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ECONOMICS, PONDA GOA
B.COM (SEMESTER-IV) EXAMINATION, APRIL 2015
STATISTICAL TECHNIQUES

Duration: 2 hours

Marks: 80

INSTRUCTIONS:

1. All questions are compulsory.

Q1. a) Explain the concept and utility of measuring correlation between two variables. (3)

b) The variable x and y are negatively correlated. The regression equation of x on y is $32x+10y+3=0$ and that of y on x is $5x+y+15=0$. Find the coefficient of correlation. (6)

c) Compute rank correlation from the following data.

Student	: 1	2	3	4	5	6	7	8
Marks in Maths	: 42	37	28	51	56	40	25	61
Marks in Statistics	: 45	30	10	35	46	55	58	70

(7)

OR

Q1 x) Explain the concept of 'regression'. How does it differ from correlation. (3)

y) The regression equation of profit(x) on sales (y) of a certain firm is $3y-5x-108=0$. The average sales of firm was ` 44,000 and the variance of the profit was $9/16$ th of the variance of sales. Find the coefficient of correlation between sales and profit. (7)

z) For a bivariate data,

$N = 10, \sum x = 20, \sum y = 40, \sum xy = 75, \sum x^2 = 58, \sum y^2 = 192$
Calculate coefficient of correlation. (6)

Q 2 a) What are random experiments. Write any two exclusive events of a sample space. (3)

b) The watches produced by a certain firm include only one defective watch in every 500 watches, 5 packs of 25 watches each are considered. Find the probability that in 5 packets, there is i) At least one defective watch

ii) More than 2 defective watches (7)

(Given:- $e^{-0.25} = 0.7788, e^{-0.4} = 0.6703, e^{-2.5} = 0.0821$)

- c) Fit a trend line for the following data hence estimate the sales in 2015. (6)

Year:	2008	2009	2010	2011	2012	2013	2014
Sales:	10	14	17	20	26	25	32

(lakhs `)

OR

- Q 2. x) Define the terms: 1) Sample space
2) Mutually exclusive events (3)
- y) There are 100 students in a class. 50 pass in Mathematics, 40 in Economics and 10 in both
If a student is selected at random, what is the probability that he has passed in
i) At least one subject
ii) Only one subject. (6)
- z) A man draws 2 balls from a bag containing 3 white and 5 black balls. If he is to receive
` 14 for every white ball and ` 7 for every black ball drawn. What is his expectation? (7)
- Q. 3. a) Calculate the value of Q_1 and Q_3 if mean of normal variate 15 and standard deviation
is 2. (3)
- b) The odds in favour of A winning a game of chess against B are 5:2, if three games
are played, what is the probability of A's winning at least one game. (6)
- c) The mean weight of 50 students is 45 kg with a standard deviation of 15 kg. Assuming
distribution of weight to be normal, find
i) the number of students with weight between 30kg and 60kg,
ii) the probability of students with weight more than 60kg. (7)
(Area under the standard normal curve between $t = 0$ to $t = 1$ is 0.3413)

OR

- Q.3. x) For a Binomial distribution mean =3 and variance =1.5. Find n and p. (3)
- y) A large consignment of tennis balls is assumed to have 20% substandard balls. A samples
of 400 balls selected from it. Find the probability that % of substandard balls in the sample
is i) at most 16%, ii) at least 22%. (6)
(Area under the standard normal curve between $t = 0$ to $t = 2$ is 0.4772 and
between $t = 0$ to $t = 1$ is 0.3413).
- z) The height of a group of 2000 students is normally distributed with mean 165 cms and
standard deviation 5 cms. How many students have height of 171 cms? (7)
(Area under the standard normal curve between $t = 0$ to $t = 1.2$ is 0.3849)

Q.4. a) Write short note sampling methods. (3)

b) A school wishes to estimate the average weight of students. A random sample of 25 students is selected. The average is found to be 40 kg with standard deviation of 5 kg. Find 95% and 99% confidence intervals. (6)

c) A automatic can-filling machine on an average, fills 180 ml of milk with a standard deviation of 2 ml. Find the probability that the average volume of milk filled in 100 cans from a lot is i) less than 179.9 ml ii) more than 180.1 ml. (7)
(Area under standard normal curve between $t = 0$ to $t = 0.5$ is 0.1915)

OR

Q. 4. x) Explain the terms estimate and estimator. (3)

y) The probability that an individual suffers bad reactions from a particular injection is 0.01. Find the probability that out of 500 individuals
i) exactly 2 suffer the reaction
ii) more than 2 will suffer the reaction.
(Given:- $e^{-5}=0.0067$, $e^{-0.5}=0.6065$) (6)

z) A test of breaking strength of 6 ropes manufactured by a company showed mean breaking strength of 750 kg. and standard deviation of 20 kg. Find 95% confidence limits for the mean breaking strength of the rope manufactured by company. (7)

Q.5. a) Explain the terms i) Type I error (3)
ii) Level of significance

b) The height of 10 students selected at random, had a mean height of 158 cms and variance of 39 cms. Assuming level of significance of 5%, test the claim that the students of the population are on the average of height less than 162.5 cms. (7)

c) The probability mass function of a random variable x is
 $P(x)=1/2$ when $x=2$
 $=3/10$ when $x=5$
 $=1/5$ when $x=6$
 $=0$ otherwise.
Find i) $P(x \text{ is even})$, ii) $P(x>3)$. (6)

OR

Q. 5. x) Write any five properties of Normal curve. (3)

y) A random sample of 400 iron rods indicated that the average length of rod is 10 cms. Can this be regarded as a sample from a large population with a mean of 10.2 cms and standard deviation of 2.25 cms at 1 % L.O.S. ? (7)

z) It is observed that 30% of students in a class are swimmers. If 3 students are selected at random from this class, what is the chance that only one of them is a swimmer? (6)

