Seat No. : _____

AL-105

April-2015

S.Y. M.B.A., Integrated

Business Statistics

Time : 3 Hours] **[Max. Marks : 100**

Instructions : (1) Statistical tables will be provided on request.
(2) Non-programmable scientific calculator can be used.

1. (a) Explain the binomial distribution in details. Also give its properties and uses. **10**

(b) Suppose that the chance of a house to catch fire during a year is 0.0001. Calculate the probability that during a particular year exactly three houses will catch fire in an area of 25,000 houses. **10**

OR

(b) A set of 10 tubes is received which is known to contain 3 defectives. If a sample of 3 tubes is taken randomly, what is the probability that it will consists of **10**

(i) One defective tube ?

(ii) No defective tube ?

2. Solve the following : (any **two**) **20**

(1) The average time it takes to serve a customer at a petrol station is 6 minutes. The service time follows exponential probability distribution. Calculate the probability that a customer will take :

(i) Less than 2 minutes to complete the service.

(ii) Between 4 and 5 minutes to get the service.

(iii) More than 10 minutes for his service.

(2) A manufacturer knows that his production line produces an item whose weight can be vary anywhere between 160 and 180 gms. In a given week, 12000 units of the item are produced :

(i) If units with less than 165 gms. on more than 178 gms. are not acceptable, how many units of the given week's output will be rejected ?

(ii) Estimate the percentage of units weighing between 162 and 174 gms.

(iii) Calculate the expected value and variance of the underlying distribution.

(3) The average income of the residents of a State is ₹ 18,500 and the standard deviation is ₹ 1,000. If it is decided to exempt people in the lowest 30 percent bracket and imposte income tax on others, what should be the minimum taxable income ? Assume incomes to be normally distributed.

3. Solve following : (any **two**) **20**

(1) At National Company the newly recruited salesmen are given a training which is followed by an aptitude test before they are put on the job. The following data collected by the sales manager of the company shows the scores at the aptitude test and sales made in the first quarter of their employment by a total of 10 salesmen. Find out Karl Pearson's coefficient of correlation between the test scores and sales.

Salesman :	1	2	3	4	5	6	7	8	9	10
Test scores :	18	20	21	22	27	27	28	29	29	29
Sales ('000 ₹) :	23	27	29	28	28	31	35	30	36	33

(2) An examination of eight applicants for a certain post was taken by a company. The marks obtained by the applicants in papers of Accountancy and Statistics are given below :

Applicant :	A	B	C	D	E	F	G	H
Accountancy (%) :	30	40	56	24	80	100	40	80
Statistics (%) :	80	60	100	60	40	20	60	60

Compute the coefficient of correlation by concurrent deviation method.

(3) The following table gives the distribution of students and of regular players among them according to age in complete years :

Age in Years :	15	16	17	18	19	20
No. of Students :	250	200	150	120	100	80
Regular Players :	200	150	90	48	30	12

Calculate the co-efficient of association between maturity and regular playing habits on the assumption that maturity is attained in 18^{th} year.

4. (1) Define regression and lines of regression. Also give properties of regression coefficients. **10**

(2) From the following problem relating to advertisement expenditure and sales of 40 comparable firms, obtain the two regression equations : **10**

Sales Revenue ('000 ₹)	**Advertisement Expenditure ('000 ₹)**			
	5 – 15	**15 – 25**	**25 – 35**	**35 – 45**
75 – 125	4	1	–	–
125 – 175	7	6	2	1
175 – 225	1	3	4	2
225 – 275	1	1	3	4

Also find out :

(i) Correlation coefficient

(ii) Value of advertisement expenditure when sales revenue is 150.

(iii) Value of sales revenue when advertisement expenditure is 30.

5. (a) The yearly sales of a company over the past 12 years are given. From the data given below calculate 3-yearly moving averages. **10**

Year	**Sales ('000 ₹)**
2001	280
2002	288
2003	266
2004	295
2005	302
2006	310
2007	303
2008	328
2009	309
2010	315
2011	320
2012	332

(b) A company, engaged in producing petrol filters has recorded the following sales in the past few years : **10**

Year :	2005	2006	2007	2008	2009	2010	2011
Sales (in lakhs of ₹)	15	17	25	28	32	43	50

(i) Fit a second degree parabolic trend equation to these data.

(ii) Use the trend equation to forecast sales for the year 2012.

OR

(b) Using the data given in the following table, calculate the quarterly seasonal indices by the method of ratio-to-trend : **10**

Year	**Quarter**			
	I	**II**	**III**	**IV**
2007	42	52	48	46
2008	46	64	62	56
2009	52	70	66	60
2010	56	88	80	74
2011	92	104	98	94

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