INTERNAL ASSIGNMENT QUESTIONS
M.Sc. (MATHEMATICS) PREVIOUS

2024

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. G.B. Reddy

Hyderabad – 7 Telangana State

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

Dear Students,

The student appearing for backlog exams of M.Sc. Mathematics (Previous) under year-wise scheme and paying examination fee for the first time has to write and submit **Assignment** for each paper compulsorily. Each assignment carries **20 marks.** The marks awarded to the students will be forwarded to the Examination Branch, OU for inclusion in the marks memo. If the student fail to submit Internal Assignments before the stipulated date, the internal marks will not be added in the final marks memo under any circumstances. The assignments will not be accepted after the stipulated date. **The students who paid examination fee and appeared for annual exams in 2023 (or) paid examination fee and not appeared for annual examinations in 2023 are not permitted to submit the assignment now.**

Candidates are required to submit the Exam fee receipt along with the assignment answers scripts at the concerned counter on or before **29.06.2024** and obtain proper submission receipt.

ASSIGNMENT WITHOUT EXAMINATION FEE PAYMENT RECEIPT (ONLINE) WILL NOT BE ACCEPTED

Assignments on Printed / Photocopy / Typed will not be accepted and will not be valued at any cost. Only HAND WRITTEN ASSIGNMENTS will be accepted and valued.

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. NAME OF THE PAPER :
5. 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 **29.06.2024** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

13/6/24

DIRECTOR

INTERNAL ASSIGNMENT- **2023 - 2024**
Course: MATHEMATICS

Paper: I **Title: Algebra** **Year: Previous**

Section – A

Answer the following short questions (each question carries two marks) $(5\ X\ 2 = 10M)$

1. Let $G = [a]$ be a finite cyclic group of order n generated by an element a, then prove that the map $\sigma: G \rightarrow G$ defined by $\sigma(x) = x^m$ is an automorphism if and only if $(m, n) = 1$

2. Show that the group $(Z/(4), +)$ cannot be written as the direct sum of two non-trivial subgroups

3. If H is a normal subgroup of a finite group G and if the index of H in G is prime to p then prove that H contains every sylow $p -$ subgroup of G

4. Let R be a commutative ring and P a prime ideal then prove that $S = R - P$ is multiplicative set and R_s is a local ring with unique maximal ideal $P_s = \{a/s \quad a \in P, s \notin P\}$

5. Let $f: R \rightarrow S$ be a homomorphism of a ring R into a ring S, then prove that (i) $f(R)$, the homomorphic image of R by f is a subring of S (ii) kernel of f is an ideal of R

Section – B

Answer the following questions (each question carries five marks) $(2X5 = 10M)$

1. Let $n = \prod_{j=1}^{k} P_j^{f_j}$, P_j distinct primes then prove that the number of nonisomorphic abelian groups of order n is $\prod_{j=1}^{k} |P(f_j)|$.

2. Let R be an integral domain then prove that R is right Ore domain if and only if there exists a division ring Q such that R is a subring of Q and every element of Q is of the form ab^{-1} for some $a, b \in R$.

Name of the Faculty: **Dr. G. Upender Reddy**
Dept. **Mathematics**

M.SC. MATHEMATICS (PREVIOUS)
INTERNAL ASSESSMENT

PAPER - II: REAL ANALYSIS

SECTION - A

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

1. Prove that every neighbourhood is an open set.
2. Prove that continuous image of a compact metric space in compact.
3. If f in continuous as [a,b], then prove that f ER(a) on [a, b].
4. State and prove Cauchy's criterion for uniform convergence of sequence of functions.
5. If f is continuous on [0, 1] and if {f(²) x^n dx = 0 n=0,1,2 , Prove that f(x)=0 on [0,1].

SECTION – B

UNIT – I : Answer the following questions (each question carries two marks) **2x5=10**

1. Prove that every continuous function defined on a compact metric space is uniformly continuous.
2. State and prove Weirstrass approximation theorem.

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

INTERNAL ASSIGNMENT QUESTION PAPER- 2023 - 2024

Course : M.Sc. (Mathematics)

Paper : III **Title :** Topology & Functional Analysis **Year: Previous / ~~Final~~**

Section – A

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

1 Define finite subcover and compactness
2 prove that a completely regular space is a Hausdorff space.
3 Define normed space and Banach space
4 prove that $(S+T)^* = S^* + T^*$
5 State and prove parallelogram Law

Section – B

UNIT – II : Answer the following essay questions (each question carries Five marks) 2x5=10

1. Prove that any continuous image of a connected space is connected
2. State and prove schwarz inequality

Name of the Faculty : Dr. K. prudhvi

Dept. Mathematics

19/02/23

PROF PGRRCDE , OSMANIA UNIVERSITY

QUESTION PAPER INTERNAL ASSIGNMENT

M.Sc Mathematics (Previous) 2023 - 2024

Paper-IV Title : Elementary Number Theory

Section -A

Note: Answer the following questions (5 x 2 =10 Marks)

(1) Show that there are infinitely many primes.

(2) Show that $\sum_{d/n} \varphi(d) = n$ for any $n \geq 1$.

(3) State and prove Euler -Fermat's theorem.

(4) Evaluate (11|13).

(5) State and prove Euler's criterion.

Section – B

Note: Answer the following questions (2 x 5 =10 Marks)

(6) (i) If f , g are any two multiplicative functions , then show that $f * g$ is also a multiplicative function.

(7) (i) State and prove Lagrange theorem for polynomial congruences.

(ii) State and prove Jacobi's triple product identity.

(Dr V.Kiran)

Department of Mathematics

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

INTERNAL ASSIGNMENT QUESTION PAPER- 2022 - 2023

Course : M.Sc. (Mathematics)

Paper : V **Title :** Mathematical Methods **Year: Previous / Final**

Section – A

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

1. Solve in series $2x\frac{d^2y}{dx^2}+(1+2x)\frac{dy}{dx}-5y=0$
2. Show that $xJ_n'(x)=nJ_n(x)-xJ_{n+1}(x)$
3. State and prove Abel's formula
4. State and prove contraction principle
5. Solve $(p^2+q^2)y=qz$

Section – B

UNIT – II : Answer the following essay questions (each question carries Five marks) 2x5=10

1. Show that $J_n(x)=\sum_{r=0}^{\infty}\frac{(-1)^r}{r!\,\Gamma(n+r+1)}\left(\frac{x}{2}\right)^{n+2r}$
2. Solve one dimensional heat equation

$$\frac{\partial u}{\partial t}=c^2\frac{\partial^2 u}{\partial x^2}$$

Name of the Faculty : Dr. A. Srisailam
Dept. Mathematics, O.U.C.S