



WEST BENGAL STATE UNIVERSITY
B.Com. Honours Part-III Examination, 2022

COMMON FOR ACCOUNTING AND FINANCE AND MARKETING

PAPER: AMPW-VIII

Time Allotted: 2 Hours

Full Marks: 50

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

MODULE-I

Advanced Mathematics

Marks-20

Answer all questions from the following

1. The demand function of a particular commodity is $y = 15 e^{-\frac{x}{3}}$, for $0 \leq x \leq 8$, where y is the price per unit and x is the number of units demanded. Determine the price and the quantity for which the revenue is maximum. 5

OR

Show that the maximum value of $x + \frac{1}{x}$ is less than its minimum value. 5

2. (a) Evaluate $\int_2^3 (2x + 3)^5 dx$. 2+5

(b) Evaluate $\int \frac{6x + 3}{x(x + 1)} dx$.

OR

- (a) Find the area of the portion bounded by the curve $y^2 = 4x$, the x -axis and the ordinate $x = 4$. 4+3

(b) Evaluate $\int x^2 e^x dx$.

3. (a) Solve the system of equations by Cramer's rule: 4+4

$$2x + 4y + 5z = 39 ; \quad x + 2y + 3z = 2 ; \quad 3x + 5y + 6z = 4$$

- (b) Given the matrix $A = \begin{pmatrix} 4 & 5 \\ 5 & 6 \end{pmatrix}$. Show that $A^2 - 10A = I$ and hence obtain A^{-1} .

OR

- (a) For the matrix $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, prove that $A^2 - 5A + 7I = 0$. 3+5

- (b) Solve the following equation by matrix inversion method:

$$x + 2y - z = 9, \quad 2x - y + 3z = -2, \quad 3x + 2y + 3z = 9$$

MODULE-II

Advanced Statistics

Marks-30

Answer *all* the questions from the following

4. (a) If $A = \{1, 2, 3\}$, then find the power set of A . 2+2+2
(b) Let $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8, 10\}$ and the universal set $S = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$. Find $(A \cup B)'$ and $(A \cap B)'$.
(c) Using Venn diagram express $(A \cup B) - (A \cap B)$.

OR

- (a) Out of 440 boys in a college, 112 boys read German, 120 read French and 168 Spanish. Of these 32 read French and Spanish, 40 read German and Spanish, 20 read German and French, while 12 read all the three languages. Using Set theory find how many boys (i) do not read any language and (ii) read just one language. 4+2
(b) With the help of set operation, find the L.C.M of 6, 9, 12.
5. (a) What is the probability that a leap year selected at random will contain 53 Sundays? 4+(2+2)+2
(b) A random variable X has the following probability density function:

$$f(x) = \begin{cases} k(9-x), & \text{for } 0 \leq x \leq 9 \\ 0 & , \text{ otherwise} \end{cases}$$

where k is a positive constant.

Show that (i) $k = \frac{2}{81}$ (ii) Find the mean of X .

- (c) Define random experiment.

OR

- (a) The probability that a person travels by plane is $\frac{1}{5}$ and that he travels by train is $\frac{2}{3}$. Find the probability of his travelling by plane or train. Find also the probability of his travelling neither by plane nor by train. 4+2+4

- (b) Write down the p.m.f. of binomial distribution.
- (c) If a random variable X follows a Poisson distribution such that $P(X = 1) = P(X = 2)$; find $P(X = 0)$.

6. (a) What do you mean by 'SRSWR' and 'SRSWOR'? From a population of size 10 a random sample of size 3 is to be drawn. What is the probable number of samples when sampling is (i) SRSWR (ii) SRSWOR? 3+5
- (b) A population consists of points 5, 7, 11, 15. Write down all possible samples of size 2 which can be drawn with replacement from the population. Find the mean and variance of the sampling distribution of mean.

OR

- (a) Define standard error of sample mean. 2+4+2
- (b) A simple random sample of size 5 is drawn without replacement from a finite population consisting of 41 units. If the population standard deviation is 6.25, what is the standard error of sample mean?
- (c) Distinguish between statistic and parameter.
7. A random sample of size 20 from a normal population gives a sample mean of 42 and a sample standard deviation of 6. Test the hypothesis that the population s.d. is 9. (For 19 d.f., 5% value of $\chi^2 = 30.14$). 6

OR

Two types of bulbs are tested for their length of life (in days) and the following data are obtained: 6

	No. of Samples	Mean life (days)	Variance
Type A	9	600	121
Type B	8	640	144

Is there a significant difference in two means? [Given t value for 15 deg. of freedom at 5% level of significance is 2.131].

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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