MIT-WPU | MIT WORLD PEACE UNIVERSITY | PUNE
TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

PRN:

# Term End Examination

Nov/Dec 2024

## MST2PF01A/MAS2065B - Differential Equations and Transform Techniques

Question Paper ID: 047662

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|---|---|---|---|
| **Faculty/School** | School of Engineering and Technology/Computer Science and Engineering | **Term** | Semester III |
| **Program** | SY B.Tech | **Duration** | **1 hour 30 minutes** |
| **Specialization** | - | **Max. Marks** | **40** |

**Section - 1 (4 X 10 Marks)**
**Answer any 4 questions**

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|---|---|---|---|---|
| 1 | (a) Solve the following linear differential equation $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = \cos 2x.$<br>(b) By using properties of inverse Laplace transform find the function $f(t)$ whose Laplace transform is $F(S) = \left\{log\left(\frac{s+2}{s-5}\right)\right\}$. | **10 marks** | CO1, CO4 | Applying |
| 2 | (a) Use inverse $Z$- transform to find the function $f(k)$ if given that $F(z) = \frac{z^2-z}{z^2-12z+35}, \lvert z\rvert > 7.$<br>(b) Solve the integral equation for the value for $f(x)$: $\int_0^\infty f(x)\cos\lambda x\ dx = \begin{cases} 1-2\lambda, & 0 < \lambda \le 1/2 \\ 0, & \lambda > 1/2 \end{cases}$ | **10 marks** | CO3, CO5 | Applying |
| 3 | (a) For the function $e^{2t}\int_0^t t\cos 3t\ dt$, find the Laplace transform.<br>(b) Use Laplace Transform to solve the linear differential equation $\frac{d^2y}{dt^2} - 3\frac{dy}{dt} - 18y = e^{-2t}$<br>Subject to conditions $y'(0) = 1, y(0) = 0.$ | **10 marks** | CO4 | Evaluating |
| 4 | (a) Find $Z$-transform of $f(k) = k\,3^k \sin\frac{k\pi}{2},\ k \ge 0.$<br>(b) Use Z-transform to solve the difference equation $f(k+1) - 4f(k) = 2^k$ if given that $k \ge 0, f(0) = 0.$ | **10 marks** | CO5 | Evaluating |

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|---|---|---|
| 5 | (a) Heat conduction in a metallic rod is represented by one dimensional heat equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$. If $u(x,t)$ satisfies the following conditions:<br>a) $u(0,t) = 0$<br>b) $u(\pi,t) = 0$<br>c) $u(x,0) = 12x$<br>find the function $u(x,t)$.<br>(b) Use the substitution $x = e^z$, to solve the Cauchy's linear differential equation $x^2\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + 2y = 0$ | 10 m |
| 6 | (a) The temperature function $u(x,t)$ satisfies heat equation $\frac{\partial u}{\partial t} = 4\frac{\partial^2 u}{\partial x^2}$.<br>Evaluate the function $u(x,t)$ subject to following conditions:<br>a) $u(0,t) = 0$<br>b) $u(10,t) = 0$<br>c) $u(x,0) = 50, 0 \leq x \leq 10$<br>(b) Find Fourier cosine transform of the function $f(x) = e^{-3x}, x \geq 0$. | 10 ma |

END OF QUESTION PAPER

# Term End Examination

Nov/Dec 2024

## CSE2PM02A - Microprocessor Microcontorller Application

Question Paper ID: 048137

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|---|---|---|---|
| **Faculty/School** | School of Computer Science and Engineering | **Term** | Semester III |
| **Program** | Second Year CSE | **Duration** | **1 hour 30 minutes** |
| **Specialization** | - | **Max. Marks** | **40** |

**Section - 1 (8 X 5 Marks)**
**Answer any 8 questions**

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|---|---|---|---|---|
| 1 | What is the Instruction pairing? Describe Instruction Pairing Rules in Pentium processor. | **5 marks** | CO1 | Und |
| 2 | List the different categories of registers in the Pentium processor. How does Control Registers CR0 and CR2 category contribute to the overall functionality of the CPU? | **5 marks** | CO1 | Und |
| 3 | Given a linear address of 37F01004H and the following details: PDBR = 12000H, Page Directory Entry = 12345H, and Page Table Entry = 234D5H, calculate the Page Directory Entry index, Page Table Entry index, and the resulting Physical Address. | **5 marks** | CO2 | A |
| 4 | Explain the data structures used in task management in the Pentium processor. Describe the role and function of each data structure in managing tasks. | **5 marks** | CO3 | Un |
| 5 | Illustrate the structure of the Task State Segment (TSS) and interpret the role of each field. Apply your understanding to differentiate between the static and dynamic categories of fields within the TSS. | **5 marks** | CO3 | Un |
| 6 | Draw and explain how each component of the call gate descriptor contributes to its function in privilege-level transitions. | **5 marks** | CO3 | Un |
| 7 | Explain the function of following pins of 8051:<br>RST<br>EA<br>PSEN<br>ALE<br>XTAL2 And XTAL1 | **5 marks** | CO4 | Un |
| 8 | List out features of 8051 controller and elaborate with architectural block diagram. | **5 marks** | CO4 | Un |

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| 9 | With the help of diagram, explain working of timer 0 in mode 1. Calculate the value of count to be loaded in TH 0 and TL 0 registers if time delay of 500 microseconds to be generated. Assume 8051 is working at 12MHZ frequency. |
| 10 | Illustrate IE register and explain the role of IE register in interrupt handling for 8051. Calculate the control word to enable Timer 0 interrupt and external interrupt 1 whereas rest of the interrupts are disabled. |

END OF QUESTION PAPER

# Term End Examination

Nov/Dec 2024

## CSE2PM01A/CSF2PM01A/AID2PM01A - Data Stuctures

Question Paper ID: 048260

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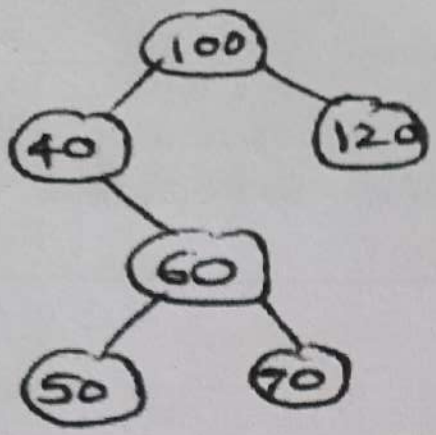
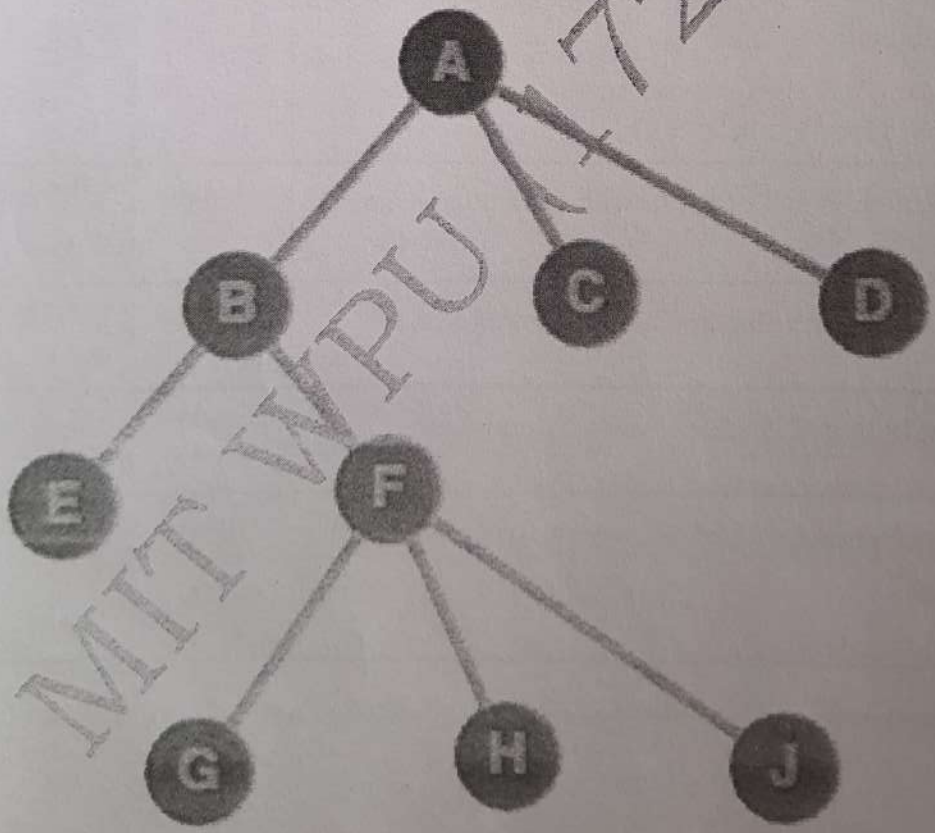
|---|---|---|---|
| **Faculty/School** | School of Computer Science and Engineering | **Term** | Semester III |
| **Program** | Second Year CSE/CSF/AIDS | **Duration** | **1 hour 30 minutes** |
| **Specialization** | - | **Max. Marks** | **40** |

**Section - 1 (8 X 5 Marks)**
**Answer any 8 questions**

| | | |
|---|---|---|
| 1 | $f(n) = n^3+10n^2+6$, $f(n)=\Omega(n^2)$ for $c>0$ and for all values of n, $n>=n0$, for $c=1$, What will be the values of n0? | **5 marks** |
| 2 | Write the pseudo C code for Polynomial Evaluation and represent the following polynomial using sequential organization:<br>a. $8\ y^4X^2+5xy+7y^2-8y-x+10$<br>b. $-8x^3y^3z^3 + 10x^3y^2z + 5xyz^2 + 15yz^2 + 54x^4z^2 + 10$ | **5 marks** |
| 3 | Explain the difference between recursion and iteration with examples. Also, list the applications of a stack. | **5 marks** |
| 4 | Write a C function for inserting an integer value in Circular Linked List . | **5 marks** |
| 5 | Write a psuedo C code to sort singly linked list using swap by pointers. | **5 marks** |
| 6 | Write a node structure for Generalized Linked List. Represent the following list using Generalized Linked List.<br>(a, b,(c, d (e, f), g), (h, i) ) | **5 marks** |

| | | | | |
|---|---|---|---|---|
| 7 | For the following binary tree, show (draw) threaded binary tree (inorder).<br>  <br> | **5 marks** | CO3, CO4 | Under |
| 8 | Build max heap for the following data.<br>60,80,35,75,43,32,78,15,55,68. Show the steps for deletion of element 75.<br>Show the final max heap. | **5 marks** | CO3, CO4 | App |
| 9 | Enlist the difference between a general tree & binary tree. Convert the given general tree to binary tree and write down the steps required for the same.<br>  <br> | **5 marks** | CO3, CO4 | Under |
| 10 | Write pseudo C code for deleting a node in BST considering the case of a node which has two children. | **5 marks** | CO3, CO4 | Unde |

# Term End Examination

May/June 2025

## CSE2PM04A/CSF2PM04A - Database Management system

Question Paper ID: 056583

| | | | |
|---|---|---|---|
| **Faculty/School** | School of Computer Science and Engineering | **Term** | Semester IV |
| **Program** | SY B.Tech CSE/CSF | **Duration** | **1 hour 30 minutes** |
| **Specialization** | - | **Max. Marks** | **40** |

**Section - 1 (8 X 5 Marks)**
**Answer any 8 questions**

| | | | |
|---|---|---|---|
| 1 | Why is Data Definition Language (DDL) important in Database Management System? Write the syntax of DDL Commands with suitable example. | **5 marks** | CO |
| 2 | Elaborate on Key Constraints, Enterprise Constraints, Domain Constraints, Entity Integrity Constraints, Referential Integrity Constraints with suitable example. | **5 marks** | CO |
| 3 | Consider the following schema and solve the queries using Relational Algebra with output<br>Suppliers (sID, sName, address)<br>Parts(pID, pName, colour)<br>Catalog(sID, pID, price)<br>1. Find the names of all red parts.<br>2. Find all prices for parts that are red or green. (A part may have different prices from different manufacturers.)<br>3. Find the sIDs of all suppliers who supply a part that is red or green<br>4. Find the names of all suppliers who supply a part that is red or green<br>5. Find the names of all suppliers who have reserved a red ~~boat~~ parts? | **5 marks** | CO |
| 4 | Discuss about Tuple Relational Calculus? Write and explain a query in TRC using the following schema.<br>Student(ID, Name, Age, Grade)<br>1. Find Students with Grade 'A'.<br>2. Find Students Who Are Older Than 18. | **5 marks** | CO |

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|---|---|---|---|---|
| 6 | Consider the following schema and solve the queries given below using MYSQL commands with output.<br>Doctors (doc_id, name, specialty)<br>Patients (pat_id, name, age, gender)<br>Appointments (app_id, doc_id, pat_id, appointment_date, fee)<br>1. Find the names of patients who had appointments with cardiologists.<br>2. Display the total number of appointments per doctor.<br>3. Get the doctor who earned the most from appointment fees.<br>4. Find the average age of patients per doctor.<br>5. List appointment dates with the highest patient footfall. | **5 marks** | CO3 | A |
| 7 | What is Cursor ? Wrire a cursor using below tables and reduce fees of all the courses according to given criteria.<br>Student(sno,sname, saddress)<br>Opted(cno, sno)<br>Course(cno, cname,,fees)<br>Criteria: 1..:<br>10% for which more than seven students have enrolled.<br>Criteria 2.<br>20% for which more than ten students have enrolled.<br>Criteria 3.<br>30% for which more than 15 students have enrolled. | **5 marks** | CO4 | A |
| 7 | What is a database trigger in PLSQL, what are its uses? Illustrate the action/ event and time associated with the trigger with suitable example? | **5 marks** | CO4 | |
| 8 | Explain the concept of a PLSQL block and its structure. How Exception Handling is done in PLSQL? Mention a Few Predefined Exceptions in PLSQL. | **5 marks** | CO4 | U |
| 9 | Consider the following two transactions and schedule. Is this schedule conflict-serializable? Explain why or why not. | **5 marks** | CO6 | |

| T1 | T2 | |
|---|---|---|
| Read(A) | | |
| | Read(A) | |
| | Write (A) | |
| Write(A) | | |

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|---|---|---|---|
| 10 | Discuss in detail log-based recovery methods with appropriate example. | **5 marks** | CO5 |

END OF QUESTION PAPER