

NBCA/M-26

37501

OBJECT ORIENTED PROGRAMMING USING C++

Paper-B23-CAP-201

(BCA) (CCA2)

Time : Three Hours]

[Maximum Marks : 50

Note : Question No. 1 is compulsory. Attempt any *four* questions out of units I, II, III & IV by selecting atleast *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. (a) Define streams in C++
- (b) What is inline function?
- (c) Differentiate between pointer and reference.
- (d) What is abstraction?
- (e) Write short note on Static data members.
- (f) Write Syntax for Copy constructor.
- (g) Differentiate between Unary vs. Binary operators.
- (h) Define Virtual base class.
- (i) What are uncaught exceptions?
- (j) Explain Divide by zero error. (1×10=10)

UNIT-I

2. (a) Explain how overloaded shift operator and member functions are used for Input-Output Operations in C++? 05

- (b) Write a program in C++ to calculate the area of circle, rectangle and triangle using function overloading. 05
3. (a) Explain the concept of structure and union in C++. Also differentiate them with the help of proper example. 05
- (b) Write a program to demonstrate the use of cascaded insertion and extraction operators in C++. 05

UNIT-II

4. What do you mean by the data members and member functions of a class? Explain how you can define a member function outside a class by taking example? 10
5. (a) What do you mean by copy constructor in C++? What are different situations in which copy constructor is applicable? 05
- (b) Define Scope resolution operator in C++. Also list its uses using suitable examples. 05

UNIT-III

6. (a) What do you mean by Operator Overloading? Which operators in C++ cannot be overloaded? Write syntax to overload binary operator with friend function. 05
- (b) Explain how can you manipulate string using operators in C++. 05
7. (a) What do you mean by abstract keyword in C++? Explain why abstract classes are used in C++. 05
- (b) Write a program to differentiate and demonstrating multiple and multilevel inheritance techniques in C++. 05

UNIT-IV

8. (a) Explain virtual function in C++. How it differs from Pure Virtual function? 05
- (b) Write a program to demonstrate use of Catch All in Exception Handling. 05
9. (a) Explain nested try block in Exception Handling. Discuss the order in which exception handling mechanism takes place in C++. Demonstrate by example. 05
- (b) What are different type of polymorphism in C++? Explain with the help of proper example. 05
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Roll No.

Total Pages : 3

37502

NBCA/M-26

INTRODUCTION TO WEB TECHNOLOGIES

Paper : B23-CAP-202

(BCA) (CC-B2)

Time : Three Hours]

[Maximum Marks : 50

Note : Question No. 1 is compulsory. Attempt any *four* questions out of units I, II, III & IV by selecting atleast *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. (a) Define ® © named entities in HTML.
- (b) What is a URL?
- (c) What is a web browser? Name any two.
- (d) Define two Empty Tags.
- (e) Explain <pre> tag.
- (f) What is JavaScript?
- (g) Explain Priority of Inline, Internal and External CSS.
- (h) Using which tag and attribute you can change background colour of a web page?
- (i) Differentiate between == and === in java script.
- (j) Explain let, var and const in java script. (1×10=10)

UNIT-I

2. (a) Define the term WWW. Explain the evolution and history of the WWW. (5)
(b) What do you mean by web client? Explain common types of Web Clients? (5)
3. Before designing a website is it necessary to plan a website. Justify your answer. Explain what steps are carried out during website planning process? (10)

UNIT-II

4. Explain basic Structure of HTML document. Also explain various block level elements and associated attributes with examples.
5. (a) Design a simple Student Registration Form for University using various fields of <form> tag in HTML. (5)
(b) Explain Ordered and Unordered List in HTML. (5)

UNIT-III

6. What do you mean by CSS? Explain various types of CSS and their syntax with examples. (10)
7. Discuss CSS Box Model using suitable example. How browser determines element appearance using CSS Box model. (10)

UNIT-IV

1. Explain the features and applications of Java-Script. How Java-Script is used to validate the data? (10)
 2. Differentiate between static and dynamic web pages with examples. Which type of web pages are more interactive? (10)
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Total Pages : 3

37503

NBCA/M-26

CONCEPTS OF OPERATING SYSTEMS

Paper : B23- CAP-203

(CC-C2)

(BCA)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Attempt all *five* questions :

- (a) Define the real time operating system.
- (b) What is thread? How it is different from Process?
- (c) What is Semaphore?
- (d) What is Swapping?
- (e) Define Seek Time. (5×2=10)

UNIT-I

2. Explain Operating System Structure and compare Monolithic and Microkernel approaches. (10)

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[P.T.O.
5/6

3. (a) What is Process Control Block? Explain different types of components of PCB. (5)
- (b) Explain inter process communication with different methods. (5)

UNIT-II

4. Explain CPU Scheduling criteria and different levels of scheduling. (10)
5. (a) What is Deadlock? Discuss different necessary conditions of deadlock. (5)
- (b) Explain how semaphores is used to solve synchronization problem? (5)

UNIT-III

6. Differentiate the following :
- (a) Fixed and Variable Partitioning.
- (b) Paging and Segmentation. (5×2=10)
7. Consider the following reference string :
- 1, 2, 3, 4, 2, 1, 6, 5, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.
- How many page fault occur for :
- (i) LRU Replacement.
- (ii) FIFO Replacement.

Note : Initially all frames are empty. Best to assume 4 frames. (10)

UNIT-IV

- (a) Explain Directory Structures with advantages and disadvantages. (5)
 - (b) Explain different techniques of Free Space Management. (5)
 - What is Disk Scheduling? Describe the LOOK and C-LOOK algorithms with Example. (10)
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Roll No.

Total Pages : 4

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37504

MATHEMATICAL FOUNDATIONS

FOR COMPUTER SCIENCE-II

Paper – B23-CAP/CTS/CAL/CDS-204

(CC-M2)

Time : Three Hours]

[Maximum Marks : 20

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question No. 9 is compulsory question.

नोट : प्रत्येक इकाई से एक प्रश्न को चुनते हुए कुल पाँच प्रश्न कीजिए। प्रश्न संख्या 9 अनिवार्य प्रश्न है।

UNIT-I (इकाई-I)

1. (a) Evaluate $\int \frac{1}{\sqrt{x+1} + \sqrt{x+3}} dx$. 2
- (b) Represent the following data by percentage sub-divided bar diagram : 2

Subject	No. of Students Section A	No. of Students Section B
English	25	60
Maths	40	84
Physics	35	56

(क) $\int \frac{1}{\sqrt{x+1} + \sqrt{x+3}} dx$ का मूल्यांकन कीजिए।

(ख) निम्नलिखित आंकड़ों को प्रतिशत उप-विभाजित बार आरेख द्वारा निरूपित कीजिए :

विषय	छात्रों की संख्या खण्ड अ	छात्रों की संख्या खण्ड ब
अंग्रेजी	25	60
गणित	40	84
भौतिकी	35	56

2. Construct a frequency polygon for the data :

4

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Students	10	20	40	30	15	10

आंकड़ों के लिए एक आवृत्ति बहुभुज का निर्माण कीजिए :

अंक	0-10	10-20	20-30	30-40	40-50	50-60
छात्र	10	20	40	30	15	10

UNIT-II (इकाई-II)

3. Calculate the median and mode of the data :

4

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Students	8	15	22	20	10	5

आंकड़ों की माध्यिका और बहुलक की गणना कीजिए :

अंक	0-10	10-20	20-30	30-40	40-50	50-60
छात्र	8	15	22	20	10	5

4. Find the mean deviation about mean and their coefficients for the data : 4

Marks	0-10	10-20	20-30	30-40	40-50
Students	5	8	15	16	6

दिए गए आंकड़ों के लिए माध्य के बारे में माध्य विचलन तथा उनका गुणांक ज्ञात कीजिए :

अंक	0-10	10-20	20-30	30-40	40-50
छात्र	5	8	15	16	6

UNIT-III (इकाई-III)

5. Find the Karl Pearson's coefficient of correlation between x and y from the data : 4

दिए गए आंकड़ों से x और y के बीच कार्ल पियर्सन का सहसंबंध गुणांक ज्ञात कीजिए :

x	3	4	8	9	6	2	1
y	5	3	7	7	6	9	2

6. Ten students secured following marks in Maths and Economics :

Maths	31	45	39	48	24	33	42	36	29	41
Economics	41	47	27	38	29	37	40	30	35	39

Compute their ranks in two subjects. Also, find the coefficient of rank correlation. 4

दस छात्रों ने गणित और अर्थशास्त्र में निम्नलिखित अंक प्राप्त किए :

गणित	31	45	39	48	24	33	42	36	29	41
अर्थशास्त्र	41	47	27	38	29	37	40	30	35	39

दोनों विषयों में उनके श्रेणी की गणना कीजिए। इसके अलावा, श्रेणी सहसंबंध गुणांक भी ज्ञात कीजिए।

UNIT-IV (इकाई-IV)

7. Determine the equation of a straight line which best fits the data : 4

उस सरल रेखा का समीकरण निर्धारित कीजिए जो आंकड़ों में सबसे सही बैठती हो :

x	1	2	3	4	5	6	7
y	9	8	10	12	11	13	14

8. Find the line of regression of x on y for the data : 4

दिए गए आंकड़ों के लिए x का y पर समाश्रयण रेखा ज्ञात कीजिए :

x	10	9	8	7	6	4	3
y	8	12	7	10	8	9	6

UNIT-V (इकाई-V)

Compulsory Question

(अनिवार्य प्रश्न)

9. (a) Write merits of median. 1
(b) Write demerits of mode. 1
(c) Define positive correlation and simple correlation. 1
(d) Write the demerits of Karl Pearson's coefficient of correlation method. 1
(क) माध्यिका के गुण लिखिए।
(ख) बहुलक के दोष लिखिए।
(ग) धनात्मक सहसंबंध और सरल सहसंबंध को परिभाषित कीजिए।
(घ) कार्ल पियर्सन के सहसंबंध गुणांक विधि के दोष लिखिए।

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PVAC/M-26

ENVIRONMENTAL STUDIES

Paper : B23-VAC-201

Time : Three Hours]

[Maximum Marks : 35

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

नोट : प्रत्येक इकाई से एक प्रश्न का चयन करते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question

(अनिवार्य प्रश्न)

1. Define the following :

निम्नलिखित को परिभाषित करें :

(a) Scope of environment studies.

पर्यावरण अध्ययन का दायरा।

(b) Consumers in an ecosystem.

एक पारिस्थितिकी तंत्र में उपभोक्ता।

(c) Endemic species.

स्थानिक प्रजातियाँ।

(d) Biological invasions.

जैविक आक्रमण।

(e) Contaminants.

संदूषक।

(f) Greenhouse gases.

ग्रीनहाउस गैसों ।

(g) Cyclone.

(7×1=7)

चक्रवात ।

UNIT-I (इकाई-I)

2. Describe the structure and function of a desert ecosystem with example. (7)

रेगिस्तानी पारिस्थितिकी तंत्र की संरचना और कार्य का उदाहरण सहित वर्णन करें ।

3. Write detailed notes on :

विस्तृत टिप्पणी लिखें :

(i) Energy flow in an ecosystem.

पारिस्थितिकी तंत्र में ऊर्जा प्रवाह ।

(ii) Role of sustainable development in environment conservation. (2×3.5=7)

पर्यावरण संरक्षण में सतत विकास की भूमिका ।

UNIT-II (इकाई-II)

4. Explain different methods of biodiversity conservation. (7)

जैव विविधता संरक्षण की विभिन्न विधियों की व्याख्या करें ।

5. Describe non-renewable energy sources and their impacts on environment. (7)

गैर-नवीकरणीय ऊर्जा स्रोतों और पर्यावरण पर उनके प्रभावों का वर्णन करें ।

UNIT-III (इकाई-III)

6. What do you understand by waste incineration? Write down its advantages and disadvantages. (7)

अपशिष्ट भस्मीकरण से आप क्या समझते हैं? इसके फायदे और नुकसान लिखिए।

7. Mention the causes and effects of soil pollution. (7)

मृदा प्रदूषण के कारणों एवं प्रभावों का उल्लेख करें।

UNIT-IV (इकाई-IV)

8. Describe the role of religions and cultures in environmental conservation. (7)

पर्यावरण संरक्षण में धर्मों और संस्कृतियों की भूमिका का वर्णन करें।

9. Explain the causes and impacts of drought. (7)

सूखे के कारण और प्रभाव स्पष्ट करें।

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BUSINESS COMMUNICATION

Paper-B23-SEC-214

Time Allowed : 3 Hours]

[Maximum Marks : 50

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

प्रत्येक इकाई में से एक प्रश्न का चयन करते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 अनिवार्य है। सभी प्रश्नों के समान अंक हैं।

Compulsory Question (अनिवार्य प्रश्न)

Write short notes on the following :

10

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए:

(a) Modern day channels of business communication.

व्यापारिक संचार के आधुनिक माध्यम।

(b) Role of press communique in Corporate world.

कॉर्पोरेट जगत में प्रेस विज्ञप्ति की भूमिका।

(c) Essentials of group communication.

समूह संचार के मूलभूत सिद्धांत।

- (d) Role of body language in business non-verbal communication.

व्यावसायिक अशाब्दिक संचार में शारीरिक भाषा की भूमिका।

UNIT-I (इकाई-I)

2. What can hamper an ideal business communication? How can such barriers be managed? 10

एक आदर्श व्यावसायिक संचार में कौन-कौन सी बाधाएँ आ सकती हैं? ऐसी बाधाओं को कैसे दूर किया जा सकता है?

3. What are prominent types of business communication? Which type is most ideal for mass communication? 10

व्यावसायिक संचार के प्रमुख प्रकार क्या हैं? जनसंचार के लिए कौन-सा प्रकार सबसे उपयुक्त है?

UNIT-II (इकाई-II)

4. Write a letter to your vendor showing displeasure for delay in sending consignment. 10

माल भेजने में देरी के लिए अपने विक्रेता को एक पत्र लिखकर अपनी नाराजगी व्यक्त कीजिए।

5. Draft a circular intended at calling a meeting to find out ways to revamp sales during recessionary period. 10

मंदी के दौर में बिक्री को पुनर्जीवित करने के तरीकों का पता लगाने के लिए एक बैठक बुलाने हेतु परिपत्र का मसौदा तैयार कीजिए।

UNIT-III (इकाई-III)

6. Assume yourself as attending an interview for Management Trainee in an FMCG company. What would you do to maximise your chances of success in the same? 10

मान लीजिए आप किसी FMCG कंपनी में मैनेजमेंट ट्रेनी के पद के लिए इंटरव्यू दे रहे हैं। ऐसे में आप अपनी सफलता की संभावनाओं को अधिकतम करने के लिए क्या करेंगे?

7. What is effective interviewing? What kind of interview would you take for hiring sales executives and why? 10

प्रभावी साक्षात्कार क्या होता है? बिक्री अधिकारियों की भर्ती के लिए आप किस प्रकार का साक्षात्कार लेंगे और क्यों?

UNIT-IV (इकाई-IV)

8. Why is Public Relation so important in modern day business settings? What are its various variants? 10

आधुनिक व्यावसायिक परिवेश में जनसंपर्क इतना महत्वपूर्ण क्यों है? इसके विभिन्न रूप क्या हैं?

9. Being a freelancer, how would you gear yourself up for your Ted Talk? How would you ensure that such a talk is a huge hit among participants? 10

एक फ्रीलांसर होने के नाते, आप अपने टेड टॉक के लिए खुद को कैसे तैयार करेंगे? आप यह कैसे सुनिश्चित करेंगे कि आपका टॉक प्रतिभागियों के बीच बेहद लोकप्रिय हो?

37541

NBCA/M-26

DATA STRUCTURES AND APPLICATIONS

Paper : B23-CAP-401

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt *five* questions in all. Q. No. 1 is compulsory.
Attempt *four* more questions selecting at least *one* question
from each unit.

Compulsory Question

1. Answer the following questions in brief :

- (a) What is the difference between linear and non-linear data structures?
- (b) Differentiate ordinary array and sparse array.
- (c) What is recursion? Which data structure is used to implement it?
- (d) Briefly explain Reverse Polish Notation.
- (e) Write down the traversal methods of binary tree.

(5×2=10)

UNIT-I

2. Give the algorithms for insertion and deletion of an element from a 1-D Array. (10)

3. Explain the formulae to calculate the address of any element of a linear array and 2-D array given their base addresses. Give example for each of them. (10)

UNIT-II

4. Describe various operations that can be applied on strings. (10)
5. Write algorithms on “searching and element” and “deleting a node” in doubly linked list. (10)

UNIT-III

6. What do you understand by Push and Pop operation on stack? Give example to both algorithms. (10)
7. What is a Priority queue? Write the application areas of priority queue. (10)

UNIT-IV

8. What is binary search tree? Give algorithm for inserting a node in binary search tree. (10)
9. Explain algorithm of Bubble Sort and explain with the help of appropriate example. (10)
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Total Pages : 2

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NBCA/M-26

FRONT-END DEVELOPMENT

Paper : B23-CAP-402

(BCA)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory.

Compulsory Question

1. (a) Define prototype.
- (b) What are modifiers in regular expression?
- (c) What is the difference between Mouse events and Keyboard events?
- (d) What is a regular expression?
- (e) What is event bubbling? (2×5=10)

UNIT-I

2. Explain objects in JavaScript. Discuss object creation methods and constructor functions with examples. (10)
3. What are Regular Expressions and what are its advantages in JavaScript? (10)

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UNIT-II

4. Explain JavaScript event handling and event listeners. (10)
5. Explain Document Object Model (DOM) and its methods. Describe how documents are manipulated using DOM. (10)

UNIT-III

6. What is Browser Object Model (BOM) window object and what are its methods? (10)
7. How forms are handled in JavaScript? Mention the ways to access and validate form data. (10)

UNIT-IV

8. What is a jQuery and what are the different jQuery selectors explain with examples? (10)
 9. How events are handled in jQuery? (10)
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37543

COMPUTER GRAPHICS

Paper-B23-CAP-403

(BCA)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question No. 1 is compulsory.

Compulsory Question

1. Explain the following in brief :
 - (a) Refresh Rate and Aspect Ratio. 2
 - (b) Uniform scaling and Differential scaling. 1
 - (c) Homogeneous coordinates. 1
 - (d) 3D Translation. 1
 - (e) Windowing and Clipping. 1
 - (f) Viewing transformation. 2
 - (g) Foreshortening and Vanishing Point. 2

UNIT-I

2.
 - (a) Explain the components of an interactive graphics system with the help of diagram. 5
 - (b) Write the major applications of computer graphics in engineering and science. 5
3.
 - (a) Differentiate between raster-scan and random-scan display systems. 5

- (b) Write a short note on Graphic Software Packages. 5

UNIT-II

4. (a) Name the two popular line drawing algorithms and write the differences among them. 5
(b) Calculate the pixels of the line and draw the line using DDA algorithm with the given coordinates as $X_1(2, 3)$ and $X_2(7, 6)$. 5
5. Explain the concept, construction, properties and significance of a Bézier curves. 10

UNIT-III

6. Explain the various Composite 2D Transformations with suitable example. 10
7. Write the steps of Sutherland-Hodgman Polygon Clipping Algorithm and Apply the Algorithm and clip the polygon with vertices $V_1(2, 2)$, $V_2(6, 6)$, $V_3(10, 2)$, $V_4(6, -2)$ where, the clipping window is defined by ($X_{\min} = 4$, $X_{\max} = 8$, $Y_{\min} = 0$, $Y_{\max} = 5$). 10

UNIT-IV

8. What do you mean by 3D Graphics projections? Explain the different categories of projections with appropriate diagrams. 10
9. (a) Describe the hidden surface removal algorithm and its two approaches. 5
(b) Explain the painter's algorithm along with its implementation. 5

Roll No.

Total Pages : 4

NPAD/M-26

24801

**ENGLISH LANGUAGE AND
COMMUNICATION : LEVEL-4**

Paper-B23-AEC-411

Time Allowed : 3 Hours]

[Maximum Marks : 35

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks. Except where indicated. Write answers in clear, legible English. Use British spellings throughout.

Compulsory Question

1. Answer all the following briefly : 7×1=7

- (a) Define the term 'prefix' and give one example.
- (b) What does the Greek root 'graph' mean? Give one word formed from it.
- (c) Change the voice of the sentence : She wrote a letter to her brother.
- (d) Change the degree of comparison : Ram is taller than Sham. (into positive degree).

- (e) Name Aristotle's three modes of persuasion.
- (f) Give any two transition words used to show contrast.
- (g) What is meant by 'unity' in a paragraph?

UNIT-I

2. (a) Identify the prefix, root, and suffix in any four of the following words, and write their meanings :
- (i) Disagreement.
 - (ii) International.
 - (iii) Unbreakable.
 - (iv) Transportation.
 - (v) Autobiography.
- (b) Add a suitable prefix to make the opposite of any three of the following words :
- (vi) Possible.
 - (vii) Legal.
 - (viii) Happy.
 - (ix) Responsible.
- 7

Or

3. What is Word formation? Discuss its main types in English with suitable examples.
- 7

UNIT-II

4. Transform any **seven** of the following sentences as directed : 7

(i) He is too weak to walk. (Remove 'too')

(ii) The tea is so hot that I cannot drink it.
(Use 'too')

(iii) Iron is heavier than any other metal.
(Change to positive degree)

(iv) No other boy in the class is as tall as Ravi.
(Change to comparative degree)

(v) As soon as the bell rang, the students left the class.
(Use 'no sooner than')

(vi) Life is not a bed of roses. (Change to affirmative)

(vii) How beautiful the sunset is! (Change to assertive)

(viii) If you work hard, you will succeed.
(Use 'unless')

(ix) Though he is rich, he is not happy.
(Change to a compound sentence)

(x) The cat chased the mouse. (Change the voice)

Or

5. Explain the different ways of expressing a condition in English with suitable examples. 7

UNIT-III

6. Explain Aristotle's three modes of persuasion, namely, Ethos, Pathos and Logos, with suitable examples. 7

Or

7. Write a short persuasive speech of about 150 words on any **one** of the following topics. Use at least two persuasion techniques :

- (i) The importance of Reading newspapers daily.
- (ii) Why every student should learn a second language.
- (iii) Say no to single-use plastic. 7

UNIT-IV

8. Write a coherent and unified paragraph of about 100 words on any **one** of the following topics. Use at least five transition words from different categories in your paragraph : 7

- (i) The advantages and disadvantages of Social media.
- (ii) The importance of Environmental protection.
- (iii) My favourite book and why I like it.
- (iv) The role of Sports in a student's life.

Or

9. What are Transition words? Explain their importance in achieving coherence in writing, with examples from at least four different categories. 7

Roll No.

Total Pages : 4

NPAV/M-26

24818

E-COMMERCE

Paper-B23-VAC-417

Time Allowed : 3 Hours]

[Maximum Marks : 35

Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई में से एक प्रश्न का चयन करते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए। प्रश्न संख्या 1 अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question (अनिवार्य प्रश्न)

1. Answer the following questions in brief : $4 \times 1\frac{3}{4} = 7$

निम्नलिखित प्रश्नों के उत्तर संक्षेप में दीजिए:

(a) What are the key features of B2B E-commerce?

बी2बी ई-कॉमर्स की प्रमुख विशेषताएं क्या हैं?

(b) What types of Middleware are commonly used in E-commerce platform?

ई-कॉमर्स प्लेटफॉर्म में आमतौर पर किस प्रकार के मिडलवेयर का उपयोग किया जाता है?

- (c) Compare and contrast online retail with brick-and-mortar retail stores.

ऑनलाइन रिटेल और पारंपरिक रिटेल स्टोर की तुलना और अंतर स्पष्ट कीजिए।

- (d) What are the common threats to network security in E-commerce?

ई-कॉमर्स में नेटवर्क सुरक्षा के लिए सामान्य खतरे क्या हैं?

UNIT-I (इकाई-I)

2. (a) What is E-commerce? What are the major advantages of E-commerce for businesses? 3½

ई-कॉमर्स क्या है? व्यवसायों के लिए ई-कॉमर्स के प्रमुख लाभ क्या हैं?

- (b) Define a brick-and-click business model and explain how it operates? 3½

एक फिजिकल स्टोर और ऑनलाइन स्टोर (ब्रिक-एंड-क्लिक) बिजनेस मॉडल को परिभाषित करें और समझाएं कि यह कैसे काम करता है?

3. What is the Internet? What are the key features that define the dynamic nature of the Internet? 7

इंटरनेट क्या है? इंटरनेट की गतिशील प्रकृति को परिभाषित करने वाली प्रमुख विशेषताएं क्या हैं?

UNIT-II (इकाई-II)

4. (a) What are the various mechanisms available for making payments online? 3½

ऑनलाइन भुगतान करने के लिए कौन-कौन से विभिन्न तरीके उपलब्ध हैं?

- (b) What is a Payment gateway? How does it facilitate online transactions? 3½

पेमेंट गेटवे क्या है? यह ऑनलाइन लेनदेन को कैसे सुगम बनाता है?

5. (a) How is text and content integrated into online business applications for user engagement? 3½

उपयोगकर्ता सहभागिता बढ़ाने के लिए ऑनलाइन व्यावसायिक अनुप्रयोगों में पाठ और सामग्री को कैसे एकीकृत किया जाता है? •

- (b) What are the essential components of IT infrastructure required to support an E-commerce business? 3½

ई-कॉमर्स व्यवसाय को चलाने के लिए आवश्यक आईटी बुनियादी ढांचे के मुख्य घटक क्या हैं?

UNIT-III (इकाई-III)

6. What are the main features of B2B e-commerce platforms for wholesalers? 7

थोक विक्रेताओं के लिए बी2बी ई-कॉमर्स प्लेटफॉर्म की मुख्य विशेषताएं क्या हैं?

7. What types of Services can be delivered effectively through E-commerce platforms? 7

ई-कॉमर्स प्लेटफॉर्म के माध्यम से किस प्रकार की सेवाएं प्रभावी ढंग से प्रदान की जा सकती हैं?

UNIT-IV (इकाई-IV)

8. What is a Digital signature and how is it used in E-commerce transactions? 7

डिजिटल हस्ताक्षर क्या है और ई-कॉमर्स लेनदेन में इसका उपयोग कैसे किया जाता है?

9. What is a Virtual organization? What are the major benefits of Operating as a Virtual organization? 7

वर्चुअल संगठन क्या है? वर्चुअल संगठन के रूप में काम करने के प्रमुख लाभ क्या हैं?

Roll No.

Total Pages : 3

NPAV/M-26

24842

SOFTWARE TESTING

Paper-B23-VOC-216

Time Allowed : 3 Hours]

[Maximum Marks : 50

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. Write short notes on the following :
 - (a) What are the principles of Software Testing?
 - (b) Define Statement Coverage Testing.
 - (c) What are the objectives of Integration Testing?
 - (d) Why are Alpha and Beta testing important before Software Release?

UNIT-I

2.
 - (a) Define Software Testing. Explain Software Testing Life Cycle.
 - (b) Differentiate between Verification and Validation in Software testing. Explain their importance in the Software Development Process.
3.
 - (a) Explain different Levels of Software Testing. What are the Best Practices for Software Testing?

- (b) Explain how testing activities correspond to development phases in the V-Testing Life Cycle. Write its pros and cons.

UNIT-II

4. (a) Explain Control-Flow based Testing.
(b) Draw the Control Flow Graph. Determine the number of test cases required for branch coverage and also write suitable test cases for the following code.

```
Start
Input number
If number % 2 == 0
Print "Even"
Else
Print "Odd"
Stop
```

5. (a) Discuss Boundary Value Analysis and Equivalence Partitioning with suitable examples.
(b) Differentiate between Black box and White box Testing.

UNIT-III

6. (a) What is Acceptance Testing? Explain the Acceptance Testing types and its benefits.
(b) Differentiate between Top-Down and Bottom-Up Integration Testing.

7. (a) Explain the concept of Software Reliability. Discuss different reliability metrics used to measure software reliability.
- (b) Explain Sandwich (Hybrid) Integration Testing. Discuss its key features, steps, advantages and disadvantages.

UNIT-IV

8. (a) Explain how the selection of an incorrect test approach can affect software quality. Discuss the factors to consider while choosing a test approach.
 - (b) Explain the role of staffing in a test plan. How do proper staffing decisions affect the effectiveness of software testing?
9. (a) Explain the importance of defining resource requirements in a test Plan. What are the consequences of Poor Resource Planning?
 - (b) "A well-written test plan is the backbone of successful Software Testing". Justify this statement by explaining the steps involved in preparing a test plan and its benefits.

MOBILE APP DESIGNING

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से एक प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

Compulsory Question (अनिवार्य प्रश्न)

1. (a) List all major Android versions.

सभी प्रमुख एंड्रॉइड संस्करणों की सूची बनाइये ।

(b) Explain the concept of measurements in Android.

एंड्रॉइड में माप की अवधारणा की व्याख्या कीजिए ।

(c) What are Broadcast Receivers in Android ?

एंड्रॉइड में ब्रॉडकास्ट रिसीवर क्या हैं ?

(d) What is the role of the View.OnClickListener interface in event handling ?

ईवेंट हैंडलिंग में View.OnClickListener इंटरफेस की भूमिका क्या है ?

(e) Describe the role of SQLiteOpenHelper ? $5 \times 2 = 10$

SQLiteOpenHelper की भूमिका का वर्णन कीजिए ।

Unit I (इकाई I)

2. Differentiate mobile application models and web applications in terms of architecture. 10

आर्किटेक्चर के संदर्भ में मोबाइल एप्लिकेशन मॉडल और वेब एप्लिकेशन के बीच अंतर बताइये ।

3. What is the Android Virtual Device (AVD) Manager ? How to create and configure a virtual device ? 10

एंड्रॉइड वर्चुअल डिवाइस (AVD) मैनेजर क्या है ? एक वर्चुअल डिवाइस कैसे बनाएँगे और कॉन्फिगर करेंगे ।

Unit II (इकाई II)

4. Explain the working and structure of GridLayout in Android. How does it differ from TableLayout ? 10

एंड्रॉइड में GridLayout की कार्यप्रणाली और संरचना की व्याख्या कीजिए । यह TableLayout से कैसे भिन्न है ?

5. (a) Differentiate between px, dp, sp, in, and mm units in Android UI design. 5

एंड्रॉइड UI डिजाइन में px, dp, sp, in, और mm इकाइयों के बीच अंतर बताइये ।

- (b) Explain the use and behavior of CheckBoxes in Android. 5

एंड्रॉइड में CheckBoxes के उपयोग और व्यवहार की व्याख्या कीजिए ।

Unit III (इकाई III)

6. Differentiate between explicit and implicit intents in Android. Explain with example. 10

एंड्रॉइड में स्पष्ट और अंतर्निहित इरादों के बीच अंतर बताइये । उदाहरण सहित व्याख्या कीजिए ।

7. What is application signing in Android ? Why is it essential before publishing an app ? 10

एंड्रॉइड में एप्लिकेशन साइनिंग क्या है ? ऐप प्रकाशित करने से पहले यह क्यों आवश्यक है ?

Unit IV (इकाई IV)

8. Describe the complete life-cycle of a Fragment. How does it differ from the life-cycle of an Activity ? 10

एक फ्रैगमेंट के पूर्ण जीवन-चक्र का वर्णन कीजिए । यह एक गतिविधि के जीवन-चक्र से कैसे भिन्न है ?

9. What is SQLite in Android ? Discuss its features and advantages for mobile application development. 10

एंड्रॉइड में SQLite क्या है ? इसकी विशेषताओं और मोबाइल एप्लिकेशन विकास के लिए फायदों पर चर्चा कीजिए ।



Roll No.

Total Pages : 2

37581

NBCA/M-26

PROGRAMMING USING PYTHON

Paper : B23-CAP-601

(BCA)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory.

Compulsory Question

1. Answer the following questions in brief :

- (a) Discuss different types of literals in Python with appropriate examples.
- (b) Differentiate between a tuple and a set.
- (c) What is the purpose of recursive functions?
- (d) What is user-defined exception? (4×2.5=10)

UNIT-I

2. Explain the following operators available in Python with example :

- (a) Relational operators.
- (b) Logical operators.
- (c) Membership operator.
- (d) Identity operator. (10)

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3. Describe how input and output operations are handled in Python with example? Also explain the purpose of exit () function. (10)

UNIT-II

4. Explain any four string manipulation functions. WAP to replace a character by another character in a string. (10)
5. What is dictionary? How we can create a dictionary? Also explain how we can replace, search, insert and remove elements in Dictionary with example? (10)

UNIT-III

6. What is an array? Provide examples to demonstrate array creation, indexing, slicing. (10)
7. Differentiate modules and functions in Python. Explain the process of importing Math module and Random module in a python program. (10)

UNIT-IV

8. Explain the following :
(a) Types of files supported by python.
(b) SYS module.
(c) OS module. (10)
9. What is turtle module and its methods? How do you set the drawing color and fill a shape with color in Turtle? (10)

Roll No.

Total Pages : 2

37582

NBCA/M-26

ADVANCED WEB DEVELOPMENT

Paper : B23-CAP-602

(BCA)

Time : Three Hours]

[Maximum Marks : 50

Note : Candidate will have to attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Write short note on the following :

- (a) Define Promises in JavaScript.
- (b) What is middleware in Express.js.
- (c) Explain a NoSQL database.
- (d) What is a CI/CD pipeline. (10)

UNIT-I

- 2. Define Semantic HTML. Discuss its role in structuring web pages and explain how it contributes to better accessibility and search engine optimization. (10)
- 3. What are CSS preprocessors? Describe the features of Sass or LESS and explain their advantages in developing and maintaining stylesheets. (10)

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22/5

UNIT-II

4. Give a brief introduction to React and Angular. How are these frameworks used in front-end development? Mention any key differences between them. (10)
5. Explain the role of Redux in state management. Why is state management important in large-scale applications? (10)

UNIT-III

6. Explain advanced SQL concepts such as joins, subqueries, and indexing. How do these techniques improve database performance and data retrieval? (10)
7. Design a simple full-stack application (for example, a student record or task management system). Explain how you would connect the front-end with the back-end and manage database operations. (10)

UNIT-IV

8. What is meant by performance optimization in web applications? Explain techniques like code splitting, lazy loading, and caching. How do these help in improving application performance? (10)
9. Write the basic steps and commands required to containerize a web application using Docker. Include relevant syntax for creating a Dockerfile. (10)

Roll No.

Total Pages : 3

37583

NBCA/M-26

ARTIFICIAL INTELLIGENCE

Paper : B23-CAP-603

(BCA)

Time : Three Hours]

[Maximum Marks : 50

Note : Student will be required to attempt *Five* questions in all.

Question No. 1 is compulsory. In addition to compulsory question, student will have to answer *four* more questions selecting *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. (a) What is the role of AI techniques in intelligent system design?
- (b) What is the 'generate and test' approach in AI?
- (c) What is an 'is-a' relationship in predicate logic? Give an example.
- (d) What is constraint satisfaction problem with an example?
- (e) What is knowledge representation? Why is it important in AI?

(5×2=10)

UNIT-I

2. Describe AI techniques in detail. How do these techniques help in building intelligent systems? Also, explain the criteria for success in AI. (10)
3. What is a production system in AI? Describe its structure, components, and characteristics with a suitable example. (10)

UNIT-II

4. Explain the Generate and Test and Hill Climbing heuristic search techniques. Compare their working principles and mention their advantages and limitations. (10)
5. Discuss the major issues in Knowledge Representation. Why is selecting an appropriate knowledge representation scheme critical in AI? (10)

UNIT-III

6. Define computable functions and predicates. Discuss their role in knowledge representation and reasoning in AI with appropriate examples. (10)
7. What is Natural Language Processing (NLP)? Explain the major stages involved in syntactic and semantic processing of natural language with examples. (10)

UNIT-IV

8. Explain different types of learning in Artificial Intelligence. Discuss Rote Learning and Learning by Taking Advice with suitable examples. (10)

 9. What are Expert System Shells? Discuss their role in the développement of expert systems and give examples of commonly used shells. (10)
-

Roll No.

Total Pages : 2

37584

NBCA/M-26

BASICS OF DATA SCIENCE USING PYTHON

Paper : B23-CAP-604

(BCA)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt all questions.

Compulsory Question

1. Short Answer Questions : (2×5=10)
- (a) Define Data Science and mention two applications.
 - (b) What are Python data types? Give examples.
 - (c) What is the use of NumPy?
 - (d) What is a pandas DataFrame & What is regression analysis?
 - (e) What is data cleaning? Also Define mean and median.

UNIT-I

2. (a) Explain the concept and importance of Data Science.
- (b) Describe Python basics including variables, data types, and control structures. (10)

OR

3. (a) Explain NumPy and pandas with examples.
- (b) Discuss how to read and write data files using pandas. (10)

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UNIT-II

4. (a) Explain different data import and export formats.
- (b) Describe data cleaning techniques such as handling missing values and duplicates. (10)

OR

5. (a) Explain data transformation techniques including normalization and scaling.
- (b) Discuss data visualization using matplotlib and Seaborn with examples. (10)

UNIT-III

6. (a) Explain descriptive statistics (mean, median, mode, standard deviation).
- (b) Describe hypothesis testing and *t*-test with examples. (10)

OR

7. (a) Explain linear regression and multiple regression using scikit-learn.
- (b) Discuss predictive models like decision trees and logistic regression. (10)

UNIT-IV

8. (a) Explain advanced features of pandas and NumPy.
- (b) Discuss time series analysis and classification using scikit-learn. (10)

OR

9. (a) Explain clustering techniques in data analysis.
- (b) Describe sensitivity analysis and scenario analysis (What-if analysis). (10)

Roll No.

Total Pages : 3

37621

BCA/M-26

ADVANCED PROGRAMMING IN C

Paper : BCA-121

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) What is a string in C?
- (b) Write one advantage of using structures.
- (c) Define a pointer.
- (d) What is memory leakage?
- (e) Define a file in C.
- (f) Name any two file handling functions.
- (g) What is a preprocessor in C?
- (h) What is the advantage of using macros? (8×2=16)

UNIT-I

2. (a) Describe various string handling functions in C such as `strlen()`, `strcpy()`, `strcmp()`, and `strcat()` with examples. (8)

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- (b) Explain typedef and enumeration in C with suitable examples. (8)

3. (a) Explain how structures are passed to functions with suitable examples. (8)
- (b) Explain array of strings in C with a suitable program. (8)

UNIT-II

4. (a) Explain pointer arithmetic with suitable examples. (8)
- (b) Explain pointer conversions with examples. (8)
5. (a) Discuss different dynamic memory allocation functions in C. (8)
- (b) Discuss pointer comparison and pointer assignment in C. (8)

UNIT-III

6. (a) Discuss different types of files in C programming. (8)
- (b) Explain the use of `fseek()`, `ftell()`, and `rewind()` functions using suitable examples. (8)
7. Write a program in C to read the contents of a file, convert them into uppercase and copy to another file. (16)

UNIT-IV

8. (a) Discuss the use of `#define` directive with suitable examples. (8)
- (b) Explain the meaning and role of `argc` and `argv` in C. (8)
9. (a) Explain the purpose of `#ifdef`, `#ifndef`, and `#endif`. (8)
- (b) Explain the use of `#include` directive in C. (8)
-

Roll No.

Total Pages : 2

37622

BCA/M-26

LOGICAL ORGANIZATION OF COMPUTERS – II

Paper-BCA-122

Time : Three Hours]

[Maximum Marks : 80

Note : Question No. 1 is compulsory. Attempt *four* other questions selecting at least *one* from each unit. All questions carry equal marks.

Compulsory Question

1. (a) Define Flip-Flop.
- (b) What is a Clock Pulse?
- (c) Define Register in digital electronics.
- (d) What is serial data transfer?
- (e) Name any two memory parameters.
- (f) Differentiate between RAM and ROM.
- (g) Define instruction cycle.
- (h) What is direct addressing mode? (8×2=16)

UNIT-I

2. (a) Describe the working of an RS Flip-Flop with the help of logic diagram and truth table.
- (b) Define State Table and State Diagram in Sequential Circuits. (16)

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3. (a) Explain the characteristics of Sequential Logic circuits.
(b) Differentiate between Combinational Logic and Sequential Logic with suitable examples. (16)

UNIT-II

4. (a) Explain shift registers in detail. Describe left shift and right shift operations with examples.
(b) Explain the working of a Serial Input Parallel Output (SIPO) shift register with diagram. (16)
5. Describe the operation of a 4-bit Asynchronous (Ripple) Counter with truth table and waveform. (16)

UNIT-III

6. (a) Describe the organization and working of Semiconductor Memory.
(b) Describe the classification of computer memory with neat diagram. (16)
7. Explain Flash Memory in detail. Describe its features, advantages, and applications. (16)

UNIT-IV

8. (a) What are I/O channels? Explain their functions and advantages.
(b) Describe the interrupt structure and explain different types of interrupts. (16)
9. Explain DMA data transfer in detail with block diagram. (16)

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Total Pages : 3

BCA/M-26

37623

MATHEMATICAL FOUNDATIONS-II

Paper : BCA-123

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question No. 1 is compulsory.

Compulsory Question

1. (a) Define logical operator.
(b) What is a contradiction?
(c) What is a group?
(d) Define a ring with an example.
(e) State any two laws of matrix algebra.
(f) What is the rank of a matrix?
(g) What are eigenvalues of a matrix?
(h) State the Cayley-Hamilton Theorem. (8×2=16)

UNIT-I

2. (a) Construct a truth table and identify whether it is a tautology :

$$(p \rightarrow q) \vee (q \rightarrow p). \quad 8$$

- (b) Explain commutative and distributive laws with suitable examples. 8

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3. What is principle of mathematical induction? Prove following by mathematical induction :

$$1^2 + 2^2 + 3^2 + \dots + n^2 = n(n+1)(2n+1)/6. \quad 16$$

UNIT-II

4. (a) Check whether the operation $*$ defined on $\mathbb{Z}$ by $a * b = a + b + 1$ forms a group? Justify your answer. 8
- (b) Define left and right cosets with examples. 8
5. Define isomorphism of groups. Show that the group $(\mathbb{Z}, +)$ is isomorphic to the group of even integers under addition. 16

UNIT-III

6. Explain addition and multiplication of matrices. Given :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 0 \\ 1 & 5 \end{bmatrix}$$

find $A + B$, AB and BA . Verify whether matrix multiplication is commutative? 16

7. Explain singular and non-singular matrices. Determine whether the matrix

$$M = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 5 \\ 2 & 6 & 3 \end{bmatrix}$$

is singular or non-singular by finding its determinant? 16

UNIT-IV

8. Explain the characteristic equation of a square matrix.
Find the characteristic equation and eigenvalues of matrix

$$A = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} . \quad 16$$

9. (a) Explain skew-symmetric matrices and their eigenvalues. 8
(b) Explain how diagonalization simplifies matrix computations? 8
-

Roll No.

Total Pages : 2

37625

BCA/M-26

STRUCTURED SYSTEM ANALYSIS AND DESIGN

Paper-BCA-125

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Differentiate between physical systems and abstract systems.
- (b) What is initial investigation in system development?
- (c) What are the advantages of database systems over file systems?
- (d) What activities are involved in system maintenance?

UNIT-I

2. (a) How does a system analyst act as a bridge between users and developers?
- (b) What are man-made information systems? How do they differ from natural systems?

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3. (a) What skills are required for an effective system analyst?
(b) Explain open and closed systems with real-world examples.

UNIT-II

4. (a) Compare interviews, questionnaires, and observation as fact-finding methods.
(b) What is feasibility study? Explain its types.
5. (a) What is system planning? Why is it important in system analysis?
(b) What is a data dictionary? What are its components?

UNIT-III

6. (a) Explain different types of costs and benefits in system development.
(b) Explain input design principles for efficient systems.
7. (a) What is a database? How does it differ from file systems?
(b) What factors influence the choice of file organization?

UNIT-IV

8. (a) Explain types of maintenance i.e. corrective, adaptive, perfective.
(b) What are different types of testing techniques? Discuss.
9. (a) What is system implementation? What are its phases?
(b) Discuss the concept of quality assurance (QA). Explain different levels of quality assurance.

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Total Pages : 3

37626

BCA/M-26

PERSONALITY DEVELOPMENT

Paper : BCA-126

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory.

Compulsory Question

1. (a) What are the causes of deranged or maladjusted personality? Explain. (4)
- (b) What are interpersonal skills and what is their importance in the workplace? (4)
- (c) Discuss verbal and non-verbal aspects that contribute to effective expression. (4)
- (d) Explain the structure and key components of an effective self-introduction, and discuss how it creates the first impression on the interview panel? (4)

UNIT-I

2. Explain the relationship between personality and self-concept, and discuss how self-concept influences individual behaviour and decision-making? Also discuss the elements of personality. (16)

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3. (a) Explain how body language can be used effectively and discuss common misuses that may lead to misinterpretation. (8)
- (b) Discuss the art of good conversation and intelligent listening. (8)

UNIT-II

4. Discuss strategies for dealing with seniors in a professional environment. Also explain how should one effectively interact with colleagues at the workplace? (16)
5. (a) Explain how to maintain professional relationships with suppliers and vendors? Discuss negotiation skills, trust-building, and ethical practices in business dealings. (8)
- (b) Discuss the effective approaches to be used while dealing with contract workers to ensure coordination, fairness, and productivity. (8)

UNIT-III

6. Discuss the importance of Group Discussion in evaluating communication skills, leadership, and team behaviour. Explain how to effectively conduct yourself during a Group Discussion. (16)
7. Define presentation skills and explain their importance in academic and professional contexts. Discuss the essential elements of an effective presentation. (16)

UNIT-IV

8. Explain the intent and purpose of interviews in the selection process. Also discuss different types of interviews. (16)
 9. (a) Explain the techniques of addressing an interview panel professionally. (8)
(b) Explain how confidence, positive attitude, stress management, and presence of mind influence interview performance? (8)
-

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Total Pages : 3

37627

BCA/M-26

ADVANCED DATA STRUCTURES

Paper : BCA-241

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting atleast *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Comment on the need to study general tree.
- (b) Why linked representation is preferred as compared to arrays in binary trees?
- (c) Differentiate between directed and undirected graph.
- (d) What is meant by shortest path in a graph?
- (e) Comment on the benefits of sorting in computer science.
- (f) If the time complexity of two algorithms is same, what are the other parameters to select an algorithm?
- (g) Comment on the need of files.
- (h) What is meant by hashing? (8×2=16)

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UNIT-I

2. What are the various ways to traverse a binary tree? Explain any two ways by writing their algorithms and using suitable examples. (16)
3. Write the algorithm for Huffman's encoding. Explain the approach used to write the algorithm along with a suitable example. (16)

UNIT-II

4. (a) Describe the various ways to represent a graph in computer memory. Which approach is better according to you and why? (8)
(b) Write and explain the Dijkstra's algorithm to find shortest path in a graph. (8)
5. What are the various ways to traverse a graph? Explain any two ways by writing algorithm and using suitable examples. (16)

UNIT-III

6. (a) Differentiate between internal sorting and external sorting. (8)
(b) Write and explain the algorithm to sort the data using tournament sort. (8)
7. Write and explain the merge sort algorithm to sort the given data. (16)

UNIT-IV

8. (a) What are the various attributes of a file? Explain. (8)
(b) Compare various types of files on various counts. (8)

 9. Discuss various techniques to handle collision in hashing using suitable examples. (16)
-

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Total Pages : 2

37628

BCA/M-26

ADVANCED PROGRAMMING USING C++

Paper : BCA-242

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory.
Attempt *four* more questions selecting *one* question from each Unit.

Compulsory Question

1. Attempt all parts (short answer/objective type) :
 - (a) What is function overriding.
 - (b) What is pure virtual function?
 - (c) Distinguish between private and public derivations.
 - (d) What is multipath inheritance?
 - (e) What is template class?
 - (f) What are file pointers?
 - (g) What is the purpose of ios::in and ios::out modes?
 - (h) What are I/O streams in C++? (8×2=16)

UNIT-I

2. What is dynamic polymorphism in C++? Discuss virtual functions and their need with example. (16)

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3. What is virtual destructor? Explain virtual destructor with a suitable example. (16)

UNIT-II

4. What are different types of type conversions in C++? Illustrate conversion between basic types to objects by giving an example. (16)
5. What are rules for protected derivation? Explain protected derivation with an example. (16)

UNIT-III

6. What is multiple inheritance? Explain roles of constructors and destructors in multiple inheritance with an example. (16)
7. Explain function template and hierarchical inheritance with suitable examples. (16)

UNIT-IV

8. Explain exception handling in C++ using try, throw, and catch with suitable examples. (16)
9. What is binary file? How can you create, read and write binary file in C++? Explain with an example. (16)

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Total Pages : 2

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BCA/M-26

E-COMMERCE

Paper : BCA-243

Time : Three Hours]

[Maximum Marks : 80

Note : Question Number 1 is compulsory. Attempt *four* more questions selecting at least *one* question from each unit.
All Questions carry equal marks.

Compulsory Question

1. (a) What is E-Commerce?
- (b) What is B2B (Business-to-Business)?
- (c) What is online shopping?
- (d) What is a global market?
- (e) Who are e-brokers?
- (f) What is online stock trading?
- (g) What is the advisory model?
- (h) Define supplier-oriented marketplace. (8×2=16)

UNIT-I

2. Explain different types of E-commerce models with examples. (16)

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3. (a) Explain the encryption process in SET and how it ensures secure payments.
(b) Write short notes on S-HTTP. (16)

UNIT-II

4. (a) Describe the role of Electronic Data Interchange (EDI) in governance and its benefits.
(b) What are the various challenges faced in implementing E-Governance? (16)
5. Describe the strategies adopted by traditional department stores to compete with online businesses. (16)

UNIT-III

6. Describe various products and services offered under B2C (Business-to-Consumer) model. (16)
7. Explain broker-based online services with their advantages. Also compare traditional brokerage services and e-brokers. (16)

UNIT-IV

8. (a) Describe the key technologies used in B2B E-commerce.
(b) Explain the concept of Just-in-Time (JIT) delivery in B2B and its advantages. (16)
9. (a) Explain the Do-it-yourself (DIY) model in E-commerce.
(b) Describe major Internet security issues in E-commerce. (16)

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Total Pages : 3

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BCA/M-26

RELATIONAL DATABASE MANAGEMENT SYSTEM

Paper : BCA-244

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each Unit-I to Unit-IV. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) List the Codd's rule for relational model.
- (b) Differentiate between Relational Algebra and Relational Calculus.
- (c) What is a Closure of Functional Dependency?
- (d) Define First Normal Form (1NF).
- (e) Write the syntax to create and drop Views in SQL.
- (f) State Aggregate Functions with examples.
- (g) What is SQL *Plus?
- (h) Differentiate between implicit and explicit cursors.

(8×2=16)

UNIT-I

2. (a) Explain the following operations with suitable examples :
 - (i) Selection.
 - (ii) Projection.

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- (iii) Union.
- (iv) Set Difference.
- (b) Explain different types of Join operations (Inner Join, Outer Join, Theta Join, Equi Join). (8+8=16)
3. (a) Explain Tuple Relational Calculus with syntax and examples.
- (b) Write Domain Relational Calculus queries for : Course (CID, CName, Credits)
- (i) Find courses with more than 3 credits.
- (ii) List course names starting with 'D'. (8+8=16)

UNIT-II

4. Define Functional Dependency (FD). Explain different types of functional dependencies. Consider relation : R (A, B, C, D, E) with FDs : $A \rightarrow BC$, $B \rightarrow D$, $CD \rightarrow E$ and Check whether A is a super key. (16)
5. What are the properties of Normalization in databases? How do you implement 3NF and BCNF? Give a suitable illustration in support to your answer. (16)

UNIT-III

6. What are SQL data types and nested queries? Write the purpose, syntax and examples of following SQL statements:
- (i) Insert.
- (ii) Alter.

- (iii) Delete.
- (iv) Grant.
- (v) Rollback. (16)

7. What are constraints? Write create statement to implement Not Null, Primary Key, Foreign Key, default and Check constraints in SQL. (16)

UNIT-IV

8. Discuss the character set and data types used in PL/SQL. Write the process of declaration and assignment of variables in PL/SQL with suitable examples. Write the advantages of PL/SQL over SQL. (16)
9. (a) Discuss conditional control structures (IF-ELSE) with examples in PL/SQL.
- (b) Write an example showing the scenario; where we use triggers in PL/SQL. (8+8=16)
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Total Pages : 3

37631

BCA/M-26

COMPUTER ORIENTED STATISTICAL METHODS

Paper : BCA-245

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each unit. First question is compulsory.

Compulsory Question

1. (a) What is cumulative frequency?
- (b) Define arithmetic mean with formula.
- (c) Distinguish between discrete and continuous random variables with one example each.
- (d) Define rank correlation.
- (e) Define curve fitting.
- (f) What is regression?
- (g) What is statistical inference?
- (h) State the assumptions of the chi-square test. (16)

UNIT-I

2. (a) Explain different types of Measures of Dispersion. (8)
- (b) Derive the relationship between Moments about mean and Moments about any point. (8)

3. The following data shows the marks obtained by 60 students in an exam :

Marks (Class Interval)	Number of Students
0 – 10	5
10 – 20	9
20 – 30	12
30 – 40	15
40 – 50	10
50 – 60	9

- (a) Construct the cumulative frequency table.
- (b) Calculate the Arithmetic Mean and mean deviation.
- (c) Find the Median of the distribution.
- (d) Calculate the Standard Deviation. (16)

UNIT-II

4. (a) Define and derive the mean and variance of a Binomial distribution. (8)
- (b) Describe the Normal distribution. Discuss its properties and importance in statistics. (8)
5. In a certain examination, the probability that a student passes in a subject is 0.7. A group of 10 students is selected at random.
- (a) Find the probability that exactly 6 students pass.
 - (b) Find the probability that at least 8 students pass.
 - (c) Find the probability that not more than 4 students pass.
 - (d) Find the mean and standard deviation of the number of students who pass. (16)

UNIT-III

6. Explain the concept and aim of regression analysis. Describe the different types of regression and explain their practical uses. (16)
7. (a) State and prove Bayes' theorem. Explain its importance in decision making with suitable examples. (8)
- (b) What is forecasting? Explain different forecasting techniques. (8)

UNIT-IV

8. (a) Distinguish between one-tailed and two-tailed tests with examples. (8)
- (b) Explain the structure of the ANOVA table for one-way classification. (8)
9. (a) Discuss the meaning of sampling. Describe different methods of sampling with advantages and disadvantages. (8)
- (b) Explain Type I and Type II errors in detail. Discuss their significance in decision-making. (8)
-

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Total Pages : 3

37632

BCA/M-26

MANAGEMENT INFORMATION SYSTEM

Paper : BCA-246

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory.

Compulsory Question

1. (a) Discuss various elements of a system with suitable examples. (4)
- (b) Explain the role of MIS in improving communication within an organization. (4)
- (c) Differentiate between logical design and physical design with suitable examples. (4)
- (d) Analyze the role of DSS in managerial decision-making. (4)

UNIT-I

2. What is a system? Explain (i) open and closed systems, (ii) deterministic and probabilistic systems, (iii) physical and abstract systems. (16)

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3. (a) Explain how accurate, timely, and relevant information supports strategic, tactical, and operational decisions? (8)
- (b) Describe the sub-systems of an Information System and explain their functions, and significance in organizational operations. (8)

UNIT-II

4. (a) Explain information requirements at different levels of management and how MIS fulfills these needs? (8)
- (b) Explain Herbert A. Simon's Model of Decision-Making. (8)
5. (a) Distinguish between formal and informal information systems. Discuss their characteristics, advantages, and limitations in an organization. (8)
- (b) Explain the role of MIS in bridging the gap between structured and unstructured decision-making. Discuss how MIS, along with DSS, helps managers handle both routine and complex problems? (8)

UNIT-III

6. Discuss the system analysis phase in Information System development. Explain its objectives, tools, and techniques used to gather and analyze user requirements. (16)

7. What is system implementation? Discuss various approaches to system implementation. (16)

UNIT-IV

8. Describe the role and functions of Personnel MIS. Explain how it helps in human resource planning, recruitment, performance appraisal, and employee records management? (16)
9. Discuss the technologies and applications of e-commerce. (16)
-

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Total Pages : 2

37633

BCA/M-26

WEB DESIGNING USING ADVANCED TOOLS

Paper : BCA-361

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Discuss the use of predefined objects in JavaScript.
- (b) How does ASP handle null and empty values?
- (c) How do you link an external CSS file to HTML?
- (d) What is a namespace in XML and why is it used?

UNIT-I

2. (a) Can a function return multiple values? Explain how (in JavaScript or VBScript).
- (b) Explain the ternary (conditional) operator with syntax in JavaScript.
3. (a) What is the difference between while and do-while loops in JavaScript?
- (b) How are functions declared in JavaScript and VBScript?

UNIT-II

4. (a) Explain features of Macromedia Dreamweaver.
(b) What are Active Server Pages (ASP), and how do they differ from static web pages?
5. (a) Describe the lifecycle of a request in an ASP-based web application.
(b) What are the common data types used in ASP scripting? Explain.

UNIT-III

6. (a) Explain how CSS is used for text and font styling.
(b) What are events in DHTML? Give examples of commonly used events.
7. (a) What are marquees? Discuss their usage and limitations.
(b) What are different ways to define colours in CSS? Explain.

UNIT – IV

8. (a) What is a Document Type Declaration (DTD)? Explain its purpose.
(b) Discuss different structures used in XML documents.
9. (a) Design an XML document for a university system including students, courses, and faculty with nested relationships.
(b) Describe the components of the FrontPage interface.

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Total Pages : 3

BCA/M-26
OPERATING SYSTEM-II
Paper-BCA-362

37634

Time : Three Hours]

[Maximum Marks : 80

Note : Question No. 1 is compulsory. In addition to that, attempt *four* more questions selecting *one* question from each unit.
All questions carry equal marks.

Compulsory Question

1. (a) What is the Critical Section Problem? Discuss the three necessary conditions that a solution must satisfy. (4)
- (b) Briefly discuss the swap space management. (4)
- (c) Discuss various ways of logging in and logging out of Linux. (4)
- (d) What are shell variables? Explain the difference between local variables, environment variables, and positional parameters. (4)

UNIT-I

2. What is a semaphore? How Bounded-Buffer, Reader-Writer and Dining-philosopher classical synchronization problems can be solved using semaphores? Discuss. (16)
3. (a) Explain directory implementation using linear list and hash table. (8)

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- (b) Explain how systems handle failures, data loss, and ensure consistency through backup and recovery techniques? (8)

UNIT-II

4. Explain FCFS, SSTF, SCAN, C-SCAN, and LOOK algorithms with their advantages and disadvantages. Analyze their performance in terms of seek time, fairness, and efficiency. (16)
5. (a) Discuss remote file transfer in Network Operating Systems. Explain the mechanisms, protocols and their role in sharing data across networks. (8)
- (b) Explain data migration in Distributed Operating Systems. Discuss its purpose, mechanisms, and advantages in improving system performance and resource utilization. (8)

UNIT-III

6. (a) Discuss the key features of the Linux operating system that make it powerful and widely used. Also explain various Linux distributions. (8)
- (b) Discuss various process oriented commands (any *four*) using syntax and examples. (8)
7. What do you understand by internal and external commands? Discuss the following commands in UNIX / Linux along with their syntax and examples :
- (i) script (ii) comm (iii) ln (iv) split (v) head (vi) chgrp (vii) mkdir (viii) mv. (16)

UNIT-IV

8. (a) What do you mean by job control? Which commands are used for one time execution of jobs, running jobs periodically and execution of batch queues? Explain the commands using syntax and examples. (6)
- (b) Explain the structure of the Linux file system, including the roles of the boot block, super block, inode block, and data block. (10)
9. Explain the conditional, looping and case statements in bash shell with suitable examples and write a shell script to concatenate two strings & convert it into uppercase. (16)
-

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Total Pages : 3

37635

BCA/M-26

COMPUTER GRAPHICS

Paper : BCA-363

Time : Three Hours]

[Maximum Marks : 80

Note : A candidate is required to attempt *Five* questions in all; selecting *one* question from each Unit-I to Unit-IV. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Define Bit planes and look up table.
(b) State the role of Display Processor.
(c) What is scan conversion of an ellipse?
(d) Define Scan-line Polygon Fill.
(e) Define Homogeneous Coordinates.
(f) What is Raster Transformation?
(g) What is 2D Viewing Transformation?
(h) Define Polygon Clipping. (8×2=16)

UNIT-I

2. (a) Differentiate between Interactive Graphics and Passive Graphics with suitable examples.
(b) Explain the working of Cathode Ray Tube (CRT) in detail. Compare Raster Scan and Random Scan display systems. (8+8=16)

3. Explain Flat Panel Display Technologies in detail. Discuss the working principles, advantages, and limitations of the following : Plasma Panel, LED, and LCD. (16)

UNIT-II

4. Differentiate between Symmetrical DDA and Bresenham's Line Algorithm. Apply Bresenham's Line Algorithm to draw a line from (0, 0) to (7, 5). Show all steps and decision parameters. (16)
5. (a) Generate points of a circle using Polar Coordinate Method for radius = 5 and center at (0, 0).
(b) Given a boundary and a seed point, apply Boundary Fill Algorithm (4-connected) and show filled pixels. (8+8=16)

UNIT-III

6. Explain coordinate transformation in graphics systems. Perform the following transformations : (i) Rotate a point (3, 4) by 90° about the origin, and (ii) Reflect a point (3, 5) about the x-axis and y-axis. (16)
7. (a) Explain Inverse Transformation. How is it used to reverse graphical operations? Provide examples.
(b) Explain Graphical Input Devices. Classify them into pointing and positioning devices with examples. (8+8=16)

UNIT-IV

8. (a) Describe Window, Viewport, and Window-to-Viewport Transformation with examples.
- (b) Explain Midpoint Subdivision Algorithm with suitable examples. (8+8=16)
9. (a) Describe Sutherland-Hodgman Polygon Clipping Algorithm with step-by-step illustration.
- (b) Discuss Composite Transformations in 3D. How are multiple transformations combined? Explain with suitable examples. (8+8=16)
-

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BCA/M-26

INTERNET TECHNOLOGIES

Paper : BCA-364

Time : Three Hours]

[Maximum Marks : 80

Note : Question Number 1 is compulsory. Attempt *four* questions in all, selecting at least *one* question from each unit. All Questions carry equal marks.

Compulsory Question

1. (a) What is IPv6?
- (b) What does ICMP provide?
- (c) Describe the concept of port numbers.
- (d) What is Web-based email?
- (e) State one limitation of TELNET.
- (f) What is routing in the Internet?
- (g) Name one type of firewall.
- (h) Define TCP segment. (8×2=16)

UNIT-I

2. (a) Describe HTTP (HyperText Transfer Protocol).
- (b) Write a detailed note on the World Wide Web (WWW) and its working mechanism. (16)
3. Compare the TCP/IP model and OSI model. Describe their similarities and differences. (16)

UNIT-II

4. (a) Differentiate TCP & UDP protocol.
(b) Describe the IP packet format (IPv4) with all header fields and their functions. (16)
5. (a) Explain the working of the Domain Name System (DNS) and its importance in networking.
(b) Write a short note on IGMP. (16)

UNIT-III

6. (a) Compare POP3 and IMAP protocols with their features and differences.
(b) Explain IP telephony and signalling protocols used in VoIP systems. (16)
7. (a) Describe the concept of Web-based email and explain how it differs from traditional email systems.
(b) Explain the working of FTP (File Transfer Protocol) and its features. (16)

UNIT-IV

8. (a) Explain the concept of Internet multicasting with its advantages and applications.
(b) Explain the role of SNMP. (16)
9. Explain Web security and common vulnerabilities such as attacks and prevention techniques. (16)

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BCA/M-26

ADVANCED PROGRAMMING WITH VISUAL BASIC

Paper : BCA-365

Time : Three Hours]

[Maximum Marks : 80

Note : Question No. 1 is compulsory. In addition to that attempt *four* more questions, selecting *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. (a) How can you create a collection in VB?
- (b) How can you load and unload a form in VB?
- (c) Comment on the use of Access Keys in Menus in VB?
- (d) Comment on the use of ImageList in VB?
- (e) Differentiate between sequential and random access files.
- (f) How can you create a circle in VB?
- (g) Enlist the various data controls.
- (h) Enlist the various operations that can be performed on the databases. (8×2=16)

UNIT-I

2. Discuss the major properties of a form. How can you create, add and remove a form from a project? Explain using suitable examples. (16)

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3. (a) How can you perform drag and drop operation in VB?
Explain using suitable example. (8)
- (b) What is MDI form? How can you create and use MDI
form? Explain using suitable example. (8)

UNIT-II

4. What is Common Dialog Box? Explain different types of
dialog boxes available in the Common Dialog Box in detail
using suitable examples. (16)
5. (a) Write a program in VB to create text pad having basic
editing features using Rich Text Box. (8)
- (b) Explain the procedure to create a menu in VB using
suitable examples. (8)

UNIT-III

6. (a) Write a VB program for drawing a rectangle filled
with blue colour on the form. The starting point of
the rectangle is at place where mouse first get down
and move to the end point when mouse get released. (8)
- (b) Explain the syntax of drawing line, point and ellipse
with suitable example. (8)
7. Describe various types of files in VB. How various operations
can be performed on files? Explain with appropriate examples
in each case. (16)

UNIT-IV

8. Discuss object models of DAO, RDO and ADO in brief. Using any one method create a project for creating employee database. (16)

 9. How can you create a simple database application in VB 6.0 where a user can add, update, delete, and view records? You can use controls of your own choice. (16)
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BCA/M-26

PROGRAMMING IN CORE JAVA

Paper : BCA-366

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following briefly :

- (a) Discuss the concept of Java Virtual Machine.
- (b) What is a constructor? How is it different from a method?
- (c) Can array be dynamic in Java? If yes, how?
- (d) Explain access modifiers in Java.
- (e) Differentiate between local and remote applet.

UNIT-I

2. Explain the basic principles of Object-Oriented Programming. Discuss concepts like encapsulation, inheritance, polymorphism and abstraction with suitable examples in Java.

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3. Differentiate C, C++ and JAVA. How Java is pure object oriented? Write its various features. Does Java is architecture neutral? Justify your answer.

UNIT-II

4. Explain polymorphism in Java. Differentiate between method overloading and method overriding with Java programs and explain their role in achieving polymorphism.
5. (a) Explain String handling in Java. Differentiate between String and StringBuffer classes.
- (b) Explain class and object in Java. Describe the process of defining a class and creating objects with a suitable example.

UNIT-III

6. What do you mean by reusability of code? Write a Java program to demonstrate single and multilevel inheritance using classes. Also, discuss whether multiple inheritance can be achieved in Java. If yes, justify your answer.
7. What is a package in Java? Explain the concept of user-defined packages in Java. Write the steps to create a package and demonstrate how to import and use it in another program?

UNIT-IV

8. Explain the concept of exception handling in Java. Write a program to demonstrate the use of try, catch, and finally blocks.

 9. (a) Explain in detail Applet life cycle. Write a program to show the working of every function in Applet.
(b) What are AWT classes? Explain various features of AWT classes.
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