# INTERNAL ASSIGNMENT QUESTIONS
# M.C.A. I 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. 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 **20-07-2026** at the concerned counter at PGRRCDE, OU on any working day and obtain receipt.

**DIRECTOR**

# INTERNAL ASSIGNMENT

# MCA SEMESTER - I

| **Note: Answer all the Questions. Each Question carries three marks** | **Q10x3M=30M** |
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| **Paper: I - PCC101** | **Subject: Mathematical Foundations of Computer Science** |

**Q No.1**

1. Determine the truth value of each of the following:
   (a) 4+2=6 and 2+2=4 (b) 5+4=9 and 3+3=5
   (c) 6+4=10 and 1+1=3 (d) Charminar is in Hyderabad or 7+1= 6
   (e) It is not true that Delhi is in Russia (f) It is false that 3+3=6 and 2+2=8
2. Construct truth tables for the following:
   (a) $\sim(p \vee q)$ (b) $\sim(p \vee \sim q)$ (c) $(p \wedge q) \vee (p \wedge q)$
   (d) $(p \vee q) \vee \sim p$ (e) $\sim(\sim p \vee \sim q)$ ( f) $p \wedge (q \wedge p)$
   (g) $p \vee \sim(p \wedge q)$
3. Show that $((p \vee q) \wedge \sim(\sim p \wedge (\sim q \vee \sim r))) \vee (\sim p \wedge \sim q) \vee (\sim p \wedge \sim r)$ is a tautology
4. Write an equivalence formula for $p \wedge (q \leftrightarrow r) \vee (r \leftrightarrow p)$ which does not contain biconditional.
5. Prove: If $\alpha^2$ is an even integer, then $\alpha$ is an even integer.
6. Show that $2^{1/2}$ is not a rational number.

**Q No.2**

1. Let A be a set with k elements and P(A) it spower sets how that the cardinality of P(A) is $2^k$.
2. If $A \oplus B$ denotes the symmetric difference of two sets A and B, then find $A \oplus B$ for the following:
   A={a,b},B={a,c}
   A={a,b},B={b,c}
3. 3If A=(1,3,5,7,9} and B={3,5,8} then find $A \Delta B$ (symmetric difference of the sets A and B).
4. Prove(or disprove) by Venn diagram or other wise that ( $A \cup B) \cap (B \cup C') \subset (A \cap B')$.
5. Define the following:(i)Power set (ii)Partition of a set give examples
6. In a survey of 500 people 285 are interested in football game, 195 are interested in hockey game, 115 are interested in basketball game, 45 in football and basketball, 70 in football and hockey and 50 in hockey and basketball games; and 50 are not interested in any of these three games. (i) How many people are interested in all the three of the games?(ii)How many people are interested in exactly one of the games?

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| Q No.3 | 1. Giveanexampleofanon-emptysetandarelationonthesetthatsatisfieseach of the following properties ; draw a digraph of the relation.(a) Reflexive (b) irreflexive (c) an anti-symmetric relation.<br>2. Let A={1,2,3,4,5,6,7}andR={(x,y)\|x–yisdivisibleby3}Show that Risan equivalence relation. Draw the graph of R.<br>3. LetA={1,2,3}andR={(1,1),(1,4),(4,1),(4,4),(2,2),(2,3),(3,2),(3,3)}<br>Write the Matrix of R and sketch its graph.<br>4. Let Rbe the relation from A={1,2,3,4,5} to B={1,3,5} which is defined by"x is less than y", write R as a set of ordered pairs:<br>5. Determine the domain and range of relation R, on set of Integers R={(x,y)\|x is a multiple of 3 and y is a multiple of 5}<br>6. Definetheterms:(i)Function(ii)One-onefunction(iii)Ontofunction(iv)<br>Identify function |
| Q No.4 | 1. Letf:N→N,f(x)=2x+3,Nbeingthesetofnaturalnumbers.Provethatfis injection but not surjection.<br>2. Show that the function from the real sin to the real s defined by f(x)=x2+1is one-to-one, onto function and find $f^{-1}$<br>3. Let the functions f:R→Randg:R→Rbedefinedbyf(x)=2x+1,g(x)=x2–2. Find formulas which define the functions g of and fog<br>4. Define the terms(a) Partially ordered set(b) Linearly ordered set. Give examples.<br>5. State and Prove the Principle of Inclusion and Exclusion.<br>6. Howmanysolutionsdoesx1+x2+x3=11have,wherex1,x2,andx3are nonnegative integers with x1 ≤ 3, x2 ≤ 4, and x3 ≤ 6. |
| Q No.5 | 1. FindtheCoefficientof16in$(1+X^4+X^8)^{10}$<br>2. Find the Generating Function to count the number of Integral Solutions to $e_1+ e_2+ e_3=10$ 0<= $e_i$.n<br>3. FindtheCoefficientof20in$(X^3+X^4+X^5+.....)^5$ |
| Q No.6 | 1. Solvetherecurrencerelation$a^r=2a^{r-1}+1$with$a^1=7$forr>1bysubstitution.<br>2. Find the particular solution of $a_r+5a_{r-1}+6a_{r-2}=3r^2$<br>3. Find a general expression for a solution to the recurrence relation $a_n+ 5a_{n-1}+ 6a_{n-2}= 4^n$n>=1 |
| Q No.7 | 1. Define (i)group(ii) a belian group.<br>2. Show that addition is a binary operation in the set Mofallm×n matrices.<br>3. Show that the least common multiple of two natural is a binary operation in the set of natural numbers N.<br>4. Define a' binary operation'.<br>5. Show that the setG={1,–1,i,–i}wherei=√-1isanabeliangroupwithrespect to multiplication as a binary operation.,,,<br>6. Prove that G={1,ω,$ω^2$}isagroupwithrespecttomultiplicationwhere1,ω, $ω^2$ are cube roots of unity. |

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| Q No.8 | 1. Show that the set off our trans formations $f_1$,$f_2$,f3,andf4,f2,onthesetof complex numbers be defined by $F_1(z)=z, F_2(z)=-z, F_3(z)=1/z, F_4(z)=-1/z$ Form safiniteabelian group with respect to the binary operation as the composition of product of two functions.<br>2. Show that the set G={0,1,2,3,4} is anabelian group with respect to addition modulo 5.<br>3. Show that the setG={1,2,3,4}isanabelian with respect to multiplication modulo 5.<br>4. On the set of integers Z, we introduce a binary operation* defined as follows .a *b=a+b+1,where+isordinaryaddition.Showthat(Z,*)isa group.<br>5. Find the order of all element sofa group($Z_4$,+4).<br>6. (G,*)isagrouporder60,findallthesub-groupsofG. |
| Q No.9 | 1. Drawagraphrepresentingtheproblemofthreehousesandthreeutilitiessay water, gas and electricity.<br>2. Define:(a)Graph(b)Self-loop(c)Digraph(d)Multigraph(e)Pseudograph(f) Order of a graph (g) Size of a graph. Give examples.<br>3. Show that the reisnographwith the sequence(1,1,3,3,3,4,6,7).<br>4. Suppose G is a non-directed graph with 12 edges.If Ghas 6 vertices each of degree3andtheresthavedegreelessthan3,whatistheminimumnumberof vertices G can have?<br>5. Showthatasimplegraphoforder4andsize7doesnotexist.<br>6. AgraphGhas21edges,3verticesofdegree4andotherverticesareofdegree 3.FindthenumberofverticesinG.<br>7. Let $C_5$ be a cycle graph with n vertices. Prove that $C_5$ is the only cycle graph isomorphic to its complement.<br>8. Prove that two graphs are isomorphic if and only if their complements are isomorphic.<br>9. The adjacency structure of a graph G is given as G=[A:B,E;B:A,E,F,G;C:D,G,H;D:C,H;E:A,B;F:G;G:B,C,F;H:C,D]Draw a graph for The same.<br>10. 10 If G is not connected then G is connected. Prove |
| QNo.10 | 1. G1andG2aretwoisomorphicgraphs.ShowthatG2isconnectedifG1is connected.<br>2. Two graphs G and G' are isomorphism if the reisa function f:V(G)->V(G')from theverticesofGtotheverticesofG'suchthat(i)fisone-one,(ii)fisonto,and (iii)ForeachpairofverticesuandvofG,{u,v}∈E(G)ifandonlyif{(f(u),f(v) }∈E(G').<br>3. Anon-directed graph G is connected if and only if G contains as panning tree. Prove<br>4. Findthemaximumpossibleheightofabinarywith13verticesanddrawgraph of the tree.<br>5. Findtheminimumheightofthetreewith9vertices.<br>6. State Kruskal's algorithm for find the minimal spanning tree.<br>7. Let HbeasubgraphofaconnectedgraphG.ShowthatHisasubgraph of some spanning tree T if H contains no cycles.<br>8. Showthatasimplenon-directedgraphGisatreeifandonlyifitisconnected and has no cycles. |

# INTERNAL ASSIGNMENT

## MCA SEMESTER - I

## PAPER – II : Data Structures Using C

**Note: Answer all the Questions. Each Question carries three marks Q10x3M=30M**

1. a) Explain the compilation and linking process of a C program with a neat block diagram.
   b) Write a C program to perform matrix multiplication of two (2x2) matrices using two-dimensional arrays.

2. a) DifferentiatebetweenPassbyValueandPassbyReferencewithasuitablecodeexample for each.
   b) DefineaStructureforaStudent(containingRollNo,Name,andMarks).Writeaprogramtoread and display data for three students using an array of structures.

3. a) DiscussthearrayrepresentationofaStackandexplainthepushandpopoperations.
   b. Illustrate the process of inserting a new node at the beginning and end of a Singly Linked List.
4. a) DefineaBinarySearchTree(BST).Showthestepstoinsertthefollowingelementsinto an empty BST: [50, 30, 70, 20, 40, 60, 80]
   b) ExplaintheBreadth-FirstSearch(BFS)andDepth-FirstSearch(DFS)graphtraversaltechniques.

5. a) DemonstratetheQuickSortalgorithmbysortingthefollowinglistofnumbers:[25,10,35, 15, 5, 20]
   b) What is Hashing? Explain any two collision resolution techniques used in hash tables.

6. a) Discuss the various categories of Data Types In C and explain the differences between Constants and Variables.
   b) Write a C program to perform Line a Search on a one-dimensional array of elements.

7. a) What is Recursion? Write are cursive C function to find the factorial of a given number.
   b) Highlight the key differences between a Structures and a Unions. Provide a code snippet to support your answer.
8. a) Explain the concept of a Queue and describe its practical applications in computer science.
   b) What is a Doubly Linked List? Explain how it differs structurally and operationally from a Circular Linked List.

9. a) Given a Binary Tree, explain the three types of Tree Traversals : In-order, Pre-order and Post-order.
   b) What is an AVL Tree? Explain the concept of balance factor and why it is important question

10. a) Illustrate the step-by-step process of sorting an array of numbers using Merge Sort.
    b) Explain the concept of Binary Search and state its time complexity compared to Linear Search.

# INTERNAL ASSIGNMENT
# MCA SEMESTER - I

## PAPER – III : Object Oriented Programming Using Java

**Note: Answer all the Questions. Each Question carries three marks Q10x3M=30M**

1. What are the benefits of Object-Oriented Development?
2. Explain classes, objects, in heritance, packages and interfaces in Java.
3. Explain by test reams and character streams in Java.
4. What is exception handling? Explain multi threaded programming in Java.
5. Explain the Collection Frame work and its interfaces in Java.
6. Describe the use of Maps, Iterators, and Comparators in Java.
7. Explain the Delegation Event Model in Java.
8. Describe the different AWT controls and layout an agers used in Java GUI programming.
9. Explain JDB C architecture and JDBC drivers.
10. Describetheservletlifecycleandrequest-responsehandlinginservlets.

# INTERNAL ASSIGNMENT

## MCA SEMESTER - I

## PAPER – IV : Computer Architecture

**Note: Answer all the Questions. Each Question carries three marks Q10x3M=30M**

1. Explain about fixed point representation and floating point representation.
2. Describe about design of control unit with timing diagram.
3. Explain about bus and memory structure.
4. Discuss about DMA controller.
5. Give the overview of mapping procedures.
6. What do you mean by instruction cycle?. Explain it with a float chart.
7. Describe about booth's multiplication.
8. Explain about virtual memory.
9. Differentiate between parallel and vector processing.
10. Describe about I/O interface.

# INTERNAL ASSIGNMENT – 2025

## MCA SEMESTER - I

## PAPER – V : Probability and Statistics

**Note: Answer all the Questions. Each Question carries three marks Q10x3M=30M**

1. Define Vector Space and Subspace, give examples.
2. Explainbrieflyaboutpointestimatedandintervalestimateswithexamples
3. State and prove multiplication the orem of probability
4. What is ANOVA?
5. Give the Differences between correlation and Regression Analysis
6. Write about linear Transformations, give examples
7. State and prove Baye's Theorem
8. Explain about Sampling Distribution
9. What is one sample and two sample testing of hypothesis for large samples
10. Explain goodness of fit.

# INTERNAL ASSIGNMENT – 2025

## MCA SEMESTER - I

## PAPER – VI : Managerial Economics & Accountancy

**Note: Answer all the Questions. Each Question carries three marks Q10x3M=30M**

1. What is Managerial Economics? How does it differ from economics?
2. What is the significance of Managerial Economics in decision-making?
3. Distinguish between substitutes and complements with examples. How does this distinction of goods help in business decision-making?
4. Explain the Law of Demand and also its exceptions.
5. Distinguish between monopoly and perfect competition.
6. Explain the assumptions and limitations of Break-even analysis.
7. Write down the five methods of capital budgeting along with decision rules.
8. Distinguishbetweenfixedandvariableworkingcapital,alongwithdiagrams.
9. Explain any four concepts of accountancy.
10. Differentiate between capital expenditure and revenue expenditure.

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