

### B. C. A. (Part II) EXAMINATION, 2014

Paper Sixth

### COMPUTER NETWORK AND INTERNET TECHNOLOGY

Time : Three Hours ]

[ Maximum Marks: 100

**Note:** Attempt any *two* parts from each question. All questions carry equal marks.

#### Unit-I

- (a) What do you mean by protocol, services and interfaces? Explain network criteria and applications of computer network.
  - (b) What do you mean by data transmission? Explain different types of transmission mode with suitable example.
  - (c) What is computer network ? Compare different categories of computer network.

### Unit-II

- (a) What do you mean by reference model ? Compare the OSI and TCP/IP reference model.
  - (b) What is IP address? Explain the different classes of IP addressing.
  - (c) What do you understand by ISO? Write the function of layers of OSI reference model.

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#### Unit-III

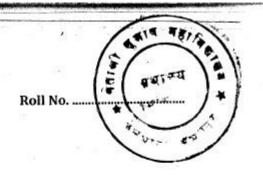
- (a) Explain ASK, PSK and FSK of data communication in brief.
  - (b) Explain the process of converting analog signal to digital signal.
  - (c) Convert binary bits 10110 to digital signals using different encoding scheme.

### Unit-IV

- (a) Give some important security considerations with CGI programs. Explain any two of them.
  - (b) Draw and explain the architecture of Internet. Also define the term 'www'.
  - (c) Design a webpage using table, form, images and frames of HTML with suitable example.

### Unit-V

- (a) How to create a Java applet ? Explain with suitable example.
  - (b) Explain with examples of the types of Javascript functions.
  - (c) Write short notes on the following:
    - (i) DHTML
    - (ii) Web Server



### B. C. A. (Part II) EXAMINATION, 2014

Paper Fourth
DBMS (ORACLE, SQL)

Time: Three Hours]

[ Maximum Marks: 100

[ Minimum Pass Marks: 40

Note: Attempt any two parts from each question. All questions carry equal marks.

- 1. (a) What are the various data models used in DBMS?
  - (b) What are the roles of database administration?
  - (c) What is the use of database system?
- 2. (a) What is the difference between strong and weak entity set?
  - (b) Define specialization and generalization with example.
  - (c) Construct an ER-diagram for hospital management, take appropriate, attributes, entity sets and relationships.
- (a) What are the different types of joins? Brief with example.

P. T. O.

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- (b) What is the concept of primary key and foreign key? Explain with example.
- Consider the following relation:
   Teacher (college-id, tname, class, subject)
   Student (college-id, rollno, sname, class,) percent)
   Civen a relational algebra expression for each of the following queries:
  - (i) Select all students of class "B. Com I sem."
  - (ii) Find teacher name who teach the student named as "Si".
  - (iii) Find all first division students of college named as "JEC".
  - (iv) Find total number of teachers.
- 4. (a) What are the anomalies in 2NF and 1NF? Brief.
  - (b) Explain functional dependencies with example.
  - (c) What is normalization? What is the difference between BCNF and DKNF?
- 5. (a) Write the command to create table student having attributes stu\_name, rollno, class, age, percent and takes rollno as primary key. Write SQL command to select all first division students.:
  - (b) Explain the following:
    - (i) Alter table
    - (ii) Update

- (c) Consider the following relational schema:
  - Doctor (did, dname, hosid, pid)

Hospital (hosid, hosname)

Patient (pid, pname, disease, admitdate, discharge\_date)

Write SQL command for the following query:

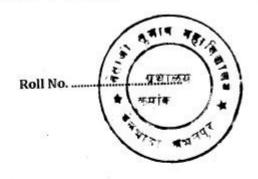
- (i) Find the name of all doctors and their hospital.
- (ii) Find the name of doctors who are treating more than 10 patients.
- (iii) Find the number of patient who are admitted for more than 5 days.
- (iv) Find the name of doctor who is treating patient whose name is "XYZ".

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# B. C. A. (Part II) EXAMINATION, 2014

Paper Second

## DIFFERENTIATION AND INTEGRATION

Time: Three Hours]

Maximum Marks: 50

Note: Attempt any two parts from each question. All questions carry equal marks.

### Unit-I

- 1. (a) If  $y = e^{a \sin^{-1} x}$ , prove that:  $(1 - x^2) y_{n+2} - (2n+1) x y_{n+1} - (n^2 + a^2) y_n = 0$ 
  - (b) Expand  $e^x$  in powers of (x-1).
  - (c) Expand e<sup>x cos x</sup> by Maclaurin's theorem.

### Unit-II

2. (a) Find the asymptotes of the curve:

$$x^3 + y^3 = 3 axy$$

(b) Find the radius of curvature at the point  $(r, \theta)$  of the curve:

$$\theta = \frac{\sqrt{r^2 - a^2}}{a} - \cos^{-1}\left(\frac{a}{r}\right)$$

(c) Show that the points of inflexion of the curve  $y^2 = (x-a)^2 (x-b)$  lie on the line 3x + a = 4b.

Unit-III

3. (a) If  $\theta = t^n e^{-r^2/4t}$ , what value of n will make:

$$\frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2\frac{\partial\theta}{\partial r}\right) = \frac{\partial\theta}{\partial t}?$$

(b) If:

$$u = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$$

then show that:

$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \tan u$$

(c) If:

$$u = x^{2} + y^{2} + z^{2}$$

$$v = x + y + z$$

$$w = xy + yz + zx$$

show that the Jacobian  $\frac{\delta \left(u, v, w\right)}{\delta \left(x, y, z\right)}$  vanishes.

Find the relation between u, v and w.

4. (a) Evaluate:

$$\int \frac{2x+5}{\sqrt{x^2+3x+1}} \, dx$$

(b) Evaluate:

$$\int \frac{x \tan^{-1} x}{(1 + x^2)^{3/2}} \, dx$$

(c) Find the value of:

$$\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} \, dx$$

5. (a) Evaluate:

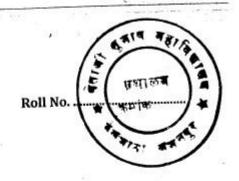
$$\int_{0}^{1} \int_{y^{2}}^{1} \int_{0}^{1-x} x \, dy \, dx \, dz$$

(b) Change the order of integration in :

$$1 = \int_0^1 \int_y^1 x^2 \cos(x^2 - xy) \, dy \, dx$$

(c) Find the length of the parabola  $y^2 = 4 ax$  from the vertex to an extremity of the latus-rectum.

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# B. C. A. (Part II) EXAMINATION, 2014

### Paper Third DATA STRUCTURE

Time: Three Hours]

[ Maximum Marks: 50

Note: Attempt any two parts from each question. All questions carry equal marks.

- (a) Define data structure. Categorise them in detail.
  - (b) What is a generic abstract data type and how is it different from the abstract data types?
  - (c) Differentiate between array of pointers and pointer to pointer.
- (a) Calculate the address of X [4] [3] in a two-dimensional array X [1 ........... 5] [1 .......... 4] stored in row major order. Assume the base address to be 1000 and each element requires 4 words of storage.
  - (b) What is record? Explain record structures.
  - (c) Show the bubble sort steps for the following numbers:

### 10, 72, 25, 04, 15, 21

 (a) Explain and write an algorithm to insert a note into a linked list at various positions.

P. T. O.

- (b) What is priority queue ? Explain.
- (c) What is Stack? Explain array representation of stack.
- 4. (a) Explain various steps for AVL search tree insertion.
  - (b) A tree (binary) T has 9 nodes. The in-order and preorder traversal of T yields the following sequence of nodes:

In-order	Pre-order
5	6
1	1
3	5
9	9
6	3
8	4
4	2
2	7
7	2

- (c) Write the types of tree. Explain the procedure of deleting in binary tree.
- 5. (a) Explain multiway merge sort.
  - (b) Write an algorithm to sort list of elements using selection sort technique.
  - (c) Write an algorithm to sort a list of elements using insertion sort technique.

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# B. C. A. (Part II) EXAMINATION, 2014

Paper Eighth
PRINCIPLES OF MANAGEMENT

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Time: Three Hours ] [ Maximum Marks: 50 Note: Attempt all questions. All questions carry equal marks.

#### Unit-I

 "Increasing industrial complexities have contributed in the development of management." Do you agree?

Or

Discuss critically the contribution and philosophy of Taylor as regards to management.

### Unit-II

Define planning. Discuss its objective and point out the characteristics of effective planning.

Or

Write short notes on the following:

- (a) Planning process
- (b) Feasibility report

#### Unit-III

3. Differentiate between formal and informal organisation. What policy should be adopted by management towards informal organisation?

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What is Span of Management? Explain the mertis and demerits of narrow and wide span of management.

### Unit-IV

 What do you understand by leadership? Describe briefly the various styles of leadership.

Or

Write short notes on the following:

- (a) McGregor's Theory X and Theory Y
- (b) Elements of effective communication

### Unit-V

What do you understand by decision-making? Discuss the process of scientific decision-making.

Or

Discuss the importance and limitations of control.

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## B. C. A. (Part II) EXAMINATION, 2014

Paper Seventh

### LINUX

Time: Three Hours]

[ Maximum Marks: 50

Note: Attempt all the *five* questions. All questions carry equal marks. Attempt any *two* parts from each question.

- 1. (a) Briefly describe the architecture of Linux.
  - (b) What are the different distributions of Linux?
  - (c) Write the command for the following:
    - Write the command to display current user of the system.
    - (ii) List the file whose name is ending with 'h'.
    - (iii) Write the command to give read, write and execute permission to the owner only.
    - (iv) Write command for pattern matching.
    - (v) Write a command to change directory.
- 2. (a) What is vi editor? How can we switch from text mode to command mode?
  - (b) Explain the following:
    - (i) Command macros
    - (ii) Yanking
  - (c) Explain E<sub>mac</sub> with its features.

P. T. O.

- (a) Write a shell script to calculate the sum of digits of entered number.
  - (b) What are the functions performed by shell and types of shell?
  - (c) Write a shell script to find the smallest number among three numbers.
- 4. (a) Write short notes on the following:
  - (i) X-windows
  - (ii) FVWM and PVWM 95
  - (b) Write the task performed by Windows Manager.
  - (c) Explain the working environment of GNOME.
- 5. (a) What is the role of system administrator?
  - (b) What are the different access permission?
  - (c) Write a step to create user in LINUX and explain user and group.



### B. C. A. (Part II) EXAMINATION, 2014

Paper First

### NUMERICAL ANALYSIS

Time: Three Hours]

[ Maximum Marks : 50

Note: Attempt any two parts from each question. All questions carry equal marks. Simple/scientific calculator is allowed.

#### Unit-I

- 1. (a) Find the root of the equation  $x^3 x 4 = 0$  using the bisection method.
  - (b) Find the root of  $x^2 5x + 2 = 0$  correct of five decimal places by Newton-Raphson method.
  - (c) Solve the equation:

$$6x^4 - 13x^3 - 35x^2 - x + 3 = 0$$

one root being  $2 - \sqrt{3}$ .

### Unit-II

2. (a) Solve the equations:

$$x + 4y - z = -5$$

$$x + y - 6z = -12$$

$$3x-y-z=4$$

using Gauss-Jordan method.

(b) Solve the system of linear equations:

$$x+2y+3z=5$$

$$2x + 8y + 22z = 6$$

$$3z + 22y + 82z = -10$$

using the Cholesky method.

(c) Find the inverse of the matrix:

$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$

by Gauss-Jordan method.

Unit-III

3. (a) Interpolate f(2) from the following data:

x	f (x)	
1	7	
2	?	
3	13	
4	21	5
5	37	

and explain why the value obtained is different from that obtained by putting x = 2 in the expression  $2^x + 5$ .

(b) Compute f (2, 4, 9, 10) when:

$$f(x) = x^4 + x^2 + 1$$
.

(c) Find the value of x correct to two decimal places lying between 15 and 20 satisfying the equation:

$$x^2 + 250 \log_{10} x = 635$$

Unit-IV

4. (a) Given:

Х	y = f(x)	
0.1	1.10517	
0.2	1.22140	
0.3	1-34986	
0.4	1-49182	

Find 
$$\frac{dy}{dx}$$
 and  $\frac{d^2y}{dx^2}$  at  $x = 0.4$ .

(b) Show that:

$$\int_0^1 \frac{dx}{1+x} = 0.69315.$$

(c) Using Simpson's '1/3' rule evaluate:

$$\int_{0.5}^{0.7} x^{1/2} e^{-x} dx.$$

Unit-V

5. (a) Use Picard's method to approximate y when  $x = 0 \cdot 1, x = 0 \cdot 2$ , given that:

$$y = 0, x = 0, \frac{dy}{dx} = x + y$$

- (b) Solve  $\frac{dy}{dx} = 1 2xy$  given that y(0) = 0 by Taylor's series
- (c) Use Runge-Kutta method of fourth order to solve: y' = xy for  $x = 1 \cdot 2$ . Initially x = 1, y = 2 (take  $h = 0 \cdot 1$ ).

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