C 81522 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 18 305—NUMERICAL ANALYSIS AND OPTIMIZATION TECHNIQUES

(2018 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (a) The exponential series is given by $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \ldots$

Find the number of terms of the above series such that their sum gives the value of e correct to five decimal places.

(10 marks)

(b) Find a root, correct to three decimal places and lying between 0 and 0.5, of the Equation : $f(x) = 4e^{-x} \sin x - 1 = 0$ using bisection method.

(10 marks)

2. (a) Find a real root of the following equation using Regula-False method

$f(x) = x^3 - 2x - 5 = 0$. Give your answer correct to four decimal places.

(10 marks)

(b) Describe the computational procedure to implement Newton-Raphson method for computing the square root of a positive number to an accuracy ε. Draw the flow chart of the same.

(10 marks)

3. (a) From the following table, find the value of $e^{1.17}$ using Gauss' forward formula :

x	e^x
1.00	2.7183
1.05	2.8577
1.10	3.0042
1.15	3.1582
1.20	3.3201
1.25	3.4903
1.30	3.6693

(10 marks)

Turn over

(b) Find a cubic polynomial which fits the data (– 2, 12), (– 1, –8), (2, 3) and (3, 5).

(10 marks)

4. (a) State Lagrange's interpolation formula and find a bound for the error in linear interpolation.

(10 marks)

(b) Given the set of tabulated points (0, 2), (1, 3), (2, 12) and (15, 3587) satisfying the function $y = f(x)$, compute $f(4)$ using Newton's divided difference formula.

(10 marks)

5. (a) Solve the system using Gauss-Seidel method :

$$6x + y + z = 20$$
$$x + 4y - z = 6$$
$$x - y + 5z = 7$$

(10 marks)

(b) Solve the equations using LU decomposition.

$$2x + 3y + z = 9$$
$$x + 2y + 3z = 6$$
$$3x + y + 2z = 8.$$

(10 marks)

6. (a) Evaluate the following using Simpson's $\frac{1}{3}$ rule with $h = 1$.

$$I = \int_3^7 x^2 \log x dx.$$

(10 marks)

(b) Use the Trapezoidal rule to evaluate, $\int_{-2}^{2}\int_{0}^{4}\left(x^2 - xy + y^2\right)dxdy.$ (10 marks)

7. (a) Solve the equation $y' = x + y^2$, subject to the condition $y = 1$ where $x = 0$.

(b) Solve the initial value problem defined by $\frac{dy}{dx} = \frac{3x + y}{x + 2y}$, $y(1) = 1$, and find $y(1.2)$ and $y(1.4)$ by the Runge-Kutta fourth order formula.

(10 + 10 = 20 marks)

[5 × 20 = 100 marks]

C 81521

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 18 304—SOFTWARE ENGINEERING

(2018 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. A) Define software life cycle. List all life cycle models and explain spiral model with a neat diagram. (10 marks)

   B) What are the categories of CASE tools ? Explain. (10 marks)

2. A) What is Software Requirement specification ? Write its structure. (10 marks)

   B) Explain various system modelling approaches. (10 marks)

3. A) What is a DFD ? Draw DFDs up to 3rd level for a Bus reservation System. Make necessary assumptions. Mention the assumptions made. (10 marks)

   B) Explain class-based modelling with suitable example. (10 marks)

4. A) Justify the importance of testing process. (10 marks)

   B) Define Software Quality Assurance. Explain various SQA activities. (10 marks)

5. A) Discuss various cost estimation models and compare. (10 marks)

   B) Write a note on software metrics. (10 marks)

6. A) Explain the following :

      a) Activity diagram.

      b) State chart diagram. (2 × 5 = 10 marks)

   B) Discuss the concept of software maintenance process. (10 marks)

7. Write a note for the following :

   (i) COCOMO estimation criteria. (ii) Level of testing.

   (iii) Object oriented models. (iv) Software process.

   (4 × 5 = 20 marks)

C 81520

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 18 303—ADVANCED JAVA PROGRAMMING

(2018 Admissions)

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (A) Explain the multi-tier architecture of J2EE applications with its advantaged and disadvantages. (10 marks)

   (B) Give an account on session management in J2EE applications. (10 marks)

2. (A) What are the different types of JDBC drivers ? Explain. (10 marks)

   (B) Explain the steps for inserting and deleting a row in a *Result Set* with example. (10 marks)

3. (A) Explain the architecture of RMI with suitable diagram. (10 marks)

   (B) Differentiate between marshalling and unmarshalling objects in RMI. (10 marks)

4. (A) What is servlet ? Explain how a servlet is created and executed in Java. (10 marks)

   (B) Describe the steps for connecting a database as a back-end of JSP. (10 marks)

5. (A) What is AJAX ? Explain the technologies used by AJAX. (8 marks)

   (B) Explain how animation and events are handled in JQuery. (8 marks)

   (C) Write a short note on JSON. (4 marks)

6. (A) What are the different types of statements in JDBC ? Explain each one with examples.

   (B) Write a short note on Remote Object Activation. (15 + 5 = 20 marks)

7. (A) Explain the use of JSP expression with illustrations. (10 marks)

   (B) List out the best practices in J2EE applications. (10 marks)

[5 × 20 = 100 marks]

C 81519 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION APRIL 2020

M.C.A.

MCA 18 302—PRINCIPLES OF COMPILERS

(2018 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (A) What are Compilers ? Explain the various phases of compiler in detail with a neat sketch. (12 marks)

   (B) Describe the various operations of input buffering. (8 marks)

2. (A) Show that the following grammar :

   $S \rightarrow AaAb \mid BbBa$
   $A \rightarrow \varepsilon$
   $B \rightarrow \varepsilon$

   is LL (1) but not SLR (1). (12 marks)

   (B) Explain the error recovery in predictive parsing. (8 marks)

3. (A) Define a directed acyclic graph. Construct a DAG and write the sequence of instructions for the expression $a + a * (b - c) + (b - c) * d$. (12 marks)

   (B) Explain the bottom-up evaluation of S-attributed definition using an example. (8 marks)

4. (A) Write a note on data access without nested procedures. (10 marks)

   (B) What is storage allocation ? What are the three storage allocation strategies ? (10 marks)

5. (A) Explain principle sources of code optimization in detail. (10 marks)

   (B) What is a basic block ? Explain various transformations on basic blocks with the help of an example. (10 marks)

Turn over

6. (A) How do you define flow graphs ? Explain its representation. (10 marks)

   (B) With a neat diagram, explain the typical subdivision of runtime memory. (10 marks)

7. Write a note on the following :

   (i) Symbol table. (ii) Region based analysis.

   (iii) Calling sequences. (iv) Activation tree.

(4 × 5 = 20 marks)

[5 × 20 = 100 marks]

C 81518

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 18 301—DATABASE MANAGEMENT SYSTEM

(2018 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (A) Explain the advantages of Database Management System over traditional file system.

   (B) List the various data abstraction concepts and the corresponding modeling concepts in Enhanced Entity-Relationship (ERR) model. (10 + 10 marks)

2. (A) Compare and contrast BCNF and 3NF with examples. (10 marks)

   (B) Explain the use of HAVING and GROUP BY clause in SQL with example. (10 marks)

3. (A) What is two-phase locking protocol ? Explain how does it guarantee serializability.

   (B) Discuss why concurrency control and recovery is needed in transaction processing in Database Management Systems. (10 + 10 marks)

4. (A) What is shadow paging ? Explain the drawbacks of shadow paging techniques. (10 marks)

   (B) What is a statistical database ? Discuss the problem of statistical database security. (10 marks)

5. (A) Explain the concepts of Object Oriented Database Management System. (10 marks)

   (B) Explain the salient features of distributed database system. (10 marks)

6. (A) Describe the three phases of the ARIES recovery method. (10 marks)

   (B) What is serializability ? Explain its types with examples. (10 marks)

7. (A) List and explain the commonly accepted threats to database security. (10 marks)

   (B) What is a data model ? Explain the different types of data model with examples. (10 marks)

[5 × 20 = 100 marks]

C 81517 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 10 305—PRINCIPLES OF ACCOUNTING AND FINANCIAL MANAGEMENT

(2010 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions. Each question carries* 20 *marks.*

1. (a) Explain the meaning of double book-keeping.

   (b) Explain the advantages of double entry book-keeping.

   (c) Difference between book-keeping and Accounting. (20 marks)

2. (a) Calculate Material Cost Variance, Material Quantity Variance and Material Price Variance from the following :

	Standard		Actual	
Material	Qty.	Rate (Rs.)	Qty.	Rate (Rs.)
X	1,000	6	1,100	7
Y	700	10	600	8

(10 marks)

   (b) Current Ratio—2.5 : 1 ; Quick Ratio—1.5 : 1 ; Current Liabilities—Rs. 50,000.

   Find out Current assets, Liquid assets and Inventory. (10 marks)

3. Explain the classification of working capital. (20 marks)

4. (a) Explain the use and significance of ratio analysis. (10 marks)

   (b) The following are the information related to sales and Profit and Loss of G Ltd. Calculate the Trend Percentage by taking 2013 as base. Also interpret the result :

Year	Sales	Stock	Profit before Tax
2013	4,500	340	420
2014	5,300	450	370
2015	6,000	700	510
2016	6,500	550	300
2017	7,000	400	750

(10 marks)

Turn over

5. The following are the figures relating to the production of a commodity for the month of January 2012 :

	1.1.2012	31.1.2012
Stock of raw materials	75,000	50,000
Work in progress	5,000	2,000
Stock of finished goods	75,000	53,000
Transactions during the month were :—		
Purchase of raw materials	10,000	
Direct wages	5,000	
Works overheads	2,000	
Administration overheads	3,000	
Selling and Distribution overheads	2,000	
Sales	1,77,000	

Prepare a Cost Sheet showing cost of production and profit. (20 marks)

6. Explain applications of break-even analysis in decision-making. (20 marks)

7. Prepare a Comparative Income Statement from the following :—

Particulars	31 March 2016	31 March 2017
Sales	21,50,000	25,00,000
Cost of goods sold	13,00,000	14,50,000
Operating Expenses :—		
Administrative expenses	2,10,000	1,80,000
Selling expense	1,90,000	2,50,000
Non-operating expense :—		
Interest	1,40,000	1,20,000
Income Tax	1,70,000	2,30,000

Also interpret the result. (20 marks)

C 81516 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 10 304—CORE JAVA

(2010 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*

All full questions carry equal marks.

I. (a) How to connect to Data base in Java using JDBC. (10 marks)

(b) Briefly explain about the Container class in awt. (10 marks)

II. Explain Layout Managers in detail with appropriate examples. (20 marks)

III. (a) What are Applets ? Explain APPLET tag in detail. Write a program that handles all mouse events in an applet window.

(10 marks)

(b) Write note on Unchecked Exceptions. Write a javaprogram which will race an exception called No Argument Exception when you run your program with no command line arguments. If there is any command line arguments display them.

(10 marks)

IV. (a) What is a Thread ? Explain the life cycle of a Thread with a suitable example.

(10 marks)

(b) Write a thread to display uppercase alphabets. Create another thread to display counting numbers. Display both the threads alternatively with suitable delay.

(10 marks)

V. (a) Write a program to define a package "arithop" and include classes Addition, Subtraction, Multiplication and Division. Import package and perform the operations.

(10 marks)

(b) Explain the use of static keyword in Java. (10 marks)

Turn over

VI. (a) Briefly explain the concept of Interfaces in Java. (10 marks)

(b) Create a class Student that stores rollno and name with member functions getData() and putData(). From this derive a class Test with data members mark 1 and mark 2 and member functions getMarks() and putMarks(). Create an interface Sports that stores sport's mark in data member sportsMark. From Test and Sports classes derive the class Result that stores total mark in data member total. Write a program to test the class.

(10 marks)

VII. (a) Write an AWT program to accept two numbers in textboxes and display the sum in another textbox when the result button is pressed.

(10 marks)

(b) Explain buzzwords of Java. (10 marks)

C 81515

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 10 303—PRINCIPLES OF COMPILER DESIGN

(2010 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *question.*
Each question carries 20 *marks.*

I. (a) What are different analysis phase of compiler ? Explain the reasons for separation of Lexical analysis from syntax analysis. (10 marks)

(b) "Top down parser is also considered as Left Most Derivation". Justify this with an example. (10 marks)

II. (a) Differentiate between Synthesized and Inherited attributes with suitable examples. (10 marks)

(b) What is syntax directed translation ? How is it different from translation schemes ? Explain with example. (10 marks)

III. (a) What is Dangling ELSE ambiguity ? How to reduce it ? (10 marks)

(b) What is intermediate code ? Translate the expression $a = b * - c + b * - c$ into quadruples, triples and indirect triples. (10 marks)

IV (a) Differentiate various techniques used for machine independent and dependent optimizations. (10 marks)

(b) What is runtime stack ? Explain storage allocation strategies used for recursive procedure calls. (10 marks)

V (a) Explain the type system in type checker ? Write the syntax directed definition for type checker. (10 marks)

(b) Draw DFA which accepts either even number of Is or odd number of 0s. (10 marks)

VI. (a) What is Reference counting ? Explain how they are used in garbage collection. (10 marks)

(b) Explain Global data flow analysis. (10 marks)

VII. (a) Write short notes on :

(i) Basic blocks and flowgraph.

(ii) Loop rolling and Loop jamming. (10 marks)

(b) Explain various compiler construction tools. (10 marks)

C 81514

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 10 302—COMPUTER NETWORKS

(2010 Admissions)

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *questions.*

1.	(a)	Explain IPv4 and IPv6 in detail.	(14 marks)
	(b)	Explain about network topologies.	(6 marks)
2.	(a)	Explain the uses of computer networks.	(6 marks)
	(b)	Explain about transport layer protocols.	(14 marks)
3.	(a)	Explain about inter domain routing protocol.	(8 marks)
	(b)	Differentiate between packet switching and circuit switching.	(12 marks)
4.	(a)	Explain Link State Routing Algorithm.	(10 marks)
	(b)	Explain Virtual Private Networks and Tunnels.	(5 marks)
	(c)	Explain advantages of IPv6.	(5 marks)
5.	(a)	Explain functions and protocols of application layer.	(10 marks)
	(b)	Explain 802.17 in detail.	(6 marks)
	(c)	Explain SMTP.	(4 marks)
6.	(a)	Explain Bluetooth architecture and Bluetooth layers.	(10 marks)
	(b)	Explain about Cell Phone Technologies.	(10 marks)
7.	(a)	Explain TELNET, MIME, DNS in detail.	(10 marks)
	(b)	Explain Multicast Routing.	(10 marks)

C 81513 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE EXAMINATION, APRIL 2020

M.C.A.

MCA 10 301—NUMERICAL ANALYSIS AND OPTIMIZATION TECHNIQUES

(2010 Admissions)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
All full questions carry equal marks.

1. (a) Find a real root of the equation $x - \cos x = 0$ by bisection Method. (10 marks)

   (b) Solve the equation $x^2 - \log e^x = 12$ using Regula-Falsi Method. (10 marks)

2. (a) Apply the principle of duality to solve the LPP

   Minimize $Z = 2x_1 + 2x_2$

   subject to, $2x_1 + 4x_2 \geq 1$
   $x_1 + 2x_2 \geq 1$
   $2x_1 + x_2 \geq 1$
   $x_1, x_2 \geq 0.$

   (10 marks)

   (b) A home resourceful decorator manufacturers two types of Lamps say A and B. Both lamps go through two technicians first a cutter and second a finisher. Lamp A requires 2 hours of the cutter's time and 1 hour of the finisher's time ; Lamp B requires 1 hour of cutter's and 2 hours of finisher's time. The cutter has 104 hours and finisher has 76 hours of available time each month. Profit on the Lamp A is Rs. 6.00 and on one B lamp is Rs. 11.00. Formulate a mathematical model.

   (10 marks)

3. (a) Solve the Following Routing Problem :

		To city				
		1	2	3	4	5
From city	1	—	10	25	25	10
	2	1	—	10	15	2
	3	8	9	—	20	10
	4	14	10	24	—	15
	5	10	8	25	27	—

(10 marks)

(b) Five different machines can do any of the five required jobs with different profits resulting from each assignment as shown below :

		Machines				
		A	B	C	D	E
Job	1	30	37	40	28	40
	2	40	24	27	21	36
	3	40	32	33	30	35
	4	25	38	40	36	36
	5	29	62	41	34	39

Find out maximum profit possible through optimal assignment.

(10 marks)

4. (a) Solve the equation $y' = x + y^2$, subject to the condition $y = 1$ when $x = 0$, using Picard's method.

(10 marks)

(b) Given the equation $\frac{dy}{dx} = 3x^2 + 1$ with $y(1) = 2$. Estimate $y(2)$ by Euler's method using (i) $h = 0.5$; and (ii) $h = 0.25$.

(10 marks)

5. (a) Use the classical Runge Kutta method to estimate $y(0.4)$ when $y'(x) = x^2 + y^2$ with $y(0) = 0$. Assume $h = 0.2$.

(10 marks)

(b) Given the equation $y'(x) = \frac{2y}{x}$ with $y(1) = 2$. Estimate $y(2)$ using the Milne - Simpson Predictor -corrector method. Assume $h = 0.25$.

(10 marks)

6. (a) Given the equation $d^2y/dx^2 = e^{x^2}$ with $y(0) = 0$, $y(1) = 0$. Estimate the values of $y(x)$ at X = 0.25 , 0.5 and 0.75.

(10 marks)

(b) The Polynomial equation $P(x) = x^3 - 7x^2 + 15x - 9 = 0$ has a root at X = 3. Find the quotient polynomial $q(x)$ Such that $p(x) = (x-3)q(x)$.

(10 marks)

7. (a) Solve the equations

$$3x_1 + x_2 = 5$$
$$x_1 - 3x_2 = 5$$

by the Gauss-Seidel method.

(10 marks)

(b) Solve the LPP using simplex method

Maximize $Z = 7x_1 + 5x_2$

subject to $x_1 + 2x_2 \leq 6$
$4x_1 + 3x_2 \leq 12$
$x_1, x_2 \geq 0.$

(10 marks)

C 3314 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2021

M.C.A. (2018 Syllabus)

MCA 18 305—NUMERICAL ANALYSIS AND OPTIMIZATION TECHNIQUES

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (a) Given $f(x) = \sin x$, consider the Taylor series approximation of orders 0 to 7 at $x = \pi/3$ and state their absolute errors.

(10 marks)

(b) Find a root, correct to three decimal places and lying between 0 and 0.5 of the equation : $f(x) = 4e^{-x} \sin x - 1 = 0$ using bisection method.

(10 marks)

2. (a) Find a real root of the following expression using Regula-Falsi method $f(x) = x^3 - 2x - 5 = 0$. Give your answer correct to four decimal places.

(10 marks)

(b) Find a quadratic factor of the polynomial : $f(x) = x^3 - x - 1$. (10 marks)

3. (a) From the following table, find the value of $e^{1.17}$ using Gauss forward formula :

x	e^x
1.00	2.7183
1.05	2.8577
1.10	3.0042
1.15	3.1582
1.20	3.3201
1.25	3.4903
1.30	3.6693

(10 marks)

(b) Using Newton's forward difference formula, find the sum : $s_n = 1^3 + 2^3 + 3^3 + \ldots n^3$.

(10 marks)

Turn over

4. (a) State Lagrange's interpolation formula and find a bound for the error in linear interpolation.

(10 marks)

(b) Show that : $\sum_{i=0}^{n} \frac{\Pi_{n+1}(x)}{(x - x_i)\Pi'_{n+1}(x_i)} = 1$, where $\Pi_{n+1}(x) = (x - x_0)(x - x_1)(x - x_2)\ldots(x - x_n)$.

(10 marks)

5. (a) Factorize the matrix into the LU form :

$$A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}.$$

(10 marks)

(b) Solve the equations using LU decomposition :

$$\begin{aligned} 2x + 3y + z &= 9 \\ x + 2y + 3z &= 6 \\ 3x + y + 2z &= 8. \end{aligned}$$

(10 marks)

6. (a) Evaluate the following equation using Simpson's $\frac{1}{3}$ rule with $h = 1$.

$$I = \int_3^7 x^2 \log x dx.$$

(10 marks)

(b) Use the trapezoidal rule to evaluate $\int_{-2}^{2} \int_{0}^{4} \left(x^2 - xy + y^2\right) dxdy$. (10 marks)

7. (a) From the Taylor series for $y(x)$, find $y(0.1)$ correct to four decimal places if $y(x)$ satisfies $y' = x - y^2$ and $y(0) = 1$.

(10 marks)

(b) Solve the initial value problem defined by $\frac{dy}{dx} = \frac{3x + y}{x + 2y}$, $y(1) = 1$ and find $y(1.2)$ and $y(1.4)$ by the Runge-Kutta fourth order formula.

(10 marks)

[5 × 20 = 100 marks]

C 3313

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (REGULAR / SUPPLEMENTARY) EXAMINATION, APRIL 2021

M.C.A. (2018 Syllabus)

MCA 18 304—SOFTWARE ENGINEERING

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (A) Explain the component-based software development model with a neat sketch.

   (B) Give an account on Scrum Frame work.

   (10 + 10 = 20 marks)

2. (A) What is requirement elicitation ? Briefly describe the various activities performed in requirements elicitation with an example.

   (B) What are called as non-functional requirements ? Explain in detail.

   (10 + 10 = 20 marks)

3. (A) What is the purpose of data flow diagrams ? Construct a context flow diagram level-0 DFD and Level-1 DFD for a library management system and explain.

   (B) Explain about software architecture design, with emphasize as fan-in, fan-out, coupling and cohesion.

   (10 + 10 = 20 marks)

4. (A) What is black box testing ? Explain the different types of black box testing strategies. Explain by considering suitable examples.

   (B) What is the purpose of software reengineering ? Summarize the activities involved in software reengineering.

   (10 + 10 = 20 marks)

5. (A) Explain in detail about the COCOMO II model for software estimation.

   (B) Explain different steps in project scheduling.

   (10 + 10 = 20 marks)

6. (A) Explain the following :

   (a) Class diagram.

   (b) Use case diagram.

   (B) Explain in detail about the characteristics and criteria for a good design.

   (5 + 5 + 10 = 20 marks)

7. Write a note for the following :

   (i) CASE tools.

   (ii) Requirement Validation.

   (iii) Objects and Classes.

   (iv) Testing Web Applications.

   (4 × 5 = 20 marks)

C 3312

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (REGULAR / SUPPLEMENTARY) EXAMINATION, APRIL 2021

M.C.A. (2018 Syllabus)

MCA 18 303—ADVANCED JAVA PROGRAMMING

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (A) What is an enterprise application? Explain the architecture of an enterprise application.
   (B) List out the best practices in J2EE applications.
   (10 + 10 = 20 marks)
2. (A) What are the different types of statements in JDBC? Explain each one with examples.
   (B) Explain the processes involved in connecting a database management system as a backend of J2EE application.
   (10 + 10 = 20 marks)
3. (A) Explain the architecture of distributed application using RMI concept.
   (B) Explain the procedure for serialization of objects using RMI.
   (10 + 10 = 20 marks)
4. (A) What are cookies? Explain how it is implemented in Servlets.
   (B) Explain the different types of JSP tags. Give suitable examples for each one.
   (10 + 10 = 20 marks)
5. (A) Explain the function and syntax of any four JQuery effect methods with example.
   (B) Write a short note on Java ME.
   (16 + 4 = 20 marks)
6. (A) List and explain different types of JDBC drivers.
   (B) Explain EIS Tier and Web Tier implementation in detail.
   (10 + 10 = 20 marks)
7. (A) Explain the different loop control statements in JSP.
   (B) Write a note on dynamically loaded classes in RMI.
   (10 + 10 = 20 marks)

C 3311

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (REGULAR / SUPPLEMENTARY) EXAMINATION, APRIL 2021

M.C.A. (2018 Syllabus)

MCA 18 302—PRINCIPLES OF COMPILERS

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (A) What are the issues to be considered in the design of lexical analyzer? Explain with an example.

   (B) Explain the following terms :

   (i) Incremental compiler ; (ii) Bootstrapping.

   (10 + 10 = 20 marks)

2. (A) Construct an LL (1) parsing table for the grammar given :

   $S \rightarrow aS \mid Ab, A \rightarrow XYZ \mid \varepsilon, X \rightarrow cS \mid \varepsilon, Y \rightarrow dS \mid \varepsilon, Z \rightarrow eS.$

   (B) List the type of errors that may be encountered in a computer program. Explain how they are handled by the compiler?

   (12 + 8 = 20 marks)

3. (A) Write syntax-directed translation scheme to generate intermediate code for a declaration statement.

   (B) Explain different techniques that are used in the implementation of three-address code with example.

   (10 + 10 = 20 marks)

4. (A) What is an activation record? Give the format of an activation record.

   (B) Discuss the issues of data access with nested procedures.

   (10 + 10 = 20 marks)

5. (A) Why target machine is important in code generation? Explain in detail.

   (B) Discuss different issues related to run-time storage allocation.

   (10 + 10 = 20 marks)

6. (A) Write the instruction to convert a regular expression to a context - free grammar. Convert the regular expression $(a \mid b)^* abb$ to an equivalent context free grammar.

   (B) Explain phases of a compiler.

   (10 + 10 = 20 marks)

7. Explain the following :

   (i) Basic blocks. (ii) Memory manager.

   (iii) Storage optimization. (iv) Recursive descent parsing.

   (4 × 5 = 20 marks)

C 3310

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (REGULAR / SUPPLEMENTARY) EXAMINATION, APRIL 2021

M.C.A. (2018 Syllabus)

MCA 18 301—DATABASE MANAGEMENT SYSTEM

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (A) What is E-R diagram? Explain any four attributes in E-R model with suitable example.
   (B) What is a data model? Explain the different types of data model with examples.
   (10 + 10 = 20 marks)

2. (A) Explain the use of HAVING and GROUP BY clause in SQL with example.
   (B) Explain the differences between 3NF and BCNF.
   (C) Write short note on functional dependency.
   (10 + 6 + 4 = 20 marks)

3. (A) Describe the different properties of a transaction.
   (B) Discuss the concurrency control mechanism in detail using suitable example.
   (C) What is a timestamp? State its advantages.
   (8 + 8 + 4 = 20 marks)

4. (A) What is shadow paging? Explain the drawbacks of shadow paging techniques.
   (B) Explain the different control measures that are used to provide security of a data in databases.
   (10 + 10 = 20 marks)

5. (A) Explain the concepts of Object Oriented Database Management System.
   (B) What is OID? Explain the primary characteristics of an OID.
   (C) Differentiate between persistent and transient objects.
   (8 + 6 + 6 = 20 marks)

6. (A) List and explain various types of specialized locking techniques used in Database Management Systems.
   (B) What is serializability? Explain its types with examples.
   (10 + 10 = 20 marks)

7. (A) List the advantages and disadvantages of Distributed Database Management Systems.
   (B) Explain the components of DBMS with a neat diagram.
   (10 + 10 = 20 marks)

C 3309 (**Pages : 2**) **Name**.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION APRIL 2021

M.C.A. (2010 Syllabus)

MCA 10 305—PRINCIPLES OF ACCOUNTING AND FINANCIAL MANAGEMENT

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
All full questions carry equal marks.

1. Define Financial Accounting. Explain :

   (a) Advantages ; (b) Disadvantages ; (c) Objectives ; and (d) Characteristics.

   (20 marks)

2. (a) From the following information find out :

   (i) P/V Ratio.

   (ii) Sales required to earn a profit of Rs. 80,000.

   (iii) Profit if sales is Rs. 2,00,000.

Year	Sales (Rs.)	Profit (Rs.)
2010	1,80,000	40,000
2011	2,40,000	64,000

   (b) Calculate (i) Gross Profit ratio ; (ii) Net Profit Ratio ; (iii) Cost of Goods sold ratio from the following : Sales Rs. 5,00,000 ; cost of goods sold Rs 2,80,000 ; Operating expenses Rs. 50,000, Interest Rs. 30,000 and tax Rs. 40,000.

   (10 + 10 = 20 marks)

3. (a) What is standard costing? Distinguish between Standard costing and Budgetary control.

   (b) What is a cost sheet? What are its advantages?

   (10 + 10 = 20 marks)

4. (a) X Ltd Purchased a machinery on 1st January 2016 for a sum of Rs. 40,000. It is expected to have a working life of 7 years, by the end of which it would get a scrap value of Rs. 5,000. Prepare the Machinery Account in the books of X Ltd. for the first 3 years by providing depreciation under Fixed Installment System.

   (b) Explain : (i) Trading Account ; (ii) Closing entry ; (iii) Balance Sheet ; (iv) Profit and Loss Account

   (10 + 10 = 20 marks)

Turn over

5. Prepare Cash Book from the following :

2018

Feb. 1. Started business with Rs. 10,000

3. Paid into bank Rs. 1,200

4. Cash received from Shankar Rs. 2,200

6. Paid to Vimal Rs. 500

11. Received cash from Bindu Rs. 2,100

13. Rent paid Rs. 600

15. Paid for stationery Rs. 100

18. Withdrew for office use Rs. 500

26. Withdrew in cash for personal use Rs. 2,300

27. Salary paid Rs. 600

28. Cash sales Rs. 3,200.

(20 marks)

6. What is ratio analysis? Explain its objectives, advantages and limitations.

(20 marks)

7. What is Computerized Accounting System? Explain the features of Computerized Accounting.

(20 marks)

C 3308 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION APRIL 2021

M.C.A. (2010 Syllabus)

MCA 10 304—CORE JAVA

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
All full questions carry equal marks.

I. (a) Explain briefly about the StringBuffer class in Java.

(b) Write short note on "Java's Magic - Byte code".

(c) Java is a strongly typed language. Justify

(d) Define Arrays. Write the syntax for creating different types of Arrays with appropriate examples.

(10 + 3 + 2 + 5 = 20 marks)

II. (a) Explain overloading of constructors with appropriate example in Java.

(b) What are Wrapper classes? What are the uses of Wrapper class in Java?

(10 + 10 = 20 marks)

III. (a) Briefly explain the Exception Hierarchy and types of Exception in Java.

(b) Write a Java program which throws a user defined exception, Valid MarkException, when ever a user enters an invalid mark, such as mark less than zero or Marks greater than maximum marks, The program reads, roll number, name and marks of Model Examination. [If Maximum Marks is 500, valid mark : 0<=mark<=500, invalid: mark<0 or mark >500.]

(10 + 10 = 20 marks)

IV. (a) Write short note on Interprocess Communication mechanism in Java.

(b) Write a thread to display uppercase alphabets. Create another thread to display lowercase alphabets. Display both the threads alternatively with suitable delay.

(10 + 10 = 20 marks)

V. (a) Create a package called pack which contains a class Prime with a member function checkPrime( ) to check whether a number is prime or not. Create another package called mypack which contains a class called Matrix and include the following member functions. To read a matrix, to display the matrix, to find the sum of diagonal elements of the matrix and check whether the sum is prime or not by accessing the method checkPrime( ) From Prime class.

(b) Explain the use of super keyword in Java.

(10 + 10 = 20 marks)

Turn over

VI. (a) Create a class called Figure which contains three data members (length, breadth and height). Include methods read( ) to read data members, display( ) to display data members and area( ) to print a general message. Derive two classes Rectangle and Triangle from Figure. Implement Dynamic method Dispatch to find the area of rectangle and triangle.

(b) Briefly explain the life cycle of Applets in Java. Create an applet that displays a message in the applet and status window of the applet.

(10 + 10 = 20 marks)

VII. (a) Create an input form contains field to enter name, place, Company name, Designation and an optional checkboxes to select his/her hobbies (5 hobbies). When you click a button all these details should be displayed in a Text area.

(b) Explain Delegation Event Model in Java.

(10 + 10 = 20 marks)

C 3307

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION APRIL 2021

M.C.A. (2010 Syllabus)

MCA 10 303—PRINCIPLES OF COMPILER DESIGN

Time : Three Hours Maximum : 100 Marks

Answer any **five** *questions.*
All questions carry equal marks.

I. (a) What is Compiler? Explain the structure of compiler in detail.

(b) Discuss about Left Recursion and Left Factoring with examples.

(10 + 10 = 20 marks)

II. (a) Differentiate the following :

(i) LR(0) and LR(1) items.

(ii) Lexeme, Token and Pattern.

(b) Explain the following machine independent optimization techniques :

(i) Copy propagation, constant folding.

(ii) Instruction Scheduling.

(10 + 10 = 20 marks)

III. (a) With neat sketch explain the structure of non-recursive predictive parser. How to handle errors on it?

(b) Explain Symbol table organization techniques.

(10 + 10 = 20 marks)

IV. (a) Explain shift-reduce parsing with the help of an example.

(b) Explain various compiler construction tools.

(10 + 10 = 20 marks)

V. (a) Explain Activation Trees and control stacks.

(b) What are the subdivisions of runtime memory? Explain in detail.

(10 + 10 = 20 marks)

VI. (a) Draw DFA which accepts either even number of 1s or odd number of 0s.

(b) Describe about different storage allocation strategies.

(10 + 10 = 20 marks)

VII. (a) What is type expression? How to construct them using various type constructors? Explain.

(b) Write short note on the following :

(i) Basic blocks & flow graph.

(ii) DAG.

(10 + 10 = 20 marks)

C 3306

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION APRIL 2021

M.C.A. (2010 Syllabus)

MCA 10 302—COMPUTER NETWORKS

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *questions.*
All questions carry equal marks.

1. (a) Explain features of ATM and layers of ATM reference model.
   (b) Explain FDDI.
   (c) Explain source routing.

   (10 + 5 + 5 = 20 marks)

2. (a) Explain Remote Procedure Call in detail.
   (b) Explain Classful Addressing in detail.

   (10 + 10 = 20 marks)

3. (a) Explain about RIP.
   (b) Explain the drawbacks of IPv4.
   (c) Explain CIDR.

   (8 + 7 + 5 = 20 marks)

4. (a) Explain Distance Vector Routing Algorithm.
   (b) Explain about Wi-Fi.
   (c) Explain PIM.

   (10 + 5 + 5 = 20 marks)

5. (a) Explain Ethernet in detail.
   (b) Explain the categories of network.

   (10 + 10 = 20 marks)

6. (a) Explain the function of the different layers in OSI Model.
   (b) Explain FTP, POP and HTTP in detail.

   (10 + 10 = 20 marks)

7. (a) Explain message switching,
   (b) Explain UDP and its applications.
   (c) Explain the functions of Application Layer.

   (5 + 10 + 5 = 20 marks)

THIRD SEMESTER M.C.A. DEGREE (SUPPLEMENTARY) EXAMINATION, APRIL 2021

M.C.A.

MCA 10 301—NUMERICAL ANALYSIS AND OPTIMIZATION TECHNIQUES

(2010 Syllabus)

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. (a) Estimate the value of sin θ at θ = 25° using the Newton-Gregory forward difference formula with the help of the following table :—

θ	10	20	30	40	50
Sin θ	0.1736	0.3420	0.5000	0.6428	0.7660

(10 marks)

(b) Explain Newton Raphson method. (10 marks)

2. (a) Distinguish between Assignment problems and Transportation problems. (10 marks)

(b) Solve using Charne's M method :

Min. $Z = 5x_1 + 6x_2$

subject to $2x_1 + 5x_2 \geq 1500$

$3x_1 + x_2 \geq 1200$

$x_1 + x_2 \geq 0$

(10 marks)

3. (a) The owner of a small machine shop has four machines available to assign jobs for the day. Five jobs are offered with expected profit in Rupees for each machines on each job as follows :

Machines	Jobs				
	A	B	C	D	E
1	62	78	50	101	82
2	71	84	61	73	59
3	87	92	111	71	81
4	48	64	87	77	80

Determine the assignment of machines of jobs that will result in a maximum profit. Which job should be declined.

(10 marks)

Turn over

(b) An animal feed company must produce at least 200 kgs. of a mixture consisting of ingredients x_1 and x_2 daily, x_1 costs Rs. 3 per kg. and x_2 Rs. 8 per kg. No more than 80 kg. of x_1 can be used and atleast 60 kgs. of x_2 must be used. Formulate a Mathematical model to the problem.

(5 marks)

(c) Explain Modified Distribution Method (MODI). (5 marks)

4. (a) Given below is a table of data for log x. Estimate log 2.5 using second order Newton interpolation polynomial :

i	0	1	2	3
xi	1	2	3	4
Log xi	0	0.3010	0.4771	0.6021

(10 marks)

(b) Explain Newton's dividend difference interpolation polynomial. (10 marks)

5. (a) Solve the following equations by Picard's method :

$y'(x) = xe^y$; $y(0)$ and estimate $y(0.1)$, $y(0.2)$ and $y(1)$.

(10 marks)

(b) Find approximation to second derivate of cos (x) at $x = 0.75$ with $h = 0.01$. Compare with the true value.

(10 marks)

6. (a) Derive the false position formula. (10 marks)

(b) Find the root of the equation $f(x) = x^2 - 3x + 2$ in the vicinity of $x = 0$ using Newton-Raphson method.

(10 marks)

7. (a) Evaluate by numerical integration $\int_0^1 \frac{1}{1+x^2}\,dx$ using Simpson's (1/3) rule and hence or otherwise find an approximate value of π.

(10 marks)

(b) Describe Trapezoidal rule for Numerical integration. (10 marks)

[5 × 20 = 100 marks]

C 3276

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 305 F—MACHINE LEARNING

Time : Three Hours Maximum : 100 Marks

Answer any **five** *questions.*

Each question carries 20 *marks.*

1. A What are the different types of machine learning approaches ? Explain each one with examples. (12 marks)

   B Explain the differences between overfitting and underfitting. How it will affect in model generalization? (8 marks)

2. A What are the benefits of pruning in decision tree induction ? Explain different approaches to tree pruning ? (8 marks)

   B Give an account on multivariate classification and regression analysis. (12 marks)

3. A Use K-Means clustering algorithm to cluster the following data into two groups using Euclidean distance measure. Assume the cluster centroids are m1 = 2 and m2 = 4.

   $\{2, 4, 10, 12, 3, 20, 30, 11, 25\}$. (10 marks)

   B Write a note on canonical correlation analysis. (10 marks)

4. A Explain about linear and nonlinear activation functions for multiclass problem.

   B Explain the architecture of back-propagation neural network.

   (10 + 10 = 20 marks)

5. A What is Deep Learning ? Also explain how does it work. (8 marks)

   B Explain the architecture of LSTM with a diagram. (12 marks)

6. A Explain the construction of classification tree. (10 marks)

   B What is recurrent neural network in Deep Learning ? Explain how it works. (10 marks)

7. A What is dimensionality reduction ? Explain how Matrix factorization works in PCA.

   B Explain about the inductive biased hypothesis space and unbiased learner.

   (10 + 10 = 20 marks)

C 3275

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L18 305E—BIO INFORMATICS

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. A) Differentiate between Prokaryotes and Eukaryotes with diagram. (10 marks)
   B) Describe the applications of Bioinformatics in detail. (10 marks)
2. A) Explain in detail about string matching algorithm. (10 marks)
   B) What is tandem repeats ? Explain in detail. (10 marks)
3. A) Explain pair-wise sequence alignment. (10 marks)
   B) Explain about Smith-Waterman algorithm. (10 marks)
4. A) Describe Multiple Sequence Alignment. (10 marks)
   B) What is phylogenetic tree ? Explain. (10 marks)
5. A) Explain in detail about Nucleic Acid sequence databases. (10 marks)
   B) What are the different Protein sequence databases available ? Explain any two. (10 marks)
6. A) Describe FASTA format with an example. (10 marks)
   B) Explain the significance of sequence alignment with illustration. (10 marks)
7. A) What do you understand about distance measures ? Explain its different types. (10 marks)
   B) Explain the structure of DNA with the support of diagram. (10 marks)

[5 × 20 = 100 marks]

C 3274 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE (REGULAR) EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 305 D—NATURAL LANGUAGE PROCESSING

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*

Each question carries 20 *marks.*

1. (A) Write a short note on regular expressions. Write regular expressions to find the following :

   (I) All words in a text corpus which is ending with Z.

   (II) All words in a text corpus which contains some digit in it.

   (B) Explain morphology and morphological parsing.

2. (A) Differentiate between top down and bottom-up parsing along with advantages and disadvantages of each.

   (B) Explain CYK algorithm on non-probabilistic parsing.

3. (A) What is POS tagging ? Explain the different approaches of it.

   (B) Write a short note on N-grams. Explain the process of computing the probability of a sentence using bigrams with the help of examples.

4. (A) What are maximum entropy classifiers ? How they can be used for document classification?

   (B) Explain beam search algorithm.

5. (A) Write short notes on the following with examples :

   (i) Homonymy.

   (ii) Polysemy.

   (iii) Synonymy

   (B) What is reference resolution ? Explain different machine learning methods for co-reference resolution.

Turn over

6. (A) Explain regular languages and their limitations

   (B) What are finite state automata ? Explain the relationship between regular expressions and finite state automata with the help of an example.

7. (A) Explain Earley algorithm for bottom-up parsing.

   (B) Explain context free grammars with examples. Demonstrate its use and limitations.

(5 × 20 = 100 marks)

C 3273 **(Pages : 2)** **Name**.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L18 305C—PATTERN RECOGNITION

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. A) "Feature extraction of 3D objects from image data is an important pattern recognition task". Illustrate with an example.

(10 marks)

B) How do you explain training and learning in Pattern Recognition systems ? Discuss with an example.

(10 marks)

2. A) Explain Maximum Likelihood Estimation with derivation of likelihood function. (10 marks)

B) Briefly describe the various approaches to develop StatPR classifiers. (4 marks)

C) Write a brief note on discriminant functions. (6 marks)

3. A) Define the concept of linear separability. (5 marks)

B) Differentiate training by sample and training by Quantization. (5 marks)

C) How do you design a linear classifier ? Explain in brief. (10 marks)

4. A) Write a short note on generalized delta rule explaining its basic operation. (10 marks)

B) State the desirable pattern associator properties. (5 marks)

C) Explain Flopfield network. (5 marks)

5 A) Explain the reasons why a Hopfield strategy should work. (10 marks)

B) Write a short note on Self organizing feature maps. (5 marks)

C) Define Hamming distance. How classification can be performed using Hamming distance ?

(5 marks)

Turn over

6. A) Briefly explain the non-parametric approaches to supervised learning. (10 marks)

   B) What are the different approaches to parameter estimation? Explain each. (10 marks)

7. A) Cite examples of applications wherein it is possible to obtain feature vector samples, but labeling is impossible.

   (6 marks)

   B) Briefly explain Sum of squared error criterion. (4 marks)

   C) Write short note on the following :

      1. Learning rate.

      2. Gradient descent approach for training.

   (10 marks)

C 3272

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 305 B—ADVANCED JAVA MOBILE PROGRAMMING

Time : Three Hours Maximum : 100 Marks

Answer any **five** *questions.*
Each question carries 20 *marks.*

1. A Explain Small Computing Technology of J2ME with example.

   B Explain Multiple MIDlets in a MIDlet Suite.

2. A Discuss high level display feature-Ticker class.

   B Explain Textbox class and Display class with an Example.

3. A What is Record Listener ? Explain with example.

   B Explain how to read and sort single data type records in a Record Enumeration.

4. A Explain how to Create table, drop a Table and Create a Secondary Index with example.

   B Describe Timestamp and metadata with example.

5. A What is simple object access protocol (SOAP) ? How SOAP works ? Explain with an example.

   B How to create distributed applications using RMI.

6. A Explain Mobile radio networks and Messaging.

   B Explain Automatic Data Synchronization with example.

7. A Describe the advantages of RMI.

   B Explain callable statement and prepared statement with example.

C 3271

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 305 A—INTERNET OF THINGS

Time : Three Hours

Maximum : 100 Marks

Answer any **five** *full questions.*

Each full questions carries 20 *marks.*

1. (A) With a diagram explain Web 3.0 view of IoT.

   (B) Describe and illustrate four pillars of IoT and their relevance to networks.

2. (A) Describe RFID middleware architecture with a diagram.

   (B) Explain Machine to Machine protocol and Ethernet Protocol.

3. (A) Explain the working groups of IoT standards.

   (B) Describe two pillars of the web with a diagram.

4. (A) Illustrate a business model for a car rental scenario in IoT.

   (B) Explain about revenue generation business models in IoT with Anti-counterfeiting.

5. (A) Explain the role of IoT for increased autonomy and agility in Production.

   (B) Explain resource management in IoT for software agents.

6. (A) With a body sensor example illustrate WSN in Internet with transducers.

   (B) Explain tool kit approach for end user in IoT.

7. (A) Compare between M2M and WSN Protocols.

   (B) Explain various unified data standard approaches used in IoT.

(5 × 20 = 100 marks)

C 3270

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L18 304 E—INTRODUCTION TO SOFT COMPUTING TECHNOLOGIES

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each full questions carries 20 *marks.*

1. a) Define soft computing and explain different soft computing techniques in detail.

   b) Distinguish between : (i) Conventional AI and adaptive intelligence ; (ii) Feed forward and Feedback networks.

2. a) Explain any two methods of composition techniques on fuzzy relations with examples.

   b) Explain different Mamdani fuzzy models and State the relevance of fuzzification.

3. a) Define the Perceptron learning rule and state the importance of Delta rule in Adaline ? Define artificial neural network. Draw its mathematical model ?

   b) Explain different ANN architectures.

4. a) Explain the architecture of back propagation network.

   b) Explain variation in standard BP algorithm.

5. a) Briefly explain different genetic algorithms. What is the concept of crossover in Genetic Algorithm ?

   b) With the help of examples, explain the various crossover technique employed in genetic algorithm.

6. a) Define Fuzzy Propositions. Explain different fuzzy propositions.

   b) Explain the characteristics and different classifications of a neuro-fuzzy hybrid system.

7. a) Explain different learning mechanisms in artificial neural network with the help of necessary diagrams.

   b) Discuss the various applications of Genetic Algorithms with illustration of a case study.

C 3269

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 304 D—MOBILE COMPUTING

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each full questions carries 20 *marks.*

1. a) Explain different mobile computing issues and challenges.

   b) Explain different characteristics of mobile computing with suitable examples.

2. a) Explain different multiplexing techniques and distinguish analogue and digital Multiplexing.

   b) What is exposed terminal channel allocation? Explain its types.

3. a) Define location management. Explain different type of architectures.

   b) Describe any *two* algorithm for location management in detail.

4. a) Define individual mobility models and explain different types of models ?

   b) Explain the architecture and header of IPv.4 protocol in detail.

5. a) Define wireless sensor network and explain its challenges and issues.

   b) Explain different sensor network routing protocols.

6. a) Define agent discovery and IP packet delivery in mobile computing and explain different requirements of mobile IP.

   b) Explain TCP with neat diagram and mention different advantages of TCP over adhoc network.

7. a) What are different location management algorithms ? Explain any *one* algorithm in detail.

   b) Explain different location management update principles.

C 3268

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 304 C—CYBER SECURITY

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each full questions carries 20 *marks.*

1. A Explain security awareness on email and internet usage policies.

   B Describe Bluetooth and Wi-Max security with necessary examples.

2. A With necessary diagram explain an intrusion detection system.

   B Describe satellite encryption security and IM system.

3. A Explain working of a web server and its vulnerability to attacks.

   B What is penetration testing ? Explain how it is performed in web application with examples.

4. A What is fooling a password change function in cloud security ? Explain with examples.

   B Explain about session token generation and its limitations in session management.

5. A Explain the algorithm for facial representation used in biometric authentication.

   B Describe any *one* algorithm for Voice Capturing and interpretation used in security.

6. A With a case study explain security in mobile telecommunication networks.

   B With example illustrate a mobile security internet system and its operation.

7. A Describe MAC Hooding and ARP poisoning.

   B Explain with necessary diagram a SPI Frame work for web application.

C 3267

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L18 304 B—DIGITAL IMAGE PROCESSING

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each full questions carries 20 *marks.*

1. A) Describe how an image is digitized by sampling and quantization and explain about checker board effect and false contouring with a neat sketch. (10 marks)

   B) Explain histogram equalization method of image enhancement. (10 marks)

2. A) Give an account on High-pass and Low-pass filters in frequency domain. (10 marks)

   B) Discuss the image smoothing filter with its model in the spatial domain. (10 marks)

3. A) Explain the properties of 2D Fourier transform. (10 marks)

   B) Discuss the image smoothing filter with its model in the spatial domain. (10 marks)

4. A) What is image compression ? Explain any four variable length coding compression schemes. (10 marks)

   B) Explain opening and closing operation with suitable examples. (10 marks)

5 A) Explain region-based segmentation and region growing algorithm. (10 marks)

   B) What is the objective of image segmentation ? Explain the role of thresholding techniques in image segmentation in detail. (10 marks)

6. A) Write short note on Prewitt, Robert's and Sobel edge detectors. (10 marks)

   B) Explain any two morphological filtering algorithms. (10 marks)

7. A) Explain the types of Gray level transformation used for image enhancement. (10 marks)

   B) Describe the elements of visual perception. (10 marks)

C 3266

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 304—A BIG DATA TECHNOLOGIES

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each full questions carries 20 *marks.*

1. a) Discuss the four dimensions of Big data.

   b) Distinguish between structured, unstructured and semi-structured data.

2. a) What is Big data Analytics ? Explain the various applications of Big Data Analytics in Business.

   b) Explain the various text analytics tools for big data.

3. Distinguish between :

   (i) Vectors and lists in R.

   (ii) Array and Data Frames in R.

   (iii) Bar Chart and Histograms.

   (iv) Box plots and Scatter plots.

4. (a) What is meant by Hadoop ? Explain Hadoop Distributed File system.

   (b) Discuss the various Map reduce Applications.

5. (a) With examples explain the various Data Querying features in Hive.

   (b) Discuss various visual Data Analytics techniques.

6. Write short notes on :

   (i) Document Databases.

   (ii) Columnar Databases.

   (iii) Graph Databases.

   (iv) Spatial Databases.

7. (a) What is meant by big data analytics framework ? Explain its characteristics.

   (b) Write an R program to sort a list of names in an array in alphabetical order.

C 3265

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 303—PRINCIPLES OF COMPILERS

Time : Three Hours | Maximum : 100 Marks

Answer any **five** *full questions.*

Each full questions carries 20 *marks.*

1. (A) Explain the subset construction of a DFA from an NFA.

   (B) Compare and contrast the role of compilers, translators and interpreters in compiling.

2. (A) Explain Recursive descent parsing LL in syntax analysis.

   (B) Explain how is pruning handled in syntax analysis and reduce non-recursive grammars.

3. (A) Explain DAG three address code generation in directed translation.

   (B) Describe Quadruples with examples in intermediate code generation.

4. (A) Explain run time memory into code and data areas.

   (B) With examples explain heap management techniques in run time environments.

5. (A) Describe data flow schemas on basic blocks of code generation.

   (B) Write basic Machine Instruction Operations for code generation.

6. (A) Explain Operator precedence parsing in syntax analysis.

   (B) Describe data flow analysis in code optimization.

7. (A) Explain input buffering with buffer pairs in detail.

   (B) Explain the importance of code generation in compiler modelling.

(5 × 20 = 100 marks)

C 3264

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L18 302—WIRELESS COMMUNICATION

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each question carries 20 *marks.*

1. A) List out the difference between 1G and 2G systems. Explain 4G frequencies for radio transmission. (10 marks)

   B) What are the different types of multiple access techniques ? Explain briefly each technique. (10 marks)

2. A) What do you mean by GSM ? Compare GSM and CDMA. (10 marks)

   B) Explain the architecture, location and handoff management in GPRS network. (10 marks)

3. A) Define Packet delivery. Explain Tunneling and Encapsulation. (10 marks)

   B) Define Mobile Transport Layer. List and explain problems with Mobile IP. (10 marks)

4. A) What is an ad-hoc network ? Explain why ad-hoc networks are needed. (10 marks)

   B) Compare Ad-hoc Networks and Wireless LAN. List the types of hybrid routing protocols. (10 marks)

5. A) What is Wireless Application Protocol (WAP) ? Write the principles of operations in WAP. (10 marks)

   B) Define in brief, "Wireless Application Environment (WAE)". Write an overview of WAE. (10 marks)

6. A) Explain the common wireless cellular network components with neat block diagram. (10 marks)

   B) Describe the various benefits of Code Division Multiple Access (CDMA) technology. (10 marks)

7. A) What are the functions of physical layer of IEEE 802.11 system ? Write the expansion for WiMAX and features of the system. (10 marks)

   B) List and explain three types of service provided by GSM. (10 marks)

C 3263

Name.....

Reg. No.....

THIRD SEMESTER M.C.A. (LATERAL ENTRY) DEGREE [REGULAR] EXAMINATION, APRIL 2021

M.C.A. (Lateral Entry)

MCA L 18 301—COMPUTER GRAPHICS

Time : Three Hours Maximum : 100 Marks

Answer any **five** *full questions.*
Each full questions carries 20 *marks.*

1. A Describe about the application of computer graphics in animation.

   B Explain the working of color CRT with a neat sketch.

2. A Explain midpoint circle drawing algorithm.

   B Describe the scan line polygon Filling algorithm.

3. A How homogeneous co-ordinates are used in computer graphics ? Explain with equations for all the three basic transformations.

   B Explain Cohen Sutherland line clipping algorithm.

4. A Compare the orthographic and oblique types of parallel projection.

   B Explain any *two* visible surface detection methods.

5. A What are the different animation techniques ? Explain each one.

   B What is Kinematics ? Explain the differences between Kinematics and dynamics. Also give an example for dynamics.

6. A Give an account on raster scan and random scan display devices.

   B Give an account on Morphing.

7. A What are the different categories of Hat panel display devices ? Explain with example.

   B What are the advantages of 3D graphics ? Describe briefly about painter's algorithm for hidden surface removal.