MID-TERM EXAMINATION

Course Name : MCA, Semester : 2nd

(February, 2023) OFF LINE mode

Subject Code: MCA 106	Subject: Software Engineering
Time : 1 ½Hours	Maximum Marks : 30
Note:Q. 1 is compulsory.	

Q1 (2.5*4)

(a) Give a brief introduction on SDLC.

(b) How to address software crisis?

(c) Write the significance of context diagram.

(d) What should be the properties of a good SRS document?

Q2 **(Attempt any Two Parts)** (5,5)

(a)With valid reasons suggest a software development model for interactive railway reservation system.

(b)To develop gaming software which is more preferable from RAD model or prototype model? Justify your answer.

(C)Suggest a suitable model to replace existing university management system software describing each step of the model.

Q3 **(Attempt any Two Parts)** (5,5)

(a)Explain the characteristics of a good SRS.

(b)Why requirement analysis is important in software development? Explain the steps need to follow for proper requirement analysis.

(C) Write the proper approach for requirement specification.

Enrollment No:

MID-TERM EXAMINATION
(Course Name: MCA) (Semester: 2)
(February, 2023) OFF LINE mode

Subject Code: MCA 108	Subject: Data Communications and Computer Networks

Time : 1 ½Hours **Maximum Marks :** 30

Note: Q. 1 is compulsory.

Q1 **(2.5*4)**

(a) For a TV satellite channel with a Signal to Noise Ratio of 20 dB and a video bandwidth of 10 MHz, what will be the maximum data rate or capacity of the channel (in Mbps)?

(b) Explain with proper reason what is the need to have both IP and MAC addresses?

(c) What is Checksum and CRC? Explain with example. Find the minimum Hamming distance for the following cases:

I. Correction of two errors.

II. Detection of 6 errors or correction of 2 errors.

(d) Differentiate between ARP and RARP.

Q2 **(Attempt any Two Parts)** **(5,5)**

(a) Explain the layered architecture followed by Internet in detail and outline the functions followed by each layer.

(b) Describe the Circuit-Switching and Packet-Switching techniques with example.

(c) How do guided media differ from unguided media? Explain in detail with all classes of transmission media.

Q3 **(Attempt any Two Parts)** **(5,5)**

(a) What is Block Coding? Explain Error Detection and Error Correction in Block Coding. Given the data word 1010011010 and the divisor 10111 then show the generation of codeword at the sender site (using binary division) and also show the checking of the codeword at the receiver site.

(b) What is Random Access in Data Link Layer? Explain Pure ALOHA and SLOTTED ALOHA. A Pure ALOHA network transmits 300-bit frames on a shared channel of 300 kbps. What is the requirement to make this collision-frame?

(c) Explain CSMA in detail with its persistent methods. Define the type of following destination addresses (Unicast/Multicast/Broadcast):

I. i. 5B:30:10:21:10:1A

II. ii. 46:20:1B:2E:08:EE

MID-TERM EXAMINATION
(Course Name MCA) (Semester II)
(February, 2023)OFF LINE mode

Subject Code: MCA 104	Subject: Machine Learning
Time : 1 ½Hours	Maximum Marks : 30
Note: Q. 1 is compulsory.	

Q1 **(2.5*4)**

(a) Differentiate between Supervised, Unsupervised, and Reinforcement Learning.

(b) What is the Curse of Dimensionality?

(c)What is Confusion Matrix? Explain all the components.

(d) What is instance-based learning? Explain with the help of an example.

Q2 **(Attempt any Two Parts) UNIT-1** **(5,5)**

(a) What is a well-posed learning problem? Explain the essential features required to define a learning problem well.

(b) Explain in detail the process of Feature Selection and Feature Extraction using a suitable example.

(c) Explain in detail the process of Principal Component Analysis (Step-wise explanation with an example).

Q3 **(Attempt any Two Parts) UNIT-2** **(5,5)**

(a) For X=(Age=youth, Income=Medium, Student=Yes, Credit=Fair), use Naïve Bayes classifier to find P(X|Buy=yes). The dataset is given below:
Note: youth (<30)

S. No	Age	Income	Student	Credit	Buy
1	<30	High	No	Fair	No
2	<30	High	No	Excellent	No
3	31-40	High	No	Fair	Yes
4	>40	Medium	No	Fair	Yes
5	>40	Low	Yes	Fair	Yes
6	>40	Low	Yes	Excellent	No
7	31-40	Low	Yes	Excellent	Yes
8	<30	Medium	No	Fair	No
9	<30	Low	Yes	Fair	Yes
10	>40	Medium	Yes	Fair	Yes
11	<30	Medium	Yes	Excellent	Yes
12	31-40	Medium	No	Excellent	Yes
13	31-40	High	Yes	Fair	Yes
14	>40	Medium	No	Excellent	No

(b)Following data is collected from a questionnaire survey and objective testing with two attributes(acid durability and strength) to classify whether a particular paper tissue is good or not. Four training samples are listed in the below table.
If the factory produces a new paper tissue that passes laboratory tests with Acid Durability = 3 and Strength = 7, without another expensive survey, classify this new tissue using KNN.
Assume K=3.

Acid Durability(s)	Strength (kg/m)	Classification
7	7	Bad
7	4	Bad
3	4	Good
1	4	Good

(c) Explain Linear Regression, its model, cost function, and Gradient Descent in detail by taking a suitable example.

(Please write your Enrollment Number)

...M EXAMINATION

Course Name : MCA ,Semester :Second

(February, 2023) OFF LINE mode

Subject Code: HMC 102	Subject: Human Values and Professional Ethics
Time : 1 ½Hours	Maximum Marks : 30
Note: Q. 1 is compulsory.	

Q1 Write short note on the following **(2.5*4)**

(a) Sharing and Caring

(b) Sympathy and Empathy

(c) Values and ethics

(d) Moral Dilemma

Q2 **(Attempt any Two Parts)** **(5,5)**

(a) Explain the concept of religion and human values with examples.

(b) Explain Indian values on the conceptual framework of Vedas.

(c) Elaborate on the concept of valuing time emphasizing on the techniques of Time Management.

Q3 **(Attempt any Two Parts)** **(5,5)**

(a) Explain in detail about Kohlberg's Theory

(b) Differentiate between justice based morality and care based morality with examples

(c)Explain the terms moral values and moral development with examples.

(Please Write your Enrollment Number)

MID-TERM EXAMINATION
MCA SECOND SEMESTER
(February, 2023)OFF LINE mode

Subject Code: MCA-102	**Subject: Object Oriented Programming using JAVA**
Time : 1 ½ Hours	**Maximum Marks :** 30

Note: Q. 1 is compulsory. Attempt any two questions from the rest.

Q1 **(5,5)**

a) Explain the role of : i) JVM architecture ii) super keyword

b) Differentiate between (using example) i) Access Modifiers in Java ii) Static members of a class

Q2 **(5,5)**

a) Explain: i) reference variable, instance variable, objects in java ii) abstract class in java

b) Create a class Employee with empno and empname. Implement addemployee() and showemplyee() methods to create 3 objects of Employee in an array and to display details of employee respectively. The addemployee() and showemployee() should not be member functions of Employee class.

Q3 **a)** Explain the following(using program): -i) Arrays in java ii) use of this **(5,5)**

b) Create a class Date (member variables: int day; int month; int year) for manipulating dates. Provide appropriate constructor that enables an object of this class to be initialized when it is declared. Design separate class Student which will have following as members:

Name	Text
Age	int
Date of Birth	Date

Create object of Student and display details of Students (name, Age and Date of birth).

Q4 **a)** Differentiate between: i)predefined and user defined packages ii) final and finalize **(5,5)**

b) Write a java programs which will accept the roll no and name from the user using java.io package. Write a method display( ) which takes the roll no as parameter and displays the detail information of the Student. If Student with the roll no does not exits display appropriate error message to user. Write a command to show how to compile and run a java program.

End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(Offline)
Course Name:<MCA >, Semester:<SECOND>
(April -May, 2023)

Subject Code: MCA-104	Subject: Machine Learning
Time :3 Hours	Maximum Marks :60

Note: Q1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1 (2.5*8=20)

(a) Explain research steps by taking suitable examples.
(b) What is the need for Normalization?
(c) Differentiate between Bagging and Boosting.
(d) Explain different activation functions.
(e) What is Manhattan distance?
(f) How validation of unsupervised learning is performed.
(g) Define DUNN index?
(h) What are the applications of reinforcement learning?

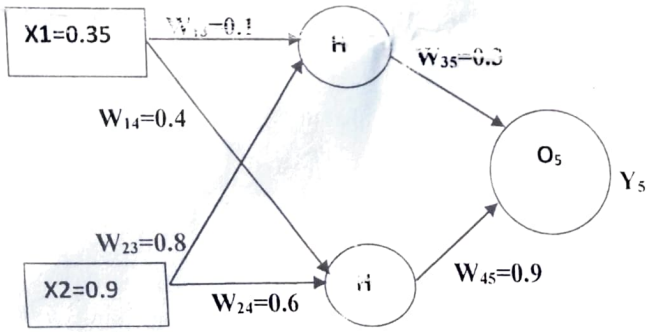
UNIT-I

Q2 Suppose 10000 patients get tested for flu; out of them, 9000 are genuinely healthy, and 1000 are genuinely sick. For the sick people, a test was positive for 620 and negative for 380. The same test for healthy people was positive for 180 and negative for 8820. Construct a confusion matrix for the data and compute the accuracy, precision, recall, and F1 score for the data. (10)

Q3 What do you understand by an imbalanced dataset? What are the different techniques to handle such types of data? (10)

UNIT-II

Q4 Assume that neurons have a sigmoid activation function and perform forward and backward passes on the network. Assume that the actual output y is 0.5 and the learning rate is 1. Perform two forward passes. (10)



Q5 Consider the table given below. Calculate the Information Gain for Age, Income, and Credit attributes. (10)

S. No	Age	Income	Student	Credit	Buy
1	<30	High	No	Fair	No
2	<30	High	No	Excellent	No
3	31-40	High	No	Fair	Yes
4	>40	Medium	No	Fair	Yes
5	>40	Low	Yes	Fair	Yes

6	>40	Low	Yes	Excellent	No
7	31-40	Low	Yes	Excellent	Yes
8	<30	Medium	No	Fair	No
9	<30	Low	Yes	Fair	Yes
10	>40	Medium	Yes	Fair	Yes.
11	<30	Medium	Yes	Excellent	Yes
12	31-40	Medium	No	Excellent	Yes
13	31-40	High	Yes	Fair	Yes
14	>40	Medium	No	Excellent	No

UNIT-III

Q6 Use k-means clustering to cluster the following dataset of six objects into two clusters. Use seed points C1=(185,72) and C2=(170,56). **(10)**

Sample No.	X	Y
1	185	72
2	170	56
3	168	60
4	179	68
5	182	72
6	188	77

Q7 Explain Reinforcement learning in detail by taking a suitable example. **(10)**

UNIT-IV

Q8 Explain the Hidden Markov model and its applications. **(10)**

Q9 Write a short note on: **(10)**

(a) Bayesian Networks

(b) Tracking Methods

End-TermExamination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
Course Name:<MCA>, Semester:<2nd>
(April -May, 2023)

Subject Code: MCA106	Subject: Software Engineering
Time :3 Hours	Maximum Marks :60

Note:Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1 (2.5*8=20)

(a) State the difference between re-engineering and reverse engineering.
(b) Give your view on "Design is not coding and coding is not design".
(c) Write the significance ER diagram to prepare a good SRS.
(d) Discuss the difference between functional and non-functional requirements.
(e) Distinguish between function oriented designs and object oriented design.
(f) Give a brief on modularity.
(g) Why planning is important to develop a software.
(h) Write a short note on types of COCOMO.

UNIT-I

Q2 Suggest a suitable software development model to enhance existing university management software. Give a detailed model. **(10)**

Q3 Give a detailed view of a software development model to develop HR automation software for an office. **(10)**

UNIT-II

Q4 Draw the data flow diagrams needed for the software designed for railway reservation. **(10)**

Q5 List out the steps needed for requirement validation. Justify why validation is necessary for preparing SRS. **(10)**

UNIT-III

Q6 Give a detailed view on available testing techniques in software engineering. **(10)**

Q7 List out the design architecture patterns with example. **(10)**

UNIT-IV

Q8 List out all the estimation methods available in software engineering. Why it is necessary to follow guidelines for estimation. **(10)**

Q9 What are the software metrics? Explain the software metrics in detail. **(10)**

End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
Course Name: MCA, Semester:2
(April -May, 2023)

Subject Code: MCA 108	Subject: Data Communications and Computer Networks

Time :3 Hours **Maximum Marks :60**

Note:Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1 **(2.5*8=20)**

(a) What are the necessary criterias for the design of effective and efficient network?
(b) Explain the four levels of addresses that are used in an Internet employing the TCP/IP protocols.
(c) Given the data word 1001 and the divisor 1011, show the generation of the code word at the sender site.
(d) In CRC, show the relationship between the following entities (size means the number of bits):
  (i) The size of the data word and the size of the code word
  (ii) The degree of the polynomial generator and the size of the divisor
(e) What is UDP? What are the advantages of using UDP over TCP?
(f) Compare and contrast the Go-Back-N ARQ with Selective Repeat ARQ protocol.
(g) Why is IPSec important? What are the uses of IPSec?
(h) Explain the steps taken by PGP to create secure email message at the sender site.

UNIT-I

Q2 Describe the need for switching and define a switch. Compare and contrast a circuit-switched network and packet-switched network. Explain with reasoning which type of switching is followed by the Internet. **(2+6+2=10)**

Q3 How do the layers of the Internet Model or TCP/IP model correlate to the layers of the OSI model? **(10)**

UNIT-II

Q4 Consider we have a big single network having IP address 200.1.2.0.We want to do subnetting and divide this network into 4 subnets. After performing the subnetting, answer the following questions for all 4 subnets: **(2+2+2+2+1+1=10)**

i. IP address of the subnet
ii. Total no. of IP addresses in the subnet
iii. Total no. of hosts that can be configured in that subnet
iv. Range of IP addresses
v. Direct Broadcast Address
vi. Limited Broadcast Address

Q5 What is the difference between a direct and indirect delivery? Compare and Contrast the two different intra-domain unicast routing protocols. What are the associated shortcomings with these routing protocols and their corresponding fixes? **(1+6+3=10)**

UNIT-III

Q6 What is Congestion Control and its effects? Explain the Congestion Control algorithm. Discuss the policies that can prevent congestion. **(2+4+4=10)**

Q7 Compare the TCP header and the UDP header. List the fields in the TCP header that are missing in the UDP header. **(10)**

UNIT-IV

Q8 Compare and contrast the symmetric and asymmetric cryptographic protocols. **(10)**

Q9 a) Differentiate between SSL and SSH. **(5+5=10)**
b) Differentiate between IDS and Firewall

End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
Course Name: MCA, Semester: Second
(April -May, 2023)

Subject Code: HMC 102	Subject: Human Values and Professional Ethics
Time :3 Hours	Maximum Marks :60

Note: Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1 (2.5*8=20)

(a) Define morals, values and ethics.
(b) Concept of ethical living and harmony in life
(c) What are ethical obligations of engineers?
(d) Define the terms profession and professionalism.
(e) Concept of IPR with examples.
(f) Relationship between human rights and human responsibilities.
(g) Briefly explain about the term environmental ethics.
(h) Relevance of research ethics.

UNIT-I

Q2 "Professional ethics and Human values' is a very relevant subject of today's environment of conflicts and stress in the profession" citing an example of a company and how it encourages to maintain a work life balance. **(10)**

Q3 "Religions have played major roles in shaping moral views and moral values, over geographical regions" Justify the statement. **(10)**

UNIT-II

Q4 (a)Explain moral dilemma with a suitable case study **(10)**
(b) Explain various points to handle moral dilemma in day to day life.

Q5 Differentiate between Kohlberg and Gilligan theory of moral development with examples **(10)**

UNIT-III

Q6 Engineering as experimentation plays a vital role in the design process - Discuss with suitable example **(10)**

Q7 Discuss the role of organization and the ethical issues and faults, considering any one of the following cases: Bhopal gas tragedy or The challenger disaster or Fukushima nuclear disaster. **(10)**

UNIT-IV

Q8 Define the term computer ethics with examples and briefly explain some unethical computer practices **(10)**

Q9 Is the Corporate Social Responsibility strategy evolving and adapting to meet new needs? Explain with examples **(10)**

End-Term Examination
(CBCS)(SUBJECTIVE TYPE)(OffLine)
Course Name:<MCA>, Semester:<2nd>
(April -May, 2023)

Subject Code:MCA-102	Subject: Object Oriented Programming using Java
Time :3 Hours	Maximum Marks :60

Note: Q. 1 is compulsory. Attempt one question each from the Units I, II, III & IV.

Q1 **(4*5=20)**

a) Explain: i) Instance variable hiding ii) Constructor
b) Write a program to create a thread and set the name and priority of the thread.
c) Compare i) multiple inheritance and multilevel inheritance
ii) predefined and user defined packages
d) Explain : i) Event, Event source and Event listener ii) AWT components

UNIT-I

Q2 What are Class variables, reference variables and objects? Write a program to implement a class Employee, with data members (last name, first name, hourly wages, and years with company).Add constructor and setter and getter methods in Employee class. Take the data of 3 employees using an array of objects. Write a code segment that will output the first name, last name, and hourly wages of each employee who has been with the company 20 years or more. Show the use of static variable. **(10)**

Q3 Write a program that accepts two numbers from command line and perform different functions like Addition ,Subtraction ,Multiplication and Division(+,-,*,/). If the user enters any other character the appropriate message will be displayed. Add constructor and setter, getter methods. The output of the program should be displayed to the user. Also Explain how to take input from the user using java.io and java util. **(10)**

UNIT-II

Q4 a)Explain final and super keyword using suitable program **(10)**
b) Using a program to explain method overloading and method overriding.

Q5 Compare a)non abstract class, abstract class and interface **(10)**
b) Visibility of different access specifiers within and outside the package.

UNIT-III

Q6 a) Explain the Thread life cycle and use of Runnable interface. **(10)**
b) Explain exception handling in java and use of try, catch, throw and throws to handle an exception.

Q7 a) Create two child threads using Thread class in java. **(10)**
b) Explain use of interface and partial implementation of an interface using program example

UNIT-IV

Q8 What is a delegation event handling model? Write a program to display at least five controls on the frame window and perform event handling on any three controls. **(10)**

Q9 What are AWT controls and containers? Write a program to create a window and display Label, Textbox, Button, checkbox and radio button and handle event handling on any two controls. **(10)**