INTERNAL ASSIGNMENT QUESTIONS
M.Sc. (STATISTICS) SEMESTER-III

2026

PROF. G. RAM REDDY CENTRE FOR DISTANCE EDUCATION
(RECOGNISED BY THE DISTANCE EDUCATION BUREAU, UGC, NEW DELHI)
OSMANIA UNIVERSITY
(A University with Potential for Excellence and Re-Accredited by NAAC with “A” + Grade)

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PROF.G.RAM REDDY CENTRE FOR DISTANCE EDUCATION
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Dear Students,

Each student has to write the answers to the Assignment questions with neat own handwriting using Blue Pen (Black Ink not allowed) for each paper. Assignments have to submit after the payment of Rs.500/- by showing the receipt of the same. If the Assignment is not submitted within stipulated time i.e. before the theory exams / last date is treated as absent.

Methodology for writing the Assignments (Instructions) :

1. First read the subject matter in the course material that is supplied to you.
2. If possible read the subject matter in the books suggested for further reading.
3. You are welcome to use the PGRRCDE Library on all working days for collecting information on the topic of your assignments. (10.30 am to 5.00 pm).
4. Give a final reading to the answer you have written and see whether you can delete unimportant or repetitive words.
5. The cover page of the each theory assignments must have information as given in FORMAT below.

FORMAT

1. NAME OF THE STUDENT :
2. ENROLLMENT NUMBER :
3. NAME OF THE COURSE :
4. SEMESTER (I, II, III & IV) :
5. TITLE OF THE PAPER :
6. DATE OF SUBMISSION :

6. Write the above said details clearly on every subject assignments paper, otherwise your paper will not be valued.
7. Tag all the assignments paper wise and submit them in the concerned counter.
8. Submit the assignments on or before **27-07-2026** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

Note : Write the Answers in A4 size white papers with Blue ink / ball point pen only

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M.SC. CDE (STATISTICS) INTERNAL ASSIGNMENT

SUBJECT: STATISTICS

PAPER – I : OPERATION RESEARCH-I

MAX. MARKS: 30

Note: Answer all questions in Section-A and Section-B with only Blue Pen.

SECTION–A (Short Answer Type) (5 Q x 2 Marks = 10 Marks)

1. Distinguish the feasible solution, basic solution, basic feasible solution, degenerate solution and optimal solution. Illustrate the same for the system of equations: Max $Z = 2X_1 - X_2$ subject to the constraints $X_1+2X_2 \leq 10$ and $3X_1+5X_2 \leq 15$ and $X_1, X_2 \geq 0$.
2. Express the Assignment and transportation problems are special cases of a Linear programming problem and discuss their interrelationships
3. Explain the Gomory's cutting plane algorithm and explain concept behind its functionality
4. State the rules for constructing a network diagram and how we can avoid the types of errors occurring in its construction?
5. What do you understand by duality? How it is involved in duality construction and dual simplex method?

SECTION–B (Essay Answer Type) (2 Q x 10 Marks = 20 Marks)

6.a) Find the optimal solution to the following Linear programming problem using an appropriate method: Maximize: $Z= 5X_1+8X_2$ subject to the constraints: $3X_1+2X_2 \geq 3$; $X_1+4X_2 \geq 4$; $X_1+X_2 \leq 5$; and $X_1, X_2 \geq 0$;

b) Find the optimal solution to the following unbalanced transportation problem using modified distribution through Vogels approximation method initial basic feasible solution.

Origin	Destination					Availability
	D_1	D_2	D_3	D_4	D_5	
O_1	73	40	49	79	20	28
O_2	62	93	96	58	33	27
O_3	96	65	80	50	55	29
O_4	57	58	29	12	87	23
O_5	56	23	87	18	12	25
Requirement	26	28	10	24	25	

7a Construct a network diagram for the simple project of erection of steel works for a shed. The various elements of project are as under.

Activity:	A	B	C	D	E	F	G	H	I	J	K
Predecessor	--	--	A	B	A, C	B	C, D	G, F	E	H, I	J
Time	7	4	8	2	3	6	9	2	3	5	7

b) (i) Stating the assumptions on economic order quantity (EOQ), write the limitations on its formulae usage?

(ii) A manufacturer has to supply his customers 600 units of his product per year. Shortages are not allowed and the inventory carrying cost amount to rs. 0.60 per unit year The setup cost per run is Rs. 80. Find the economic order quantity, minimum average yearly cost and the optimum number of orders per year?

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M.SC. CDE (STATISTICS) INTERNAL ASSIGNMENT

SUBJECT: STATISTICS

PAPER – II: APPLIED REGRESSION MODELS

MAX. MARKS: 30

Note: Answer all questions in Section-A and Section-B with only Blue Pen.

SECTION–A (Short Answer Type) (5 Q x 2 Marks = 10 Marks)

1. What is the concept behind in defining the R^2 with respect to the multiple correlation related to the functional model. Also define adjusted R^2
2. Stating the assumptions underlying, illustrate in detail with two biological applications of probit regression model.
3 State the assumptions underlying the variance component models for two-way random effect model and also write its hypothesis for testing and justify.
4. Explain the Gauss-Newton Method in obtaining solution for parameters of non-linear regression. Illustrate it with a suitable example.
5. Stating the conditions for robust regression model, discuss various methods used for same in detail?

SECTION–B (Essay Answer Type) (2 Q x 10 Marks = 20 Marks)

6.a) Explain the Steepest Descent Method in obtaining solution for parameters of non-linear regression. Define Logistic and Gompertz growth curves and state their properties.

b) Obtain in the estimates of parameters in the probit model. Also obtain the procedure for testing the significance of the coefficients in the model?

7a) Write the steps involved in selecting the best Regression using (i) Forward selection (ii) Backward Elimination methods.

b) Obtain the estimates for variance components in a random effect model of balanced two way classification with one observation per cell.

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M.SC. CDE (STATISTICS) INTERNAL ASSIGNMENT

SUBJECT: STATISTICS

PAPER – III: TIME SERIES ANALYSIS

MAX. MARKS: 30

Note: Answer all questions in Section-A and Section-B with only Blue Pen.

SECTION–A (Short Answer Type) (5 Q x 2 Marks = 10 Marks)

1. Derive the ML estimator of variance of AR(p) model. write the model for p=1,2. Explain model and writs its significance.
2. How can you examine the stationarity using Autocovariance? Illustrate with a suitable example?
3. What is diagnostic checking and explain model diagnostic checking for residuals
4. State and define the three explicit forms of ARIMA Model
5. What is spectral function of a stationary process? Write its importance?

SECTION–B (Essay Answer Type) (2 Q x 10 Marks = 20 Marks)

6.a) Describe the time series model identification procedure using ACF and PACF?

b) Define ARIMA (p, d, q) model and derive the random shock form of ARIMA model with an example.

7a) Define the sample spectrum? Establish the relation between the sample spectrum and auto covariance function estimate?

b) How can you identify the time series model for the data using Auto and partial auto correlation functions?

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M.SC. CDE (STATISTICS) INTERNAL ASSIGNMENT

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PAPER – IV: STATISTICAL QUALITY CONTROL

MAX. MARKS: 30

Note: Answer all questions in Section-A and Section-B with only Blue Pen.

SECTION–A (Short Answer Type) (5 Q x 2 Marks = 10 Marks)

1. Write about control chart for non-normal distribution
2. Derive sample size for an inspection plan for variables when lower specification is given
3 Explain the economic design of variable charts and write their importance. Compare with non-parametric control charts.
4. Write the role of continuous sampling plans and state their properties.
5. Explain the multivariate quality control charts with suitable real life examples.

SECTION–B (Essay Answer Type) (2 Q x 10 Marks = 20 Marks)

6.a) Explain the construction of Operating Characteristic function and ARL functions for control charts for variables.

b) Explain the construction of Cumulative Sum Chart and write the interpretation for making the appropriate decisions on the data.

7a) What is meant by acceptance sampling plan and rectifying inspection program? Describe designing of Rectifying sampling plan?

b) Explain the various capability indices and its role in quality control