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| **QP CODE: D4BEC2406** | **(Pages: 2)** | **Reg. No** | **: .....** |
| | | **Name** | **: .....** |

**FOURTH SEMESTER FYUGP EXAMINATION, APRIL 2026**

**Discipline Specific Core (DSC) Courses - Major**

**ECO4CJ205 : ANALYTICAL TOOLS FOR ECONOMICS II**

**(Credits: 4)**

**Time: 2 Hours** **Maximum Marks: 70**

## Section A

**Answer the following questions. Each carries 3 marks (Ceiling: 24 marks)**

| | | | |
|---|---|---|---|
| 1. | What are the two types of random variables? Give examples. | BL1 | CO1 |
| 2. | Mean and varince of a binomial distribution is 2.5 nd 1.875 respectively. Obtain the binomial distribution. | BL3 | CO2 |
| 3. | Write any 3 properties of lognormal distribution. | BL1 | CO2 |
| 4. | What are the applications of Chi - square distribution? | BL1 | CO4 |
| 5. | Define conditional probablity functions. | BL2 | CO2 |
| 6. | If X and Y are independent random variables. Prove that $COV(X,Y)=0$ | BL3 | CO2 |
| 7. | A sample of 49 observations has a mean of 75. The population standard deviation is 14. Find the 90% confidence interval for the population mean. | BL3 | CO3 |
| 8. | Define p value. | BL2 | CO4 |
| 9. | If the calculated t-statistic is 2.5, is it significant at the 5% level and 10 degrees of freedom (two-tailed)? | BL3 | CO4 |
| 10. | Two unbiased estimators $T_1$ and $T_2$ of a parameter $\theta$ have variances 4 and 6 respectively. Which estimator is more efficient? Justify your answer. | BL2 | CO3 |

## Section B

**Answer the following questions. Each carries 6 marks (Ceiling: 36 Marks)**

| | | | |
|---|---|---|---|
| 11. | If $A$ and $B$ are two events such that $P(A)=1/3, P(B)=1/4$ and $P(A\cap B)=1/8$. Find $P(A\|B)$ and $P(A\|B')$. | BL2 | CO1 |

**(PTO)**

| | | | |
|---|---|---|---|
| 12. | A random sample of 15 observations from a normal population has a variance of 20. Test at 1% level of significance whether the population variance is 25. Clearly state the hypotheses, test statistic, critical value, and conclusion. | BL3 | CO4 |
| 13. | Obtain the standard error of mean of a random sample of size n from a normal population with parameters μ and $\sigma^2$. | BL2 | CO3 |
| 14. | Following are the differences in test scores before and after coaching:<br>−3, +4, +2, −1, +5, +3<br>Apply the Wilcoxon Signed-Rank Test at 5% level of significance. | BL3 | CO4 |
| 15. | If $P(A) = 0.3, P(B) = 0.2$ and $P(A \cap B) = 0.1$. Find the probabilities of (1) at least one of the events; (2) exactly one of the events; and (3) none of the events occur. | BL3 | CO2 |
| 16. | State classical, empirical, axiomatic defenition of probability. | BL1 | CO1 |
| 17. | State Chebyshev's inequality. And write its impotrtance in law of large numbers. | BL2 | CO2 |
| 18. | Suppose $X \sim P(\lambda)$, find M L E of $\lambda$. | BL3 | CO3 |
| | **Section C** | | |
| | **Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)** | | |
| 19. | Define sampling distribution.<br>Derive the distribution of sample mean if 15 samples are taken from Normal distribution with mean -5 and standard deviation 4. | BL3 | CO3 |
| 20. | The marks obtained by students under three teaching methods are:<br>• Method A: 60, 65, 70<br>• Method B: 55, 60, 62<br>• Method C: 68, 72, 75<br>Use the Kruskal–Wallis test to test whether there is a significant difference among the methods at 5% level. | BL3 | CO4 |
| | **CO : Course Outcome** | | |
| | **BL : Bloom's Taxonomy Levels** (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create) | | |