VCD: 2/5/22- MATHS AND STATS-FYBCOM SEM.II-3 HRS -100 MKS

Q.1 Multiple Choices questions: 50

1) For the demand x, the price is $p = 21 + x^2$ if the cost function for x items is $c = x + x^2$ then the profit when just 1 item is sold is ___

a) 10 b) 20 c) 21 d) 100

2) If $y = 100 - 10\ logx^{10} then\ \frac{dy}{dx}\ is$ _____

a) $100 - logx$ b) $\frac{100}{x}$ c) $\frac{-100}{x}$ d) $100 - \frac{100}{x}$

3) The cost of manufacturing x toys is $C = x^2 - 5x + 7$ then the Marginal cost of manufacturing 10 toys is _____

a) 57 b) 15 c) 10 d) -30

4) For the demand $D = 2 - 3p + p^2$ the demand when $p = 5$ is_____

a) 25 b) 12 c) 35 d) 27

5) If $p = 9\ and\ MR = 6\ then\ \eta = ?$

a) 6 b) 9 c) 12 d) 3

6) For a fixed sum invested for 3 years, simple interest will always be ____ than compound interest.

a) Equal
b) Greater
c) Lesser
d) Sometimes greater and sometimes lesser

7) Principal = Rs. 10,000, time period = 3 years, r = 5% p.a compounded annually. Amount after 3 years is

a) 11,576.25
b) 11,567.25
c) 11,675.25
d) 11,765.25

8) The accumulated amount after 3 years of an immediate annuity of Rs.5,000 p.a. with the rate of interest of 6% compounded annually is Rs.

a) 15,000
b) 15,900
c) 15.921.23
d) 15,918

9) An annuity in which each payment is made at the beginning of the year is called _____.

a) annuity due
b) annuity certain
c) Immediate annuity
d) uniform annuity

10) A loan of Rs.80,000 is returned in 3 monthly installments at 12% p.a. find the EMI using the Flat rate Method.

a) Rs.25,488.67
b) Rs.27,466.67
c) Rs.28,576.67
d) Rs. 26,567.82

11) Karl Pearson's coefficient of correlation from the following:

n = 10, $\sum x = 40$, $\sum y = 50$, $\sum x^2 = 200$, $\sum y^2 = 500$, $\sum xy = 160$ is

a) -0.45
b) -0.35
c) -0.40
d) -0.36

12) If x and y are independent than coefficient of correlation between x and y is

a) $r = 1$
b) $r = -1$
c) $r = 0$
d) $r \neq 0$

Karl pearson's coefficient of correlation from the following:

$Cov(x,y) = -400,\ \sigma_x = 20,\ \sigma_y = 50$ is

a) -0.5
b) -0.4
c) -0.55
d) -0.45

14) If the values calculated for 10 pairs of x and y variables are: $b_{yx} = \frac{1}{3}$, $r = \frac{1}{2}$, s.d of x=3, then s.d of y is

a) 2
b) 4
c) 1
d) 3

15) For a bivariate data. $\bar{x}$ = 53, $\bar{y}$ = 28, b_{YX} = −1.2 line of regression Y on X is

a) Y= -1.2x +31.6
b) Y= -1.2x+63.6
c) Y = -1.2x + 91.6
d) Y = -1.2x +28

16) Change in trend values due to earthquake is an example of is an example of

a) Secular trend
b) Seasonal variations
c) Cyclic variations
d) Irregular variations

17) If quarterly average is 16 and grand average is 20, then seasonal index of that quarter is

a) 0.8
b) 1.25
c) 80
d) 320

18) If $\Sigma p_1 q_0 = 440\ \Sigma p_0 q_0 = 320\ then$ cost of living index No is _

a) 137.5 b) 275 c) 1375 d) 13.75

19) If laspeyre's Index No is 120 and Paasch'es inden No is 125, the p_{01} (D-B) is _____

a) 122 b) 122.5 c) 123 4) 123.5

20) Arrangement of data in historical order is called

a) Correlation
b) Regression
c) Index numbers
d) Time series

21) For a normal distribution, standard deviation is 15. Quartile deviation is

a) 10
b) 11
c) 12
d) 13

22) Poisson distribution is a limiting case of Binomial distribution when

a) n is very small and p is very large
b) n is very large and p is very small
c) n and p are very small
d) n and p are very large

23) For a Poisson distribution, P(0) = P(1), then mean is

a) 1
b) 2
c) 3
d) 4

24) For a Binomial distribution containing 14 independent Bernoulli trials, P(failure) = 4/7, then mean is equal to

a) 6
b) 8
c) 24/7
d) 8/7

b) How many outcomes are there in a Bernoulli trial?

a) 1
b) 2
c) 3
d) 4

Q.2 Attempt any Two of the following: 10

a) For the Supply function $S = p^2 - 2p + 10$, find the Supply when price is 3 and also find the price when Supply is 18.

b) Differentiate the following functions w. r. t. x

i) $y = logx + 5x + e^x + x^4 + 25$. ii) $y = \frac{2x+3}{x^2+1}$.

c) Find the extreme values for the function $f(x)=x^3-6x^2+9x$

Q.3 Attempt any Two of the following: 10

a) The difference between simple interest and compound interest on a certain amount for 4 years at 10% p.a is Rs. 1,282. Find the principal.

b) Mr. Vinod lent Rs. 8,000 to Mr. Ram and Rs. 10,000 to Mr. Raj for a period of 5 years at same rate of interest and received total simple interest of Rs. 6,750. Find simple interest paid by each of them.

c) A loan of Rs. 50,000 is to be returned in 3 monthly installments at the rate of 10%p.a. compounded monthly. Find the EMI using the reducing balance method.

Q.4 Attempt any Two of the following:

a) Estimate the marks in statistics of a student who secured 65 marks in mathematics from the following Bivariate data:

	Mathematics	Statistics
Mean marks	70	80
Standard deviation	8	10
Correlation coefficient	0.8	

b) Find Spearman's correlation coefficient for the following data showing the marks given by two judges to participants in a talent contest:

Judge-I	72	51	41	38	39	67	36
Judge-II	77	55	64	50	40	64	40

c) The regression equation of income (x) on expenditure (y) is $3x - 2y = 3{,}900$. The ratio of the standard deviation of income and expenditure is 4:3 find the coefficient of correlation between income and expenditure. Also find the average income if the average expenditure is Rs.1,800.

Q.5 Attempt any Two of the following: 10

a) Find five yearly moving averages for the following data.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Production	87	90	92	98	105	93	100	110	125

b) Find seasonal index of given time series using simple average method.

Quarterly values

Year	I	II	III	IV
2003	55	53	57	51
2004	56	55	60	53
2005	57	56	61	54

c) Find P_{01} (L), P_{01} (P) and P_{01} (D-B).

Base Year Current Year				
Com-	Po	[redacted] q_0	P_1	q_1
A	30	3	40	3
B	60	4	50	1
C	50	9	50	4
D	70	2	60	2

Q.6 Attempt any Two of the following: 10

a) If mean and variance of Binomial distribution are 4 and 2.4 respectively, find n, p and probability of 8 successes.

b) The average number of phone calls in a call centre is 5. Find the probability that during a specific minute, the number of calls is less than 3. $(e^{-5} = 0.0067)$

c) The weekly wages of 8,000 workers are normally distributed with mean Rs. 770 and standard deviation Rs. 70. Find number of workers whose wages are below Rs.700. (area between z=0 and z=1 is 0.3413)

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