

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

MCA I Year I Semester (R20) Supplementary End Semester Examinations – November 2022
MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q. No.1 to 5 answer either Part A or Part B only.

| Q.No | Question | Marks | CO | BL | | | | | | | | | | | | | | | | | | | | | | |
|-----------|--|----------|--------|--------|------|------|------|----|-----|--------|------|------|------|------|------|------|------|-----|----|----|----|----|----|-----|---|---|
| Q.1(A) | Write the following with example: i. Poset ii. Find the power set of these sets a. {a} b. {a,b} c. {1,2,3} | 6M 6M | 1 1 | 1 3 | | | | | | | | | | | | | | | | | | | | | | |
| OR | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q.1(B) | i. Explain Chain with example. ii. Construct the Hasse diagram for $(\{1,2,3,6,12,24\},)$ for divides relation. | 6M 6M | 1 1 | 2 5 | | | | | | | | | | | | | | | | | | | | | | |
| Q.2(A) | i. Write Multi-graph, Hamilton path ii. Explain Tree, binary Tree with examples. | 6M 6M | 2 2 | 2 2 | | | | | | | | | | | | | | | | | | | | | | |
| OR | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q.2(B) | i. What is meant by prefix code? Explain with an example. ii. Describe Path in a graph, Circuit in a graph, Directed Graph with examples. | 6M 6M | 2 2 | 2 2 | | | | | | | | | | | | | | | | | | | | | | |
| Q.3(A) | i. Find the Mean, Median and Mode of the given data. 12,13,45,23,24, 33,12,13, 15, 10, 13 ii. Explain Skewness and Kurtosis of a distribution. | 6M 6M | 3 3 | 3 2 | | | | | | | | | | | | | | | | | | | | | | |
| OR | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q.3(B) | Calculate the correlation coefficient for the following data: <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px 5px;">X</td><td style="padding: 2px 5px;">68</td><td style="padding: 2px 5px;">64</td><td style="padding: 2px 5px;">75</td><td style="padding: 2px 5px;">50</td><td style="padding: 2px 5px;">64</td><td style="padding: 2px 5px;">80</td><td style="padding: 2px 5px;">75</td><td style="padding: 2px 5px;">40</td><td style="padding: 2px 5px;">55</td><td style="padding: 2px 5px;">64</td></tr><tr><td style="padding: 2px 5px;">Y</td><td style="padding: 2px 5px;">62</td><td style="padding: 2px 5px;">58</td><td style="padding: 2px 5px;">68</td><td style="padding: 2px 5px;">45</td><td style="padding: 2px 5px;">81</td><td style="padding: 2px 5px;">60</td><td style="padding: 2px 5px;">68</td><td style="padding: 2px 5px;">48</td><td style="padding: 2px 5px;">50</td><td style="padding: 2px 5px;">70</td></tr></table> | X | 68 | 64 | 75 | 50 | 64 | 80 | 75 | 40 | 55 | 64 | Y | 62 | 58 | 68 | 45 | 81 | 60 | 68 | 48 | 50 | 70 | 12M | 3 | 4 |
| X | 68 | 64 | 75 | 50 | 64 | 80 | 75 | 40 | 55 | 64 | | | | | | | | | | | | | | | | |
| Y | 62 | 58 | 68 | 45 | 81 | 60 | 68 | 48 | 50 | 70 | | | | | | | | | | | | | | | | |
| Q.4(A) | A computer center has three printers A, B, and C, which print at different speeds. Programs are routed to the first available printer. The probability that a program is routed to printers A, B and C are 0.6, 0.3 and 0.1 respectively. Occasionally a printer will jam and destroy the printout. The probability that printers A, B and C will jam are 0.01, 0.05 and 0.04 respectively. Your program is destroyed when a printer jams. What is the probability that printer A is involved? Printer B involved? Printer C involved? | 12M | 4 | 3 | | | | | | | | | | | | | | | | | | | | | | |
| OR | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q.4(B) | A drug is used to maintain a steady heart rate in patients who have suffered a mild heart attack. Let X denotes the number of heart beats per minute obtained per patient <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px 5px;">x</td><td style="padding: 2px 5px;">40</td><td style="padding: 2px 5px;">60</td><td style="padding: 2px 5px;">68</td><td style="padding: 2px 5px;">70</td><td style="padding: 2px 5px;">72</td><td style="padding: 2px 5px;">80</td><td style="padding: 2px 5px;">100</td></tr><tr><td style="padding: 2px 5px;">$f(x)$</td><td style="padding: 2px 5px;">0.01</td><td style="padding: 2px 5px;">0.04</td><td style="padding: 2px 5px;">0.05</td><td style="padding: 2px 5px;">0.80</td><td style="padding: 2px 5px;">0.05</td><td style="padding: 2px 5px;">0.04</td><td style="padding: 2px 5px;">0.01</td></tr></table> | x | 40 | 60 | 68 | 70 | 72 | 80 | 100 | $f(x)$ | 0.01 | 0.04 | 0.05 | 0.80 | 0.05 | 0.04 | 0.01 | 12M | 4 | 3 | | | | | | |
| x | 40 | 60 | 68 | 70 | 72 | 80 | 100 | | | | | | | | | | | | | | | | | | | |
| $f(x)$ | 0.01 | 0.04 | 0.05 | 0.80 | 0.05 | 0.04 | 0.01 | | | | | | | | | | | | | | | | | | | |

Find the (i) $p(68 \leq X \leq 72)$ (ii) Distribution function (iii) average heart-beat of the patients (iv) variance of heart beats.

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- Q.5(A) Let X be a Poisson random variable with parameter $k=10$.
- a) Find the expression for the density for X .
 - b) Find $E[x], VarX, \sigma_x$
 - c) Find $P[X \leq 4]$ 12M 5 3
 - d) Find $P[X > 4]$

OR

- Q.5(B) i. Let X be a Gamma random variable with $\alpha = 3, \beta = 4$
- What is the expression for the density for X ? 6M 5 3
 - What is the Moment generating function for X ?
 - Find μ, σ^2, σ
- (ii) Define the normal distribution and write its characteristics. 6M 5 2
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*****END*****

Hall Ticket No:

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Course Code: 20MCAP101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

MCA I Year I Semester (R20) Supplementary End Semester Examinations – November 2022
Programming with C++

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q. No.1 to 5 answer either Part A or Part B only.

| Q.No | Question | Marks | CO | BL |
|--------|--|-------|----|----|
| Q.1(A) | Explain in detail about Object Oriented Programming Concepts. | 12M | 1 | 2 |
| | OR | | | |
| Q.1(B) | Develop a C++ program to implement control structures. | 12M | 1 | 5 |
| Q.2(A) | Write a short note on I) Parameterized Constructor II) Copy Constructor | 12M | 2 | 2 |
| | OR | | | |
| Q.2(B) | Write a C++ program to display student's information using Class Declarations, Definition, and Accessing Class Members by objects. | 12M | 2 | 2 |
| Q.3(A) | What is Operator Overloading and explain unary and binary operator overloading. | 12M | 3 | 2 |
| | OR | | | |
| Q.3(B) | Write a C++ program to demonstrate multiple inheritance by creating a class cuboid which extends class rectangle, class shape. It calculates area and volume. Use appropriate constructors and member variables. | 12M | 3 | 3 |
| Q.4(A) | Describe Virtual function and abstract class with an example | 12M | 4 | 2 |
| | OR | | | |
| Q.4(B) | Write a C++ program to implement simple calculator using class template. | 12M | 4 | 3 |
| Q.5(A) | Explain the process of open, read, write and close files. | 12M | 5 | 2 |
| | OR | | | |
| Q.5(B) | Write a C++ program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size. | 12M | 5 | 3 |

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Question Paper Code: 20MCAP102

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

MCA I Year I Semester (R20) Supplementary End Semester Examinations – November 2022
COMPUTER ORGANIZATION AND ARCHITECTURE

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either A or B only

| Q.No | Question | Marks | CO | BL |
|-----------|---|-------|----|----|
| Q.1(A) | Explain the operation of Computer with neat diagram | 12M | 1 | 2 |
| OR | | | | |
| Q.1(B) | Explain the connections between the processor and the memory with a neat diagram. | 12M | 1 | 2 |
| Q.2(A) | Elaborate on the organization of Micro programmed control unit with a neat diagram. | 12M | 2 | 2 |
| OR | | | | |
| Q.2(B) | a) Discuss the organization of hardwired control unit. b) Discuss the control sequence execution of instruction ADD(R ₃), R ₁ . | 12M | 2 | 3 |
| Q.3(A) | Explain different types of hazards that occur in a pipeline. | 12M | 3 | 2 |
| OR | | | | |
| Q.3(B) | Explain various approaches used to deal with conditional branching. | 12M | 3 | 2 |
| Q.4(A) | Discuss the different mapping techniques used in cache memories and their relative merits and demerits. | 12M | 4 | 3 |
| OR | | | | |
| Q.4(B) | What do you mean by virtual memory? Discuss how paging helps in implementing virtual memory. | 12M | 4 | 2 |
| Q.5(A) | Explain enabling and disabling Interrupts. | 12M | 5 | 2 |
| OR | | | | |
| Q.5(B) | Explain about Direct Memory Access. | 12M | 5 | 2 |

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
MCA I Year I Semester (R20) Supplementary End Semester Examinations – NOV/DEC 2022
OPERATING SYSTEMS

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either A or B only

| Q.No | Question | Marks | CO | BL |
|-----------|---|----------|--------|--------|
| Q.1(A) | What is operating system? Explain the functions and services of operating system. | 12M | 1 | 2 |
| OR | | | | |
| Q.1(B) | What is system call? Explain different types of system call? | 12M | 1 | 2 |
| Q.2(A) | Write about the various CPU scheduling algorithms. | 12M | 2 | 3 |
| OR | | | | |
| Q.2(B) | What is semaphore? Describe the binary and counting semaphores in details. | 12M | 2 | 2 |
| Q.3(A) | Explain the following: i. File access Methods ii. Free space management | 6M 6M | 3 3 | 2 2 |
| OR | | | | |
| Q.3(B) | On a disk with 1000 cylinders, numbers 0 to 999, compute the number of tracks, the disk arm must move to satisfy the entire requests in the disk queue. Assume the last request service was at track 345 and the head is moving toward track 0. The queue in FIFO order contains requests for the following tracks: 123, 874, 692, 475, 105, and 376. Find the seek length for the following scheduling algorithm. a) SSTF b) LOOK c) C-SCAN d) C-LOOK | 12M | 3 | 3 |
| Q.4(A) | Explain the UNIX structure and environment. | 12M | 4 | 2 |
| OR | | | | |
| Q.4(B) | What is SED in unix ? Explain different operations of UNIX? | 12M | 4 | 2 |
| Q.5(A) | Explain the following with examples: i. Pipes and filters in unix ii. Quoting mechanism in unix | 6M 6M | 5 5 | 2 2 |
| OR | | | | |
| Q.5(B) | Explain the following with examples: i. Shell variables ii. Command line editing | 6M 6M | 5 5 | 2 2 |

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Hall Ticket No:

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Question Paper Code: 20MCAP104

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA I Year I Semester (R20) Supplementary End Semester Examinations – November 2022

OBJECT ORIENTED SOFTWARE ENGINEERING

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

In Q.no 1 to 5 answer either A or B only

| Q.No | Question | Marks | CO | BL |
|--------|---|-------|----|----|
| Q.1(A) | i. Define Software Engineering. Discuss its characteristics | 6M | 1 | 2 |
| | ii. Explain the agile software development process model | 6M | | 2 |
| | OR | | | |
| Q.1(B) | i. Compare and contrast the difference between water fall model and prototype model | 6M | 1 | 2 |
| | ii. What is object orientation. Explain its characteristics | 6M | | 2 |
| Q.2(A) | Consider a case study and design the SRS Document | 12M | 2 | 3 |
| | OR | | | |
| Q.2(B) | i. What is the purpose of use case diagram? Explain its components? | 6M | 2 | 2 |
| | ii. Differentiate between functional requirements and non functional requirements. | 6M | | 2 |
| Q.3(A) | Consider any case study, draw the class diagram and discuss. | 12M | 3 | 3 |
| | OR | | | |
| Q.3(B) | What is deployment diagram? Explain with an example. | 12M | 3 | 2 |
| Q.4(A) | Explain the following: | | 4 | |
| | i. ISO model for software quality | 6M | | 2 |
| | ii. Boehms and McCalls model for software quality. | 6M | | 2 |
| | OR | | | |
| Q.4(B) | Explain different size oriented metrics. | 12M | 4 | 2 |
| Q.5(A) | Discuss about the following: | | 5 | |
| | i. White box testing | 6M | | 2 |
| | ii. Black Box testing | 6M | | 2 |
| | OR | | | |
| Q.5(B) | What is software maintenance? Discuss its challenges? | 12M | 5 | 2 |

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Question Paper Code: 20MCAP105

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA I Year I Semester (R20) Supplementary End Semester Examinations – November 2022

COMPUTER NETWORKS

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.no 1 to 5 answer either A or B only

| Q.No | Question | Marks | CO | BL |
|-----------|--|-------|----|----|
| Q.1(A) | Explain TCP/IP reference model in detail. Give brief description about various layers? | 12M | 1 | 2 |
| OR | | | | |
| Q.1(B) | Explain in detail about the unguided transmission media with neat sketch. | 12M | 1 | 2 |
| Q.2(A) | Explain in detail about CSMA protocol. | 12M | 2 | 2 |
| OR | | | | |
| Q.2(B) | Explain the concept of CRC in detail. | 12M | 2 | 2 |
| Q.3(A) | Explain in detail about the switching concepts. | 12M | 3 | 2 |
| OR | | | | |
| Q.3(B) | Explain distance Vector routing algorithm in detail. | 12M | 3 | 5 |
| Q.4(A) | Illustrate and explain UDP and its packet format. | 12M | 4 | 3 |
| OR | | | | |
| Q.4(B) | Explain how congestion control is achieved in TCP. | 12M | 4 | 2 |
| Q.5(A) | Explain in detail about WWW. | 12M | 5 | 2 |
| OR | | | | |
| Q.5(B) | What is firewall? Explain the types of firewalls in detail. | 12M | 5 | 2 |

*** END***