

GOVERNMENT COLLEGE(A) RAJAHMUNDRY
CBCS SYLLABUS (Semester Wise) 2024-25
I B.Sc Statistics/Semester-II

COURSE-4: RANDOM VARIABLES AND MATHEMATICAL EXPECTATIONS

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1	Explain P.M.F and P.D.F.	BT2	PO2	C02
2	Explain about bi variate discrete random variable.	BT1	PO1	CO2
3	Explain about random variables and its types .	BT1	PO2	C01
4	State and prove multiplication theorem in expectation for two events	BT3	PO5	CO2
5	State and prove Cauchy-schwartz in equalities.	BT3	PO3	CO3
6	Describe about strong-law of large numbers	BT3	PO1	CO5
7	Write about statement of central limit theorem	BT3	PO2	CO5
8.	What is Lindberg – Levy CLT?	BT2	PO2	C04

SECTION – B

Answer Any THREE questions.

3X10=30M

9	Define distribution function in univariate random variable and explain properties	BT2	PO3	CO3
10	Describe about distribution function of bi variate random variables	BT2	PO2	CO2
11	State and prove additional theorem of expectation for n events	BT3	PO4	CO3
12	State and prove chebyshev in equality	BT3	PO4	CO3
13	Explain about moments generating function and its properties	BT2	PO5	CO4
14	Explain the following (i) Population (ii) Sample (iii) Parameter (iv) statistic (v) sampling distribution (vi) standard error	BT1	PO3	CO5

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CBCS SYLLABUS (Semester Wise) 2024-25
II B.Sc Statistics/Semester-III
COURSE 5: Theoretical Discrete Distributions

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1	Define Bernoulli distribution?	BT1	PO2	C01
2	Explain about Binomial distribution?	BT2	PO2	C04
3	Define Poisson distribution?	BT3	PO5	CO2
4	Describe C.F of Poisson distribution?	BT2	P02	C02
5	Discuss about C.F of Negative Binomial Distribution?	BT1	PO1	CO2
6	Define Geometric distribution?	BT3	PO4	CO3
7	Describe C.F of Hyper-Geometric distribution?	BT1	PO3	CO5
8	Explain Limiting case of Negative Binomial Distribution to Normal distribution?	BT1	PO3	CO5

SECTION-B

Answer any THREE questions

3X10=30M

9	Explain Binomial Distribution and its Properties	BT1	PO2	C01																		
10	Fit a Binomial Distribution for the following data <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">X</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">1</td> <td style="padding: 2px;">2</td> <td style="padding: 2px;">3</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">5</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">7</td> </tr> <tr> <td style="padding: 2px;">f</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">4</td> <td style="padding: 2px;">13</td> <td style="padding: 2px;">28</td> <td style="padding: 2px;">42</td> <td style="padding: 2px;">20</td> <td style="padding: 2px;">6</td> <td style="padding: 2px;">2</td> </tr> </table>	X	0	1	2	3	4	5	6	7	f	0	4	13	28	42	20	6	2	BT3	PO3	C01
X	0	1	2	3	4	5	6	7														
f	0	4	13	28	42	20	6	2														
11	Explain Poisson Distribution and its Properties	BT3	PO4	CO3																		
12	Illustrate about Limiting case of Negative Binomial Distribution to Normal distribution.	BT3	PO3	CO3																		
13	Define Geometric distribution and derive its Mean and Variance through M.G.F.	BT1	PO1	CO2																		
14	Define Hyper-Geometric distribution and derive its Mean and	BT2	PO2	CO3																		

Variance through M.G.F.			
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II B.Sc Statistics/Semester-III
COURSE 6: Theoretical Continuous Distributions

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1	Write short note on Continuous Random variables	BT3	PO3	CO1
2	Explain applications of Uniform Distribution?	BT3	PO1	CO5
3	Describe C.F of Exponential distribution.	BT3	PO2	CO5
4	Explain Applications of Normal Distribution	BT2	PO2	CO3
5	Explain about Standard Normal Distribution	BT3	PO5	CO2
6	Explain about Sampling distribution.	BT3	PO3	CO3
7	Explain F – Distribution	BT2	PO3	CO3
8	Explain about χ^2 - Distribution	BT1	PO3	CO5

SECTION-B

Answer any THREE questions

3X10=30M

9	Explain Rectangular Distribution and its Properties	BT3	PO1	CO5
10	Explain Exponential Distribution and its Properties	BT2	PO2	CO2
11	Explain Gamma Distribution and its Properties	BT1	PO3	CO5
12	Describe briefly about the Beta distribution of second kind and derive it's mean and variance.	BT3	PO4	CO3
13	Define Normal distribution and derive it's mean and variance.	BT2	PO2	CO3
14	Explain about Student's t- distribution	BT3	PO5	CO2

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CBCS SYLLABUS (Semester Wise) 2024-25
II B.Sc Statistics/Semester-III
COURSE 7: STATISTICAL METHODS

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X 4 =20M

1	Explain about principal of Least Squares.	BT3	PO3	C01
2	Define Correlation and types of correlation.	BT2	P02	C02
3	Explain about Karl Pearson's Coefficient of Correlation.	BT1	PO1	CO2
4	Describe about Intra-class correlation.	BT1	PO3	CO5
5	Define Regression.	BT1	PO2	CO3
6	Describe about Consistency of data.	BT1	PO3	CO5
7	Define Association of attributes	BT3	PO1	CO5
8	Explain about Fitting of Exponential Curve	BT3	PO1	CO5

SECTION-B

Answer any THREE questions

3X10=30M

9. Explain Fitting of Second Degree Parabola

BT3,P03,CO1

OR

10. Fit a Straight line of the form $y=a+bx$ to the following data

BT3,PO2,C01

X	2	4	6	8	10	12
Y	10	14	19	25	31	36

11. Explain Regression lines X on Y

BT3,P02,CO1

OR

12. Compute Correlation Coefficient for the following data

BT3,PO2,C01

X	20	14	36	29	5	11
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Y	19	9	25	10	2	6
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13. Explain about Partial and Multiple Correlations

BT3,PO3,C03

OR

14. Explain about Consistency of Data?

BT3,PO2,C01

CBCS SYLLABUS (Semester Wise) 2024-25
II B.Sc Statistics/Semester-III
COURSE 8: STATISTICAL INFERENCE-I

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1	Explain short note on Estimation?	BT3	PO3	C01
2	Explain about Confidence Intervals?	BT2	P02	C02
3	Define null and alternative hypothesis?	BT1	PO1	CO2
4	Explain types of errors?	BT1	PO3	CO5
5	Explain single proportion?	BT1	PO2	CO3
6	Explain F-test for equality of variances	BT1	PO3	CO5
7	What are Non parametric tests and its assumptions?	BT3	PO1	CO5
8	Explain Sign test?	BT3	PO1	CO5

SECTION-B

Answer any THREE questions

3X10=30M

1	Explain criteria of a good estimator	BT3	PO3	C01
2	Explain MLE	BT2	P02	C02
3	State and Prove NP-Lemma	BT1	PO1	CO2
4	Explain Single and two means concept in Large Samples	BT1	PO3	CO5
5	Explain about Chi-square test goodness of fit	BT1	PO2	CO3
6	Explain Median test	BT1	PO3	CO5

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CBCS SYLLABUS (Semester Wise) 2024-25
II B.Sc Statistics/Semester-IV
COURSE 9: SAMPLING TECHNIQUES

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1	Explain short note on types of Sampling.	BT1	PO1	CO2
2	Explain about Sampling Errors and Non-sampling errors	BT3	PO5	CO2
3	Explain SRSWR vs SRSWOR	BT2	PO3	CO3
4	Explain allocations in Stratified Sampling	BT1	PO2	CO3
5	Explain Random numbers method	BT3	PO2	CO5
6	Explain Systematic Sampling	BT3	PO1	CO5
7	Explain NSSO	BT3	PO2	CO5
8.	Explain National Statistical Commission	BT2	PO2	C04

SECTION-B

Answer any THREE questions

3X10=30M

9	Explain principal steps in sample survey.	BT2	PO2	CO3
(OR)				
10	Show that $E(s^2)=S^2$ in SRSWOR.	BT4	PO5	CO4
11	Comparison of variance of SRS, StRS and SYS for a linear trend	BT1	PO2	C01
(OR)				
12	Show that $V(\bar{y}_{opt}) \leq V(\bar{y}_{prop}) \leq V(\bar{y}_{srswor})$	BT3	PO4	CO3
13	Define Systematic sampling and write it's advantages and disadvantages.	BT4	PO5	CO4
(OR)				
14	Explain the roles and responsibilities of C.S.O	BT1	PO2	C01

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CBCS SYLLABUS (Semester Wise) 2024-25

II B.Sc Statistics/Semester-IV

COURSE 10: DESIGN AND ANALYSIS OF EXPERIMENTS

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1	Write about assumptions of ANOVA.	BT3	PO3	CO3
2	Write Short note on ANOVA	BT2	PO3	CO3
3	Define completely randomized design (CRD)	BT3	PO3	CO1
4	Explain about fixed effect & random effect model.	BT2	PO3	CO3
5	Describe about applications for RBD.	BT3	PO5	CO2
6	Write about advantages and disadvantages of LSD.	BT2	PO2	CO3
7	Describe about applications for LSD.	BT2	PO3	CO3
8	Describe Yates procedure to find factorial effect totals.	BT1	PO2	CO3

SECTION-B

Answer any THREE questions

3X10=30M

9	Explain ANOVA two way classification	BT1	PO2	CO1
(OR)				
10	Explain ANOVA one way classification	BT2	PO2	CO2
11	Explain about CRD	BT3	PO5	CO2
(OR)				
12	Explain about RBD	BT2	PO3	CO3
13	Explain about LSD			
(OR)				
14	Explain 2^3 factorial experiments			

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II B.Sc Statistics/Semester-IV
COURSE 11: NUMERICAL ANALYSIS

Time: 2 ½ hrs

MODEL PAPER

Max Marks: 50

SECTION-A

Answer any FIVE questions.

5 X4 =20M

1. Given $y_0 = 3, y_1 = 12, y_3 = 200, y_4 = 100$. Find $\Delta^4 y_0$ without forming difference table BT2,PO1,C02

2. Find the missing term in the following data.

BT3,PO1,C02

x	0	1	2	3	4
y	1	3	9	—	81

3. Given that $\sqrt{12500} = 111.803399, \sqrt{12510} = 111.848111, \sqrt{12520} = 111.892806, \sqrt{12530} = 1.937483$. Show by gauss backward formula that $\sqrt{12516} = 111.874930$

BT3,PO1,C02

4. Explain Newton's Divided difference formula and Lagrange's formula

BT2,PO1,C01

5. Find $f'(1)$ for $f(x)=1/(1+x^2)$ using the following table .

BT1,PO1,C02

X	1.0	1.1	1.2	1.3	1.4
Y	0.5000	0.4524	0.4098	0.3717	0.3378

6. Find $f'(2.5)$ from the following table

BT2,PO1,C03

X	1.5	1.9	2.5	3.2	4.3	5.9
Y	3.375	6.059	13.625	29.368	73.907	196.57

7. Evaluate $\int_1^1 (4x - 3x^2)dx$ taking 10 intervals by trapezoidal rule

BT1,PO1,C03

8. Using Taylor's series method, find $y(0.1)$ correct to four decimal places if $y' = x - y^2$ and $y(0) = 1$. BT2,PO1,C01

SECTION-B

Answer any **THREE** questions

3X10=30M

9. State and prove Newton – Gregory formula for forward interpolation with equal intervals **BT1,PO1,C03**

OR

10. From the following table , find the number of students who obtain less than 45 marks . **BT3,PO3,C02**

Marks	30-40	40-50	50-60	60-70	70-80
No.of students	31	42	51	35	31

11. Find $f'(0.6)$ and $f''(0.6)$ from the following table .

BT2,PO1,C02

X	0.4	0.5	0.6	0.7	0.8
f(x)	1.5836	1.7974	2.0442	2.3275	2.6510

OR

12. Apply Gauss forward formula to find the value of u_9 if $u_0 = 14$, $u_4 = 24$, $u_8 = 32$, $u_{16} = 40$. **BT2,PO1,C01**

13. Evaluate the integral $\int^{5.2} \log x \, dx$ using Weddle's rule.

BT3,PO1,C02

OR

14. Given $\frac{dy}{dx} = y - x$ with $y(0) = 2$, find $y(0.1)$ and $y(0.2)$ correct to four decimal places

BT2,PO1,C01

dx
by using Runge – Kutta method .