poisson distribution, where  $e^{-1} = 0.36788$ ? (12)

**SECTION - D**

7. (a) If  $p$  is any prime and  $m$  any integer, then prove that either  $(p, m) = 1$  or  $(p | m)$ .
- (b) Show that every integer  $n > 1$  can be expressed as product of primes and factorization is unique apart from the order in which the factors occur. (12)
8. (a) Prove that primes of the form  $8k+5$  are infinite.
- (b) State and prove Euclidean Algorithm. (12)

**SECTION - E**

9. (a) Give the advantage of arithmetic mean.
- (b) What is 'quartile'? How are they used to measure skewness?

- (c) Define conditional probability.
- (d) Define regression coefficient. What information do they supply?
- (e) Write a short note on various measure of central tendency.
- (f) Poisson distribution is a limiting case of Binomial distribution? Explain. (6×2=12)