

**M.A. (PREVIOUS) EXAMINATION 2016 HELD IN 2017**  
**ECONOMICS (PAPER III)**  
**ADVANCE ECONOMIC STATISTICS**

Time: 3 hours

Max Marks: 100

**Instructions:**

- (i) Attempt any FIVE questions
- (ii) All questions carry equal marks

Q1 (a) Thousands of customers have accounts at a large Departmental Store. Accountant claims that average unpaid balance for these accounts is Rs. 1000, a figure obtained by computing the average of the unpaid balances for 50 of the accounts.

- (i) Identify the population and its parameter
- (ii) What is the sample?
- (iii) Is the figure of Rs. 1000 a parameter or a statistic?

(b) The number of men and women who have received an MBA degree from a particular University in each of 5 years is shown below:

Year	2012	2013	2014	2015	2016
Men	74	85	90	112	128
Women	12	20	32	48	67

Use a line chart to depict these data.

Q2 A random sample of voters in a city is classified by age group as shown by the following data

Age Group	Frequency
18 under 24	17
24 under 30	22
30 under 36	26
36 under 42	35
42 under 48	33
48 under 54	30
54 under 60	32
60 under 66	21
66 under 72	15

- (a) Compute the mean median and mode for this distribution.
- (b) Compute the sample standard deviation for these data.

Q3 (a) For the following production of tractors data of Pakistan find annual percentage change in the production of tractors and calculate Arithmetic mean and geometric mean of annual percentage change.

Year	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Prod. of Tractors	24,311	27,101	36,059	44,095	49,642	54,431

(b) Show that  $\sum (X - \bar{X})^2$  is least.

- Q4 The AVP pediatrics clinic has been in business for 18 years. The office manager noticed that prices of clinic materials and office supplies fluctuate over time. To get a handle on the price trends for running the clinic, the office manager examined prices of 6 items the clinic uses as part of its operation. Shown here are 10 items their prices and the quantities for the year 2013 and 2014. Use this data to develop unweighted aggregate price indexes for 2014 with a base year of 2013. Compute the Laspeyres's price index for the year 2014 using 2013 as the base year. Compute the Paasche's index number for 2014 using 2013 as the base year.

Items	2013		2014	
	Price	Qty	Price	Qty
Syringes (dozen)	6.7	150	6.95	135
Cotton swabs (box)	1.356	60	1.45	65
Patient record form (pad)	5.1	8	6.25	12
Children's Tylenol (bottle)	4.5	25	4.95	30
Computer paper (box)	11.95	6	13.2	8
Thermometers	7.9	4	9	2

- Q5 A specialist in hospital administration stated that the number of FTEs (full time employees in a hospital) can be estimated by counting the number of beds in the hospital (a common measure of hospital size). A healthcare business researcher decided to develop a regression model in an attempt to predict the number of FTEs hospital by the number of beds. She surveyed 12 hospitals and obtained the following data. The data are presented in sequence according to the number of beds:

<b>No. of Beds (X)</b>	23	29	29	35	42	46	50	54	64	66	76	78
<b>FTE (Y)</b>	69	95	102	118	126	125	138	178	156	184	176	225

- (a) Calculate correlation coefficient.  
 (b) Estimated regression model  
 (c) Interpret a and b values  
 (d) Predict number of full time employees (Y) when the number of beds (X) is 54.
- Q6 (a) A professor has announced that the grades in a statistics exam have a mean value of 72 and a standard deviation of 6. Not knowing anything about the shape of the distribution of grades, what can we say about the proportion of grades that are between?
- (i) 66 and 78  
 (ii) 60 and 84  
 (iii) 54 and 90
- (b) What would be your answer to Q6 (a) be if the professor also announced that the grades have a mound shaped distribution?

- Q7 A box contains 5 red, 4 white and 6 blue balls which, except for the colour, are indistinguishable. Find, if a ball is drawn randomly from the bag, the probability that is:
- (a) Red
  - (b) White
  - (c) Red or white
  - (d) Not white
  - (e) Neither red nor white.