

Roll No.

HD-2862

B. C. A. (Part II)

EXAMINATION, March-April, 2025

(Old Course)

Paper First

CALCULUS AND DIFFERENTIAL EQUATIONS

Time : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 27

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

Unit—I

1. (a) Evaluate :

$$\lim_{x \rightarrow 2} \frac{x-2}{|x-2|}$$

if it exists.

P. T. O.

- (b) Test the continuity of the following function at $x=0$:

$$f(x) = \begin{cases} \frac{e^{1/x} - 1}{e^{1/x} + 1}, & x \neq 0 \\ 0, & x = 0 \end{cases}$$

- (c) Is the following function differentiable at $x=0$?

$$f(x) = \begin{cases} x \tan^{-1} \frac{1}{x}, & \text{when } x \neq 0 \\ 0, & \text{when } x = 0 \end{cases}$$

Unit—II

2. (a) Differentiate the following function with respect to x :

$$\tan^{-1} \left(\frac{\sqrt{1+x^2} + 1}{x} \right)$$

- (b) If $y = (\sin^{-1} x)^2$, prove that :

$$(1-x)^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} = 2$$

- (c) Find all the points of local maxima and minima and the corresponding maximum and minimum values of the function :

$$f(x) = -\frac{3}{4}x^4 + 2x^3 + \frac{9}{2}x^2 + 100$$

Unit—III

3. (a) Solve the integration :

$$\int \tan^{-1} \left(\sqrt{\frac{1 - \cos 2x}{1 + \cos 2x}} \right) dx$$

- (b) Solve :

$$\int \frac{x^3}{(x^2 + 1)^3} dx$$

- (c) Evaluate the integral :

$$\int x^5 \cos(x^3) dx$$

Unit—IV

4. (a) Evaluate the integral :

$$\int_0^{3\pi/2} \sqrt{1 - \cos 2x} dx$$

- (b) Evaluate the following definite integral :

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

(c) Evaluate :

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

Unit—V

5. (a) Find the differential equation by family of curves :

$$y = Ae^{3x} + Be^{5x}$$

for the different values of A and B.

- (b) Solve the differential equation :

$$e^y (1 + x^2) dy - \frac{x}{y} dx = 0$$

- (c) Solve the differential equation :

$$(x+1) \frac{dy}{dx} = 2xy,$$

given that $y(2) = 3$.

x x x x x

Roll No.

HD-2863

B. C. A. (Part II)

EXAMINATION, March-April, 2025

(Old Course)

Paper Second

DATABASE MANAGEMENT SYSTEM

Time : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 27

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

Unit—I

1. (a) Explain three-tier architecture of DBMS.
- (b) Write database languages with example.
- (c) Write short notes on the following :
 - (i) Data model
 - (ii) DBMS users

P. T. O.

Unit—II

2. (a) Explain the different types of attributes with notation and example.
- (b) What is Entity ? Explain the different types of relationship in E-R Model.
- (c) Explain Specialization, Generalization and Aggregation.

Unit—III

3. (a) Explain selection, projection, cross product, set difference and rename operations in relational algebra.
- (b) Explain different types of relational calculus.
- (c) Write short notes on the following :
 - (i) Embedded query language
 - (ii) Join

Unit—IV

4. (a) Explain insert anomalies, update anomalies and delete anomalies in normalization.
- (b) Explain 2NF, 3NF and BCNF.
- (c) Explain Denormalization and EF Codd's rules.

Unit—V

5. (a) What is SQL ? Explain DDL and DML in SQL.
- (b) Explain integrity constraint and triggers.
- (c) Explain the following in SQL with example :
- (i) Having
 - (ii) Order by
 - (iii) View
 - (iv) Group by
 - (v) Where

x x x x x

Roll No.

HD-2864

B. C. A. (Part II)

EXAMINATION, March-April, 2025

(Old Course)

Paper Third

PROGRAMMING IN C++

Time : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 27

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

UNIT—I

1. (a) What is Literal constant ? Explain in detail with suitable example of valid and invalid literal constant.
- (b) What is bitwise operator ? Explain in detail with suitable example. Also explain the role of precedence and associativity of these operators.

P. T. O.

- (c) What is decision making statement ? Explain the syntax and working of switch statement with suitable example.

UNIT—II

2. (a) What is structure ? Explain the need of structure in detail with suitable program.
- (b) What is function prototype ? Explain different types of function's argument with suitable example.
- (c) What is Return type in function ? How the different types of data can be returned by function ? Explain in detail.

UNIT—III

3. (a) What is dynamic memory allocation ? Explain memory allocation and de-allocation operator in detail with suitable example.
- (b) What is access modifier ? Explain the use of different types of modifier with suitable example.
- (c) What is destructor ? Explain its use with suitable example also explain the use of copy constructor.

UNIT—IV

4. (a) What is pointer to object ? Explain its uses in detail.
- (b) What is derived class ? Explain the working of parameterized constructor in drive class with suitable example.
- (c) What is pointer ? Explain its type and operation in detail.

UNIT—V

5. (a) What is virtual function ? Explain its using in function overriding.
- (b) What is operator overloading ? Write a simple program to overload '+' operator.
- (c) What is Friend class ? Explain its uses with suitable program.

Roll No.

HD-2865

B. C. A. (Part II)

EXAMINATION, March-April, 2025

(Old Course)

Paper Fourth

COMPUTER NETWORKS

Time : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 27

Note : Answer any *two* parts from each question. Each question carries equal marks.

Unit—I

1. (a) Define computer network ? Give differences between Computer Networks and Distributed Systems.

P. T. O.

- (b) Explain network architecture and differentiate between point-to-point and multi-point models.
- (c) What is the difference between LAN, MAN and WAN ? Write properties of each one.

Unit—II

- 2. (a) By describing transmission of data differentiate between analog and digital transmission in computer networks.
- (b) What do you understand by Modem Standards ? Explain it.
- (c) Write a note on digital data transmission.

Unit—III

- 3. (a) What do you know about ISO organization ? Write its role also.
- (b) Describe the main objectives of the OSI reference model.
- (c) What are the differences between logical addressing and physical addressing in the OSI model ? Explain it through any example.

Unit—IV

4. (a) What is the TCP/IP model ? Explain its importance in modern networking.
- (b) Describe IP addressing. Write how it works in the TCP/IP model ?
- (c) Explain the architecture of Client Server model.

Unit—V

5. (a) Define network security. Explain its importance in modern communication systems.
- (b) Explain the working of symmetric and asymmetric encryption with suitable examples.
- (c) With a neat sketch explain the steps of Data Encryption Standard to encrypt plain text to cipher text.

x x x x x

Roll No.

HD-2866

B. C. A. (Part II)

EXAMINATION, March-April, 2025

(Old Course)

Paper Fifth

OPERATING SYSTEMS WITH LINUX

Time : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 27

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

Unit—I

1. (a) What is the need of operating system ?
Explain it.
- (b) Explain multi-programming and multiprocessing system.
- (c) Explain the batch processing and spooling in operating system.

P. T. O.

Unit—II

2. (a) Explain process control block.
- (b) What is scheduling ? Explain the types of scheduler.
- (c) Explain the Round Robin Scheduling.

Unit—III

3. (a) Explain the concept of virtual memory.
- (b) A LRU page replacement is used with the four page frame and eight pages. How many faults will occur with reference string is 0172327103 if the four frames are initially empty ?
- (c) What is segmentation ? How does it differ from paging ?

Unit—IV

4. (a) Explain the features of Unix operating system.
- (b) Explain Vi-editor.
- (c) Explain the following commands :
- (i) who
 - (ii) pwd
 - (iii) ls
 - (iv) mv
 - (v) cp

[3]

Unit—V

5. (a) Write a shell program for greatest number in between two numbers.
- (b) What is shell ? Explain its features.
- (c) Explain decision-making structure in shell programming.

x x x x x

Roll No.

HD-2867

B. C. A. (Part II)
EXAMINATION, March-April, 2025
(Old Course)

FOUNDATION COURSE

Paper Sixth

(English Language)

Time : Three Hours

Maximum Marks : 80

Minimum Pass Marks : 27

Note : Answer all questions. The figures in the right-hand margin indicate marks.

1. Answer the following questions : $15 \times 2 = 30$

- (a) What are the identifying features of Indian art ?
- (b) What do you mean by the art ?
- (c) Describe the different styles of Indian dance.
- (d) Mention the five Vedangas.

P. T. O.

- (e) Write a short note on Indian literature.
- (f) What is the content of "Atharva Veda" ?
- (g) Who wrote Mahabharata ?
- (h) Write a short note on Hindu Trinity.
- (i) What happened in 1857 ?
- (j) Write a short note of the partition of Bengal.
- (k) What are the main features of Indian Constitution ?
- (l) How many duties are enumerated in the Indian Constitution ?
- (m) Which state sends the maximum number of members to Lok Sabha ?
- (n) What do you mean by communication ?
- (o) How do you prepare for an interview ?

Unit-I

7. Write a brief note on Indian Archaeology. 10

Or

Write a note on Indian Music.

Unit-II

8. Write a brief story of Mahabharata . 10

Or

Mention the *five* Vedangas and explain it.

[3]

Unit-III

9. Write a note on Civil Disobedience Movement. 10

Or

What is 'National Consciousness' ?

Unit-IV

10. Describe the main characteristics of Indian Constitution. 10

Or

Discuss the Fundamental Rights.

Unit-V

11. What is Group Discussion? Explain 10

Or

Give a brief idea of job interview.

x x x x x