Register Number:

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**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

M.A. ECONOMICS - II SEMESTER

SEMESTER EXAMINATION - APRIL 2018

**EC: 8117 – Statistical Methods for Economists**

**Time: 2½ Hours Max Marks: 70**

This question paper has **TWO** printed pages and **THREE** parts

**PART A Answer any TEN of the following 2 X 10 = 20**

1. Define central tendency and dispersion
2. Differentiate between univariate and bivariate data with an example
3. Give classical definition of probability.
4. Define random variable and explain the types of random variables with an example for each.
5. Define Bernoulli distribution with usual notations
6. What is point estimation? State desired qualities for a good estimator.
7. Define ANOVA and mention its applications.
8. Define the term random experiment.
9. State additive and multiplicative law of probability.
10. Differentiate between discrete and continuous probability distributions.
11. Give two examples of each of the application of i) Binomial distribution ii) Poisson distribution.
12. Derive the expression for mean square error.

**PART B Answer any TWO of the following 10 x 2 = 20**

1. A) The amount allocated in the 12th five years plan in thousand crores of rupees is given below, represent data using split bar diagram (4)

Heads Transport Agriculture Education Irrigation Industry

Central (govt) 400 200 250 300 50

State (govt) 50 150 300 250 100

B) Goals scored by two teams A and B in a football season were as follows: (6)

 Team A: 2, 1, 2, 1, 3, 0, 1, 2, 1, 2, 1, 1, 0, 0

Team B 3, 3, 1, 1, 0, 2, 0, 1, 0, 0, 1, 0,

Compare both teams using coefficient of variation and comment on the result.

1. A) A can hit a target 2 times with 6 shots, B can hit 3 times with 4 shots and C can hit

 2 times with 3 shots. If each of them shoot once at the target, what is the probability that

 (i) all of them hit. (ii) at least one of them hits. (4)

B) Following is the probability distribution of the random variable X: (6)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | -3 | -1 | 0 | 1 | 3 |
| P(X=x) | 6/k | 2/k | 1/k | 3/k | 2/k |

 Find i) K ii) E(2X+3) iii) Var(X)

1. A) Explain the types of errors involved in testing of hypotheses with an example (3)

B) Differentiate between level of significance and type I error. (2)

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C) Explain test procedure for testing $H\_{0} : μ= μ\_{0} vs H\_{1} : μ\ne μ\_{0} $, where $μ= $population mean and $μ$0 = specified value of mean when sample size is small and variance unknown (5)

**PART C Answer any TWO of the following: 15 X 2= 30**

1. A) Find correlation coefficient between age of husband (X) and age of wife (Y) from the following data: (4)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Y | 60 | 34 | 40 | 50 | 45 |
| X | 75 | 38 | 44 | 55 | 44 |

B) Explain time series, cross sectional and panel data with an example for each (3)

C) Compute median from following data (3)

Wages (00 Rs) 40-50 50-60 60-70 70-80 80-90

No of employers: 10 15 18 21 16

1. A)Compute Fisher’s price index number from the following data. (5)

|  |  |  |
| --- | --- | --- |
| Item | Base year | Current year |
| Price | Quantity | Price | Quantity |
| A | 6.00 | 10.00 | 6.40 | 12.00 |
| B | 4.50 | 20.00 | 5.50 | 24.00 |
| C | 2.30 | 15.00 | 4.00 | 16.00 |
| D | 6.10 | 6.00 | 8.00 | 10.00 |

B) Define Normal Distribution and state any four characteristics of it. (5)

C) Explain t-test for significance of correlation coefficient (5)

1. A) The joint probability distribution of X and Y is given by the following table (5)

|  |  |  |  |
| --- | --- | --- | --- |
|  XY | 1 | 3 | 9 |
| 2  | 1/8  | K | 1/12 |
| 4 | 1/4  | 1/4  | 0 |
| 6 | 1/8 | 1/24 | 1/12 |

1. Find K ii) Find marginal distributions of X and Y iii) Find E(X) and E(Y)

B) Three brands of batteries are under study. It is suspected that the life-time (in weeks) of three brands are different, hence five batteries of each brand are tested and following results are obtained. Apply one way ANOVA to test the effect of brand on life-time of batteries at α =5% critical value = 3.89 (10)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Brand 1  | 122 | 117 | 75 | 89 | 81 |
| Brand 2  | 56 | 77 | 114 | 124 | 131 |
| Brand 3  | 84 | 84 | 85 | 87 | 88 |

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