6 Write short notes on any **two** of the following :

(i) Techniques of association of attributes and testing

(ii) Type one and type two error

(iii) One tailed and two tailed tests

(iv) Level of significance.

OR

6 A sample analysis of examination results of 500 students was made. It was found that 220 had failed, 170 had secured a third class, 90 were placed in second class and 20 got a first class. Are these figures commensurate with the general examination result which is in the ratio of 4 : 3 : 2 : 1 for the various categories respectively.

(The tabular value of chi-square for three degrees of freedom at 5% level of significance is 7.81)

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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 7105 Roll No.

M.B.A.

(Only for the candidates admitted/Readmitted in the session 2008-09)

(SEM. I) EXAMINATION, 2008-09

BUSINESS STATISTICS

Time : 3 Hours] *[Total Marks : **100***

Note : *(1) The question paper contains **three** parts.*

*(2) All questions are **compulsory**.*

PART - I 1×20=20

1 (a) In a series, 20 percent values are greater than 90, then _____ is 90.

(b) In computing the average ratio of increase in GNP _____ is the most suitable measure.

(c) The algebraic sum of the deviations of 10 observations measured from 15 is 7. Thus, the mean is

(i) 105 (ii) 70

(iii) 15.7 (iv) none of these.

(d) For a symmetric distribution $Q_1 = 25$ and $Q_3 = 45$, the median is

(i) 20 (ii) 25

(iii) 35 (iv) none of these.

(q) The arithmetic mean and harmonic mean of a distribution are 64 and 49 respectively. Then geometric mean is

(i) 60 (ii) 56.5

(iii) 56 (iv) none of these.

(r) If $r = 0.90$, then the coefficient of determination is

(i) 0.30 (ii) 0.45

(iii) 0.81 (iv) 0.18

(s) For a Poisson distribution, $P(2) = P(3)$, then its probability function will be

(i) $\frac{e^{-2}2^x}{\lfloor x}$ (ii) $\frac{e^{-6}\cdot 6^x}{\lfloor x}$

(iii) $\frac{e^{-3}3^x}{\lfloor x}$ (iv) none of these.

(t) Probability of getting 53 Tuesdays in an ordinary year is

(i) $\frac{1}{7}$ (ii) $\frac{2}{7}$

(iii) $\frac{3}{7}$ (iv) none of these.

PART - II

2 Attempt any **two** parts : **15×2=30**

(a) Share prices of two companies *A* Ltd. and *B* Ltd. were recorded as follows :

A Ltd.	*B* Ltd.
12	113
13	114
15	113
14	115
14	117
14	114
13	112
17	114

Which company's share prices are more variable ?

(b) Construct Fisher's Ideal Index from the following data and show that it satisfies time reversal and factor reversal tests :

	2006		2007	
Commodity	Price	Value	Price	Value
A	10	100	12	144
B	15	75	20	120
C	8	80	10	110
D	20	60	25	50
E	50	500	60	540

(e) The component useful for the long-term forecasting is _____.

(f) The correlation coefficient is the geometric mean of _____.

(g) The arithmetic mean of Laspeyres and Paasche's indices is

(i) Fisher index

(ii) Bowley's index

(iii) Marshal and Edgeworth index

(iv) None of these.

(h) If $r = 0$, then $Cov(X, Y)$ is

(i) 1 (ii) -1

(iii) 0 (iv) None of these.

(i) $\bar{X} \pm 3\sigma$ range of a normal distribution curve covers _____ percent area of the curve.

(j) The mode of a normal distribution is 70 with standard deviation 25, then its median will be _____.

(k) The parameters of a binomial distribution with mean = 8 and variance = 4 are

(i) $n = 2,\ p = \frac{1}{4}$ (ii) $n = 16,\ p = \frac{1}{2}$

(iii) $n = 32,\ p = \frac{1}{4}$ (iv) none of these.

(l) If X is a normal variable with $\mu = 50$ and $\sigma = 10$, then $P(30 < X < 80)$ is the same as

(i) $P(3 < Z < 8)$ (ii) $P(-2 < Z < 3)$

(iii) $P(-1 < Z < 3)$ (iv) none of these.

(m) The number of degrees of freedom for a contingency table of order (5×4) is _____.

(n) Chi-square distribution is completely known if its _____ is known.

(o) Paired t-test is used when

(i) observations in the two samples are independent

(ii) observations in the two samples are the same

(iii) observations in the two samples are paired

(iv) none of these.

(p) The standard error of sample mean, when the population is finite, is

(i) $\frac{\sigma}{\sqrt{n}}$ (ii) $\frac{\sqrt{n}}{\sigma}$

(iii) $\sqrt{\frac{N-n}{N-1}}\,\frac{\sigma}{\sqrt{n}}$ (iv) none of these.

(c) Fit a straight line trend by least squares method to the data given below and estimate trend for 2008 :

Year	2002	2003	2004	2005	2006	2007
Sales (in '000 Rs.)	10	12	15	16	18	19

PART - III

$12\frac{1}{2} \times 4 = 50$

3 Define Statistics and discuss its application in managerial decision making.

OR

3 Compute an appropriate measure of skewness for the following data :

Sales (Rs. lakhs)	Number of companies
Below 50	12
50 – 60	30
60 – 70	65
70 – 80	78
80 – 90	80
90 – 100	55
100 – 110	45
110 – 120	25
Above 120	10

4 Distinguish between correlation and regression analysis. Write the mathematical properties of Coefficient of Correlation.

OR

4 Find the means of X and Y variables and the coefficient of correlation between them from the following two regression equations :

$$2Y - X = 50$$

$$3Y - 2X = 10$$

5 Define Probability Distribution. Explain the salient features of Binomial, Poisson and Normal distribution.

OR

5 An aptitude test was conducted on 900 employees of the Metro Tyres Limited in which the mean score was found to be 50 units and standard deviation was 20. On the basis of this information, you are required to answer the following questions :

(i) What was the number of employees whose mean score was less than 30 ?

(ii) What was the number of employees whose mean score exceeded 70 ?

(iii) What was the number of employees whose mean score were between 30 and 70 ?

$\frac{x-\mu}{\sigma}$	0.25	0.50	0.70	1.00	1.25	1.50
Area	0.0987	0.1915	0.2734	0.3413	0.3944	0.4332