INTERNAL ASSIGNMENT QUESTIONS
M.Sc (Mathematics) IV Semester

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)

DIRECTOR

Prof. N.Ch. Bhatracharyulu

Hyderabad – 7 Telangana State

PROF.G.RAM REDDY CENTRE FOR DISTANCE EDUCATION
OSMANIA UNIVERSITY, HYDERABAD – 500 007

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. YEAR WISE (I, II & III YEAR) :
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 **10th March, 2026** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

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INTERNAL ASSIGNMENT QUESTION PAPER– 2025-26
Course M.Sc. (Mathematics) IV Semester

Paper : I **Subject : Functional Analysis.**

Total Marks: 30

Section – A

UNIT– I : Answer the following short questions
(each question carries two marks) **5x2 =10**

1) Prove Riez's lemma.

2) State and prove parallelogram law.

3) Let T be a bounded linear operator on a complex

Hilbert space H and $< \boldsymbol{Tx}, \boldsymbol{x} >$ is real.

4) let X be a normed space $x \neq 0$ be any element of X.
Then prove that there exists a bounded linear functional f on X such that $\|f\| = 1$ and $f(x) = \|x\|$.

5) In X is an inner product space. then prove that
$$\|x + y\| \leq \|x\| + \|y\| \; \forall \, x, y \in X$$

Section -B

UNIT– II Answer the following Long questions
(each question ten marks) **2x10= 20**

1). (i)Prove that every finite dimensional subspace Y of a normed space X is compete
(ii)State and prove Bessels inequality in an inner product space X.

2). State and Prove Closed graph theorem

Name of the Faculty : V. Venkateshwarlu
Department: Mathematics

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INTERNAL ASSIGNMENT QUESTION PAPER (Feb-2026)
COURSE: M.Sc MATHEMATICS, SEMESTER-IV,
SUBJECT: Partial Differential Equations.

SECTION – A

Answer the following questions ($5 \times 2 = 10$)

1. Define compatible systems of first order PDE's and Derive the compatibility condition.
2. Derive Charpit's auxiliary equations.
3. Find the region in which the partial differential equation.
   $x^2(y-1)u_{xx} - x(y^2-1)u_{xy} + y(y^2-1)u_{yy} + u_x = 0$ is hyperbolic.
4. Solve $(D^2 - DD' + D' - 1)u = \cos x + 2y$.
5. Solve one dimensional wave equation by method of separation of variables.

SECTION-B

Answer the following questions ($2 \times 5 = 10$)

6. Describe the Cauchy's method of characteristics to solve first order nonlinear partial differential equations.
7. Describe the classification of second order PDE and its canonial forms.

Dr. A. Venkatalakshmi.
Professor.
Dept of Mathematics.
Osmania University

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OSMANIA UNIVERSITY, HYDERABAD–500 007

INTERNAL ASSIGNMENT QUESTION PAPER

COURSE : M.Sc. (Maths) IV Semester

Paper : III **Subject :** Numerical Techniques.

Total Marks: 30

Section – A

UNIT – I : Answer the following short questions (each question carries two marks) 5x2=10

1 Discuss the derivation & the order of convergence of Newton-Raphson Method

2 Solve by Gauss Elimination Method : $10x_1 + x_2 - 2x_3 = 5$
$x_1 + 10x_2 - x_3 = 2$
$2x_1 - 3x_2 + 20x_3 = 6$.

3 Derive Newton's forward Difference Interpolation formula.

4 Derive and write Algorithm for Simpson's Method

5 Given $\frac{dy}{dx} = 4 + x^2 + y$, $y(0) = 1$ find $y(0.02)$ using Modified Euler's Method

Section – B

UNIT – II : Answer the following Questions (each question carries ten marks) 2x10=20

1 Find the approximation to the root of the equation $f(x) = x^3 - 3x - 5 = 0$ which lies between 2 and 3 using Muller's Method

2. Solve the Differential Equation $\frac{dy}{dx} = \frac{1}{x+y}$ for $x = 0.5, 1$ by using Runge-Kutta Method with $x = 0$, $y = 1$

Dr. J.G. Shyamsundar

Name of the Faculty :

Dept. Mathematics

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INTERNAL ASSIGNMENT QUESTION PAPER

COURSE : M.Sc. (Maths) IV Semester

Paper : IV **Subject :** Mathematical Statistics

Total Marks: 30

Section – A

UNIT – I : Answer the following short questions (each question carries two marks) 5x2=10

1 State and prove addition theorem of probability.

2 State and prove Bayes theorem.

3 Write the properties of Normal Distribution.

4 Write short notes on central limit theorem.

5 Explain ~~the~~ chi square test for goodness of fit.

Section – B

UNIT – II : Answer the following Questions (each question carries ten marks) 2x10=20

1a) present two problems on difference of means and difference of proportions (from text book).

b) present two problems from chi square test and F-test.

2a) Write two problems from Normal Distribution and Binomial Distribution.

b) Solve two problems from central limit theorem and confidence intervals.

Name of the Faculty : Prof. V. Srinivas

Dept. Mathematics.