VPM'S JOSHI BEDEKAR COLLEGE, THANE (WEST)

ASSIGNMENT (ACADEMIC YEAR 2019-20)

CLASS: -F.Y.B.COM. (SEM-I)

SUBJECT: - MATHS AND STATS

UNIT-I:- Shares and mutual funds

1 Lily purchased 560 shares of market price Rs. 380 per share & afterwards sold them with a market price of Rs. 450 per share. She had to pay 0.2% brokerage for both the deals. Find the total purchase & total sale amounts. Also her total gain.

2 Mr. Amir Khan bought 500, Rs. 10 shares of a company at Rs. 15 each through a broker who charged 1% brokerage on purchase. The company paid 14% dividend annually. Find (i) his total investment, (ii) his annual income from the shares, (iii) the rate of return on investment.

3 Find the face value of a share if an investment of Rs. 900000 put into purchase 8% shares quoted at Rs. 15 each, earned a total dividend of Rs. 9600.

4 Find the market price of a share, if Rs. 16000 were invested to purchase 6% Rs. 100 shares & a total dividend of Rs. 384 was obtained.

5 Ram invested Rs. 18000 in a mutual fund scheme with entry load of 2.25% at the NAV of Rs. 110. How many units did he purchase? The current NAV is Rs. 130. Find the current value of his investment.

6 An investor joined a mutual fund with Rs.26176 when NAV was Rs.80. When the NAV touched Rs.100, he sold all his units. Find his gain in the entire deal if the entry load is 2.25% & the exit load is 0.5%.

7 An investor purchased 100 units of a mutual fund scheme at the NAV of Rs.20. The fund declared a dividend of Rs.4 per unit. After receiving a dividend, he sold all the units at the NAV of Rs.22. Find the rate of return on investment.

8 Mr. Subhash Agrawal purchased a unit of Reliance Growth an open ended fund at Rs.275 & its NAV after 13 months is Rs.367. Find the absolute change, percentage change & annualizes change in NAV.

9 On the instructions of Mr. Anthony Gonsalvis, a mutual fund executed an S.I.P. and invested Rs.5000 each on the 8th of each month from January-2016 to April-2016. The N.A.V.s for these 4 days were Rs.37.34, Rs.37.56, Rs.37.66 and Rs.37.78 respectively. Find the average acquisition cost per unit up to 2 decimal places. (The number of units was rounded off up to3 decimal places. There was no entry load).

10 Katrina invested Rs.15000 on 5th of every month for 5 months in a SIP of a mutual fund. The N.A.V.s on these dates were Rs.42.26, Rs.40.25, Rs.49.57 and Rs.51.45 & Rs.39.32 respectively. There was same entry load of 2.3% for all these months. Find the average acquisition cost per unit.

UNIT-II: - A) Permutation and combination

B) Linear programming problem

1 How many words can be formed by using the letters of the word "EQUQTION"? How many of them will (i) start with A? (ii) Start with A & end with O? (iii) Start & end with a vowel? (iv) Have the consonants always together? (v) Have no consonants together?

2 Three boys & five girls are made to sit in a line for a music competition. How many different arrangements can be made so that (i) no 2 boys are together? (ii) boys are always together?

3 In how many ways we can arrange 3 books of mathematics, 4 books of statistics and 5 books of economics on a shelf such that the books of each subject are always together?

4 How many 4 digit numbers can be formed with the help of the digits 1, 2, 3, 4, 5 & 6 if (i) Repetition of digits is allowed? (ii) Repetition of digits is not allowed?

5 Four cards are drawn from the well shuffled pack of 52 playing cards. How many selections will consist of (i) exactly one card from each suit? (ii) Exactly 2 kings? (iii) At least 3 face cards? (iv) At most 1 red card?

6 How many committees of 3 boys and 4 girls can be formed from 5 boys and 5 girls such that (i) a particular boy is included in the committee? (ii) a particular boy is excluded from the committee?

7 Solve the following L.P.P.by graphical method.

i Maximize $z=7x + 6y$, subject to $x + y \leq 6$, $3x + y \leq 9$, $x \geq 0$, $y \geq 0$.

ii Minimize $z=5x +2y$, subject to $10x + 2y \geq 20$, $5x + 5y \geq 30$, $x \geq 0$, $y \geq 0$.

8 A printing company prints 2 types of magazines A & B. The company earns Rs.25 & Rs.35 on each copy of magazine A & magazine B respectively. The magazines are processed on 3 machines. Magazine A requires 2 hours on machine I, 4 hours on machine II & 2 hours on machine III. Magazine B requires 3 hours on machine I, 5 hours on machine II & 3 hours on machine III. Machines I, II & III are available for 35, 50 & 70 hours per week respectively. Formulate the L.P.P. so as to maximize the total profit of the company.

9 A company produces 2 types of dog foods F1 & F2 which cost Rs.50 & Rs.30 per unit respectively. Each type of food contains 2 types of nutrients N1 & N2 in different quantities. Each unit of F1 contains 2 units of N1 & 4 units of N2. Each unit of F2 contains 3 units of N1 & 2 units of N2. The minimum daily requirements of N1 & N2 for a dog is 6 units & 8 units respectively. Formulate the LPP.

Unit III-

Measures of Central Tendency -

1. Explain the measure of central tendency. State the requisites of good average.
2. Explain merits and demerits of arithmetic mean and median.
3. Compare arithmetic mean, median and mode as measures of central tendency.
4. Ten students secured the following marks in a certain examination. Find mean ,median and mode.
   39, 42, 30, 41, 38, 58, 41, 35, 37 ,41
5. Find mean, median and mode for the data given below-

x	2	3	4	5	6	7
f	10	15	20	10	8	7

6. Find mean, median and mode for the following distribution-

Class interval	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44
Frequency	6	15	21	15	10	9	4

7. There are men, women and children working in a factory. The total number of workers is 500. The average daily wage of 250 men workers Rs. 100. The average wage of 150 women workers is Rs. 80. What is the average wage of children working in that factory, given that the average daily wage of all the 500 workers taken together is Rs. 82?
8. Find the median and the two quartiles for the following data.

Rainfall in cms	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55
No. of years	2	5	8	12	10	7	6

   Also, find 3^{rd} and 8^{th} decile and 56^{th} percentile.
9. Draw a Histogram for the following data and hence locate mode graphically

marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of students	15	20	40	20	10	4

10 Draw 'less than ' curve for the following data.

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Age in years	10 - 14	14 - 18	18 - 22	22 - 26	26 - 30
No. of persons	20	40	20	10	4

Hence locate- Median and two quartiles.

Unit IV-

Elementary Probability Theory :

1. Define the following terms:
   (i) Random experiment
   (ii) Sample space of an experiment
   (iii) An event
   (iv) Complementary event
   (v) Mutually exclusive events
   (vi) Exhaustive events
   (vii) Independent events
2. Define probability of an event and state addition theorem on probability. Also state the theorem when A and B are mutually exclusive.
3. State multiplication theorem on probability for two events. When are two events said to be independent?
4. Two dice are thrown simultaneously. What is the probability that the sum of numbers is
   (i) less than 2 (ii) 9 (iii) multiple of 4 (iv) greater than 9 (v) a perfect square
5. There are 30 tickets numbered 1 to 30. One ticket is drawn at random. What is the probability that the number on the ticket drawn is divisible by
   (i) 5 or 9 (ii) 3 or 7?
6. Two cards are drawn from a normal pack of 52 well shuffled cards. What is the chance that they are- (i) both kings (ii) both spades (iii) one spade and one heart (iv) both black (v) both aces (vi) both face cards?
7. The probability that A, B and C hit the target is 2/3, 3/4 and 5/9 respectively. If all of them fire simultaneously, what is the probability that-
   (i) all of them hit the target
   (ii) only one hits the target
   (iii) at least one hits the target?
8. A box contains 8 red, 9 blue and 15 black balls. One ball is drawn at random from this box. Find the probability that –
   (i) it is red or blue (ii) neither blue nor black (iii) not red.
9. The probability of P winning in a game is 1/3 and that of Q winning is 1/4. What is the probability that one of them wins?
10. If A,B and C are independent events such that P(A) = 0.2, P(B) = 0.3 and P(C) = 0.1, find the probability of simultaneous occurrence of all the three events.
11. $P(A \cup B) = 5/6$, $P(\bar{A}) = 1/3$, $P(B) = 1/2$, find $P(\bar{B})$, $P(A \cap B)$.
12. If $P(A^C) = 2/3$, $P(B) = 1/4$, $P(A \cup B) = 5/12$ Find $P(A \cap B)$ and $P(A/B)$.

Sums based on Random Variable, its expectation and variance:

1. Find the mean and variance of X given the following probability distribution.

x	-10	15	20	25	30
Probability	1/5	3/20	1/2	1/10	1/20

2. A random variable X has following probability distribution-

x	0	1	2	3	4	5	6
probability	k	2k	3k	5k	4k	2k	k

Find k. Hence find E(X).

.3. The following table shows a probability distribution of a random variable X.

X	-1	0	1	2	3
P(X)	0.1	0.25	0.25	0.2	0.2

Find (i) $P(X > 1)$ (ii) E(X) (iii) V(X)

Decision Theory

1. Explain the following criterion in the decision making
i)Maximin ii) Maximax iii) Minimax regret

2. Write a note on Decision tree

3. Define the following along with examplei)Act ii) State of nature

4. Explainthe term opportunity loss in decision theory. Explain how the optimal decision is obtained with respect to opportunity loss

5. Given the following pay off table ,find optimal decision using (i) Maximax criterion (ii)Maximin criterion (iii) Laplace criterion

Course of Action	State of Nature		
	S_1	S_2	S_3
A_1	65	45	30
A_2	75	25	105
A_3	90	70	75

6. Given the following pay off table ,find optimal decision using (i) Maximax criterion (ii)Maximin criterion (iii) Laplace criterion

Demand	Course		
	C_1	C_2	C_3
Low	100	98	82
Medium	92	105	81
High	85	70	60

7. Construct the regret table and find the best decision by Minimax Regret criterion

State of Nature	Course of Action		
	A_1	A_2	A_3
S_1	100	98	82
S_2	92	105	81

8. Given the pay off matrix, Solve the decision problem using EMV Criterion

Course of Action	State of Nature		
	E_1	E_2	E_3
P	15	14	10
Q	13	15	12
R	17	16	25
Probability	0.5	0.4	0.1

9. Given the pay off matrix, Solve the decision problem using EOL Criterion

Course of Action	State of Nature		
	S_1	S_2	S_3
A_1	14	16	10
A_2	12	15	16
A_3	20	18	14
Probability	0.4	0.3	0.3

10. Find the best Action by using EOL Criterion for the following pay off matrix

State of Nature	Probability	Action	
		A_1	A_2
S_1	0.4	120	150
S_2	0.3	160	100
S_3	0.3	140	170

11. The following is the demand distribution of a certain product

No. units demanded	10	11	12
Probability	0.35	0.40	0.25

The product is sold at Rs.100 per unit with cost of Rs. 70 construct payoff table

12. Draw a decision tree for the given payoff table and suggest the optimum decision

	Participation Level		
Types of Policy	High	Medium	Low
A	20	18	10
B	15	30	20
Probability	0.35	0.30	0.35