BCA CTS 2nd NEP/ Library

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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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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

8. Explain the features and applications of Java-Script. How Java-Script is used to validate the data? (10)

9. 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)

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

8. (a) Explain Directory Structures with advantages and disadvantages. (5)

   (b) Explain different techniques of Free Space Management. (5)

9. What is Disk Scheduling? Describe the LOOK and C-LOOK algorithms with Example. (10)

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NBCA/M-26 **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 betwen 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

HUMAN VALUES AND ETHICS

Paper–B23-VAC-101

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 चुनकर, कुल **पाँच** प्रश्न हल करें। प्रश्न संख्या 1 अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question (अनिवार्य प्रश्न)

Objective Type Questions (वस्तुनिष्ठ प्रकार के प्रश्न)

1. (i) What primarily distinguishes values from skills?

(a) Values are external; skills are internal

(b) Values guide behaviour, while skills help perform tasks

(c) Skills define character, while values define capability

(d) There is no difference between values and skills.

मूल रूप से मूल्यों और कौशलों में क्या अंतर है?

(अ) मूल्य बाहरी होते हैं; कौशल आंतरिक

(ब) मूल्य व्यवहार का मार्गदर्शन करते हैं, जबकि कौशल किसी कार्य को करने में सहायता करते हैं

(स) कौशल चरित्र को परिभाषित करते हैं, जबकि मूल्य क्षमता को

(द) मूल्यों और कौशलों में कोई अंतर नहीं है।

(ii) What is the main goal of Virtue Ethics?

(a) Creating rules and regulations

(b) Building the character of a person

(c) Maximizing benefits for the majority

(d) Punishing unethical actions.

सद्गुण–नैतिकता का मुख्य उद्देश्य क्या है?

(अ) नियम और कानून बनाना

(ब) व्यक्ति के चरित्र का निर्माण करना

(स) बहुसंख्यक के लिए अधिकतम लाभ करना

(द) अनैतिक कार्यों को दंडित करना।

(iii) Which of the following defines best "human values"?

(a) Monetary rewards achieved through effort

(a) Guidelines for ethical behaviour

(b) Cultural traditions that never change

(c) Laws imposed by governments.

निम्नलिखित में से कौन-सी "मानव मूल्यों" की सबसे अच्छी परिभाषा है?

(अ) प्रयास से प्राप्त आर्थिक पुरस्कार

(ब) नैतिक व्यवहार के लिए दिशानिर्देश

(स) सांस्कृतिक परंपराएं जो कभी नहीं बदलतीं

(द) सरकार द्वारा लागू किए गए कानून।

(iv) Which of the following is an example of a social value?

(a) Respect for diversity (b) Meditation practice

(c) Professional excellence (d) Accumulation of wealth.

निम्नलिखित में से कौन सामाजिक मूल्य का उदाहरण है?

(अ) विविधता का सम्मान (ब) ध्यान अभ्यास

(स) व्यावसायिक उत्कृष्टता (द) धन संचय।

(v) What values does "Brahmvihara" promote?

(a) Physical well-being

(b) Compassion and kindness

(c) Professional success

(d) Strict adherence to rules.

"ब्रह्मविहार" किस प्रकार के मूल्यों को बढ़ावा देता है?

(अ) शारीरिक स्वास्थ्य (ब) करुणा और दयालुता

(स) व्यावसायिक सफलता (द) नियमों का कठोर पालन।

(vi) How can we best describe the relation between values and ethics?

(a) Values form the foundation for ethical principles
(b) Ethics and values are completely unrelated
(c) Ethics are personal, while values are social
(d) Values are universal, while ethics are relative.

मूल्य और नैतिकता के बीच संबंध को हम कैसे समझ सकते हैं?

(अ) मूल्य नैतिक सिद्धांतों की नींव होते हैं
(ब) नैतिकता और मूल्य एक-दूसरे से पूरी तरह असंबंधित हैं
(स) नैतिकता व्यक्तिगत होती है, जबकि मूल्य सामाजिक
(द) मूल्य सार्वभौमिक होते हैं, जबकि नैतिकता सापेक्ष।

(vii) Which of the following best describes an integrated personality?

(a) Balances different aspects of the self harmoniously
(b) Avoids social interactions
(c) Focuses only on personal success
(d) Rejects spiritual development.

एक समन्वित (integrated) व्यक्तित्व की सबसे अच्छी परिभाषा क्या है?

(अ) आत्म के विभिन्न पहलुओं को संतुलित रूप से समाहित करना
(ब) सामाजिक संपर्क से बचना
(स) केवल व्यक्तिगत सफलता पर ध्यान देना
(द) आध्यात्मिक विकास को अस्वीकार करना

Descriptive Answer Type Questions
(वर्णनात्मक उत्तर प्रकार के प्रश्न)

UNIT–I (इकाई–I)

2. What are human values and how are they relevant in contemporary world? Discuss.

मानव मूल्य क्या हैं और आज की दुनिया में ये कैसे प्रासंगिक हैं? चर्चा करें।

3. How do personal, social, moral, and spiritual values shape an individual's personality? Explain.
व्यक्तिगत, सामाजिक, नैतिक और आध्यात्मिक मूल्य एक व्यक्ति के व्यक्तित्व को कैसे आकार देते हैं? समझाइए।

UNIT–II (इकाई–II)

4. Discuss various methods to cultivate ethical values among individuals and society.
व्यक्तियों और समाज में नैतिक मूल्यों को विकसित करने के विभिन्न तरीकों पर चर्चा करें।

5. Briefly explain deontology, virtue ethics and utilitarianism.
परिणाम निरपेक्षवाद, सद्गुण उपयोगितावाद और नैतिकता (नजपसपजंतपंदपेउ) की संक्षिप्त व्याख्या करें।

UNIT–III (इकाई–III)

6. Describe the Panchkosha model discussed in Upanishads and its relevance for human well-being.
उपनिषदों में वर्णित पंचकोश मॉडल का वर्णन करें और मानव कल्याण के लिए यह कैसे प्रासंगिक है, बताइए।

7. How can four Antah-Karanas of Yoga be helpful in understanding human personality? Discuss.
योग के चार अंत:करण मानव व्यक्तित्व को समझने में कैसे सहायक हो सकते हैं? चर्चा करें।

UNIT–IV (इकाई–IV)

8. What are professional ethics? Are they relevant in contemporary situation? Analyze.
व्यावसायिक नैतिकता क्या होती है? क्या ये आज के समय में प्रासंगिक हैं? विश्लेषण करें।

9. Why are transparency and accountability significant in professional practices? Explain.
व्यावसायिक आचरण में पारदर्शिता और जवाबदेही क्यों महत्त्वपूर्ण हैं? विवेचना करें।

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PSEC/M-26 **13314**

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)

1. 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.

कॉरपोरेट 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 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?

BCA CTIS 5th/ NEP/ Library

Roll No. ..... Total Pages : 2

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)

Roll No. ..... Total Pages : 3

37545

NBCA/M-26

BASICS OF INFORMATION SECURITY

Paper : B23-CTS-402

(CTIS) (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) State the three goals of Information Security.
   (b) Differentiate between viruses and worm in brief.
   (c) Differentiate between hashing and encryption in brief.
   (d) What is meant by secure network?
   (e) Why should unused services be disabled in a system? (5×2=10)

UNIT–I

2. (a) Explain the CIA triad with suitable examples. (5)
   (b) Discuss the need for protecting information in modern systems. (5)

3. (a) What are security threats? Explain different types in detail. (5)
   (b) What is risk assessment? Explain its basic process. (5)

UNIT–II

4. (a) Differentiate between symmetric and asymmetric encryption. (5)

   (b) What is a digital signature? Explain its working and purpose. (5)

5. (a) Explain authentication along with different authentication methods. (5)

   (b) Explain working of Discretionary Access Control (DAC) in detail. (5)

UNIT–III

6. (a) Explain the principle, working and uses of VPN in detail. (5)

   (b) Differentiate between IDS and IPS. (5)

7. (a) What is secure software development? Explain its working and importance. (5)

   (b) What is SQL injection? Explain using suitable examples. (5)

UNIT–IV

8. (a) Explain operating system security and explain its importance along with how it can be achieved? (5)

   (b) Explain the concept of system hardening with examples. (5)

9. (a) What are SSL/TLS? Explain their role in web security. (5)

(b) What are web security tools? Explain in detail. (5)

Roll No. ..... Total Pages : 3

37546

NBCA/M-26

COMPUTER NETWORKS

Paper : B23-CTS-403

BCA(CTIS)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt *five* questions in all. Question Number 1 is compulsory. In addition to the compulsory question, attempt *four* more questions, selecting *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. Answer any *five* of the following questions in brief :

(i) Which LAN standard is being used in the lab of your department? What is its topology?

(ii) What is the role of protocols in networking?

(iii) What is the function of ARP?

(iv) What is meant by Quality of Service (QoS) in networking?

(v) What is the purpose of DNS in the Internet?

(vi) How does an intrusion detection systems (IDS) provide security to a network?

(vii) Describe any one kind of attack to which a network may be vulnerable.

UNIT–I

2. Explain with diagrams the various network topologies and the type of networks where they are used. Also, describe the role of routers and switches in networks along with the specific topologies with which these devices are used.

3. (a) Sketch the layers of the TCP/IP model and list the main protocols of the Transport layer and Internet layer along with their purpose.

   (b) What are signal encoding techniques? Explain any two with relevant diagrams.

UNIT–II

4. (a) Describe the Checksum method for error detection with an example.

   (b) Name any one Media Access Control protocols used in LANs and describe it.

5. Illustrate the process of subnetting with an example. How does it improve IP address utilization?

UNIT–III

6. (a) Sketch the format of UDP protocol and list its limitations.

   (b) Describe any one technique used for controlling congestion in networks.

7. Give a brief description of the following protocols :
   (a) HTTP.
   (b) FTP.
   (c) SMTP.

UNIT–IV

8. Explain the role of firewalls in a layered network security model. Differentiate between packet-filtering and application-level firewalls. Also, describe the role of a Virtual Private Network (VPN) in network security.

9. Answer the following questions in brief :
   (a) Describe any *one* security challenge you faced/or can face while using the Internet.
   (b) Compare Wi-Fi and Bluetooth.
   (c) What are the key challenges in mobile ad hoc networks (MANETs)?

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?

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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 is 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.

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Roll No. ..... Total Pages : 04

BAQ/M-26 14310

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 ? 5×2=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

37585

NBCA/M-26

ETHICAL HACKING AND PENETRATION TESTING

Paper : B23-CTS-601

(CTIS)

(BCA)

Time : Three Hours] [Maximum Marks : 50

Note : Question No. 1 is compulsory, selecting *one* question from each Unit.

Compulsory Question

1. Attempt all questions :

(a) Define ethical hacking and mention one role of an ethical hacker.

(b) What is DNS interrogation?

(c) What is a brute force attack?

(d) Define SQL Injection.

(e) What is phishing in social engineering? (2×5=10)

UNIT–I

2. Explain the phases of hacking in detail. (10)

3. Discuss ethical hacking, types of hackers, and cyber laws. (10)

UNIT–II

4. Explain footprinting techniques and tools. (10)

5. Describe scanning and enumeration techniques. (10)

UNIT–III

6. Explain password cracking techniques and privilege escalation. (10)

7. Discuss malware types and common exploitation techniques. (10)

UNIT–IV

8. Explain OWASP Top 10 vulnerabilities. (10)

9. Describe penetration testing phases and report writing. (10)

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Total Pages : 3

37586

NBCA/M-26

CYBER FORENSICS AND INCIDENT RESPONSE

Paper : B23-CTS-602

(CTIS)

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.

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) Digital Forensic.
डिजिटल फोरेंसिक।

(b) Hashing.
हैशिंग।

(c) NTFS
एन.टी.एफ.एस.।

(d) FTK Imager.
एफटीके इमेजर।

(e) Forensic Cloning.
फोरेंसिक क्लोनिंग।

(5×2=10)

UNIT–I (इकाई–I)

2. (a) How Digital forensic is used in Incident response? (5)
घटना प्रतिक्रिया में डिजिटल फोरेंसिक का उपयोग कैसे किया जाता है?

(b) Differentiate between Incident response and Digital forensic. (5)
घटना प्रतिक्रिया और डिजिटल फोरेंसिक के बीच अंतर करें।

3. Explain primary types of cybercrimes. Also explain the common attack vectors. (10)
साइबर अपराधों के प्राथमिक प्रकारों की व्याख्या करें। सामान्य आक्रमण वैक्टरों की भी व्याख्या करें।

UNIT–II (इकाई–II)

4. Explain crucial components in Cloning. Also explain key Forensic Cloning techniques & methods of Data acquisition. (10)
क्लोनिंग में महत्वपूर्ण घटकों की व्याख्या करें। प्रमुख फोरेंसिक क्लोनिंग तकनीकों और डेटा अधिग्रहण के तरीकों की भी व्याख्या करें।

5. What are the key features and benefits of NTFS? Give comparison between NTFS with FAT. (10)
एनटीएफएस की प्रमुख विशेषताएं और लाभ क्या हैं? एनटीएफएस और एफएटी के बीच तुलना कीजिए।

UNIT–III (इकाई–III)

6. What are the key issues in Data Ownership and Jurisdiction? Also explain the legal and technical hurdles. (10)
डेटा स्वामित्व और क्षेत्राधिकार में प्रमुख मुद्दे क्या हैं? कानूनी एवं तकनीकी बाधाओं के बारे में भी बताएं।

7. Define Wireshark. Explain in detail the working of Wireshark. (10)
वायरशार्क को परिभाषित करें। वायरशार्क की कार्यप्रणाली को विस्तार से समझाइये।

UNIT–IV (इकाई–IV)

8. Write short note on Incident Response lifecycle. (10)
घटना प्रतिक्रिया जीवनचक्र पर संक्षिप्त टिप्पणी लिखें।

9. (a) Define Forensic report writing and presenting evidence. What are the key principles of writing a forensic report? (5)
फोरेंसिक रिपोर्ट लिखने और साक्ष्य प्रस्तुत करने को परिभाषित करें। फोरेंसिक रिपोर्ट लिखने के प्रमुख सिद्धांत क्या हैं?

(b) Briefly explain the structure of a forensic report and the presentation of evidence. (5)
फोरेंसिक रिपोर्ट की संरचना और साक्ष्य की प्रस्तुति को संक्षेप में समझाएं।

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NBCA/M-26

CLOUD DEPLOYMENT AND AUTOMATION

Paper : B23-CTS-603

BCA (CTIS)

Time : Three Hours] [Maximum Marks : 50

Note : A candidate will be required to answer *five* questions in all, selecting *one* question from each unit in addition to Compulsory Question No. 1. All questions carry equal marks.

Compulsory Question

1. Short Answer (Attempt *all*) :
   (a) Define cloud deployment models.
   (b) What is Infrastructure as Code (IaC)?
   (c) What is Ansible?
   (d) Explain AWS Lambda.
   (e) Explain auto-scaling. (2×5=10)

UNIT–I

2. Explain cloud deployment models (public, private, hybrid, multi-cloud) with advantages and use cases. Also compare AWS and Azure services. 10

3. Describe :
   (a) Storage options : Azure Blob, file & block storage.
   (b) Subnets & load balancer. 10

UNIT–II

4. Explain AWS Cloud Formation with Stacks and Templates. 10

5. Explain AWS CLI and Azure CLI with automation use cases. 10

UNIT–III

6. Explain the following configuration management tools :
   (a) Ansible.
   (b) Chef.
   (c) Puppet. 10

7. Write short note on the following :
   (a) CI/CD concepts.
   (b) AWS CodePipeline & CodeBuild. 10

UNIT–IV

8. Explain cloud monitoring tools :
   (a) AWS Cloud Watch.
   (b) Azure Monitor. 10

9. Explain :
   (a) IAM roles & policies.
   (b) Disaster recovery planning. 10

Roll No. ..... Total Pages : 2

37588

NBCA/M-26

BASICS OF BLOCKCHAIN

Paper : B23-CTS-604

(BCA-CTIS)

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. Define the following :

(a) Distributed ledger.

(b) Ethereum Vritual Machine.

(c) Digital Signature.

(d) Consensus.

(e) Mining Pool.

UNIT–I

2. Explain Centralized and Decentralized Blockchain systems.

3. Explain the applications of Blockchain in Supply chain.

UNIT–II

4. Explain structure of block in detail.

5. Explain the different security threats in Blockchain and the different measures adopted for Protection and Mitigation.

UNIT–III

6. Briefly explain the different layers of Blockchain. Also give the vulnerable layers among these with suitable reason.

7. Explain Transaction Workflow in Bitcoin.

UNIT–IV

8. What are the different limitations of Blockchain.

9. Explain any case study of e-Governance initiatives using Blockchain technology in any Indian state.

BCA CTIS 2nd Non NEP / Library

Roll No. ..... Total Pages : 3

TBCA/M-26 **3680**

COMPUTER NETWORKS

Paper–BCA–CTIS–201

Time Allowed : 3 Hours] [Maximum Marks : 60

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 any **six** of the following questions in brief :

   (a) List any two advantages of Networking in organizational environments.

   (b) What is meant by Logical topology?

   (c) Name any two wireless LAN standards.

   (d) What is ARP used for in a Network?

   (e) What type of service does IP provide to upper layers?

   (f) What is the purpose of ICMP in a network?

   (g) What do you mean by Remote access in Networking?

   (h) Name any one tunnelling protocol.

UNIT–I

2. (a) Classify different types of Computer networks based on geographical coverage and usage.

   (b) Compare workgroup and domain-based network architectures.

3. (a) Name any two transmission media used in networks and discuss their characteristics.

   (b) Name any three important protocols of the TCP/IP model and specify their purpose.

UNIT–II

4. Examine the functional responsibilities of various network devices such as NIC, repeater, bridge, switch, router and gateway.

5. Evaluate the role of CSU/DSU and modems in enabling communication over Digital and analog transmission systems.

UNIT–III

6. Describe the addressing scheme followed in IPv4 and compare the structure of IPv4 and IPv6 datagrams.

7. (a) Give an introduction of WANs and WAN switching techniques.

(b) Evaluate how satellite-based and cellular technologies contribute to wide-area connectivity?

UNIT–IV

8. (a) What is the role of authentication and authorization in Network security?

   (b) How does each stage of a network troubleshooting model contribute to problem resolution?

9. (a) Given a network issue scenario, demonstrate how command-line tools such as ping, traceroute and netstat can be used to identify and isolate faults.

   (b) Give a brief description of the use of system monitoring and hardware troubleshooting tools, along with examples of tools.

Roll No. ..... Total Pages : 3

TBCA/M-26 **3681**

DATA STRUCTURES

Paper–BCA–CTIS–202

Time allowed : 3 Hours] [Maximum Marks : 60

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 questions: $8\times\frac{1}{2}=12$

   (i) What is meant by data structure?

   (ii) What is sparse matrix?

   (iii) Enlist the various ways to storage strings in computer memory.

   (iv) What is meant by recursion?

   (v) What is meant by queue?

   (vi) What is a binary search tree?

   (vii) State any two applications of trees.

   (viii) Comment on the purpose of Warshall's algorithm.

UNIT–I

2. (a) Discuss the various classifications of data structures in detail. 6

(b) Write an algorithm for deleting an element from a one–dimensional array and explain the same using suitable example. 6

3. (a) Explain various types of arrays. Discuss how you can find an address of an element in one and two dimensional array. 6

(b) How can you analyze performance of an algorithm? Explain using suitable examples. 6

UNIT–II

4. (a) Discuss the various basic operations on strings using suitable examples. 6

(b) Write an algorithm to convert an infix expression to prefix expression and explain the same using suitable example. 6

5. (a) Discuss the various ways to store stacks in computer memory using suitable examples. 6

(b) Discuss the various types of linked lists along with their memory representations. 6

UNIT–III

6. (a) Discuss the various ways to store queues in computer memory using suitable examples. 6

(b) Write an algorithm to traverse a binary tree using preorder traversal and explain the same using suitable example. 6

7. (a) Write and explain the algorithm to search an element using binary search. 6

(b) Write and explain the algorithm to sort the given data using insertion sort. 6

UNIT–IV

8. What is an AVL tree? Explain the process of insertion, deletion and searching in an AVL tree using suitable examples. Also discuss the significance of AVL tree. 12

9. (a) Write and explain the Dijkstra's algorithm. 6

(b) Write and explain Prim's algorithm to find minimum spanning tree. 6

Roll No. ..... Total Pages : 2

TBCA/M-26 **3683**

WEB DESIGNING–II

Paper–BCA–CTIS–205

Time allowed : 3 Hours] [Maximum Marks : 60

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: 4×3=12

   (i) Differentiate between == and === operators in JavaScript.

   (ii) Define constants in PHP. How are they different from variables?

   (iii) Compare cookies and sessions in PHP.

   (iv) What are prepared statements in MySQLi?

UNIT–I

2. Explain the use of jQuery selectors. Write a code to apply styles using selectors. 12

3. (a) Describe how Bootstrap can be integrated with jQuery. 6

(b) Explain JavaScript functions. Write a program to demonstrate function definition, parameters and return values. 6

UNIT–II

4. What are arrays in PHP? Write a program demonstrating indexed, associative and multidimensional arrays. 12

5. Describe user–defined and built-in functions in PHP. Write an example of each and explain their use. 12

UNIT–III

6. Explain how file uploads work in PHP. Write a PHP script to upload a file. 12

7. Explain the regular expressions. What are their advantages in form validation and string processing? 12

UNIT–IV

8. Write PHP code to perform a DELETE operation on a MySQL table based on a user's input. Explain the process. 12

9. (a) Describe the steps to select a database after connecting to MySQL using PHP. 6

   (b) Write a PHP program to insert form data into a MySQL database table. 6

Roll No. ..... Total Pages : 3

TBCA/M-26 **3685**

DATA BASE MANAGEMENT SYSTEM

Paper–BCA–CTIS–208

Time allowed : 3 Hours] [Maximum Marks : 60

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 questions: 8×1½=12

   (i) Define database sub–schema and database instance?

   (ii) Differentiate between logical and physical data independence.

   (iii) What are inference rules in functional dependency?

   (iv) Write a note on Domain Key Normal Form (DKNF).

   (v) How do you perform Cartesian product? State example.

   (vi) Write a note on referential integrity constraint.

   (vii) Why do we use Alter and Update statement in SQL? Write syntax.

   (viii) Define functions and packages in PL/SQL?

UNIT–I

2. (a) Define Data Base Management System (DBMS)? What are its properties? Discuss database characteristics. 6

   (b) What are database functions and interfaces? State examples. 6

3. (a) Who is Data Base Administrator (DBA) and Application Developer? Write the responsibilities of a DBA. 6

   (b) Write note on 1–tier and 2–tier database architecture. How mapping is performed in 3–tier architecture? 6

UNIT–II

4. What is data model? Explain network data model along with its advantages and disadvantages. How relational model is different from network data model? 12

5. Explore the benefit and need of normalization. Discuss the normal forms based on the concept of full and partial functional dependency and join dependency. 12

UNIT–III

6. (a) What do you mean by entity, attribute and relationship? Discuss different types of attributes in reference to inventory system. Show its symbolic notations. 6

   (b) What is relationship role name and recursive relationship? Write about total and partial participation constraint. Show its symbolic notations. 6

7. (a) How relational algebra is different from relational calculus? Explain the following operations with example:

(i) Intersection (ii) Project

(iii) Join. 6

(b) Differentiate between Tuple Relational Calculus (TRC) and Domain Relational Calculus (DRC). How do we express query in TRC and DRC? State example. 6

UNIT–IV

8. (a) Write the syntax and example to create relations using primary key, foreign key, check, null and default constraints. 6

(b) How do we write SQL queries using where, group by and order by clause? State example. 6

9. (a) Outline and explore PL/SQL block structure. State examples illustrating the use of control structure in PL/SQL. 6

(b) Why do we use cursors and triggers in PL / SQL? Write the syntax to create trigger (before / after with insert / delete / update) in PL / SQL. 6

BCA CTIS 4th Non NEP/ Library

Roll No. ..... Total Pages : 3

TBCA/M-26 **3689**

SERVER ADMINISTRATION

Paper–BCA–CTIS–404

Time allowed : 3 Hours] [Maximum Marks : 60

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 questions: 4×3=12

   (i) What is Windows Deployment Services and how is it used to deploy operating systems over a network?

   (ii) What are the key considerations and best practices when configuring EFS in a multi–user environment?

   (iii) How does Windows use NTFS and share permissions to control access to files and folders?

   (iv) How does the DNS address resolution process work from a client query to the final IP address retrieval?

UNIT–I

2. (a) Describe the process of adding and removing roles and features using Server Manager in Windows Server 2012. 6

(b) Explain how partitions are created and managed during the installation of Windows Server 2012. 6

3. (a) How does Server Core improve security and resource efficiency compared to the full GUI version? 6

(b) How is local storage configured in Windows Server 2012? Describe the use of disk management tools. 6

UNIT–II

4. (a) What is the Encrypting File System? Explain the process of encrypting a file using EFS and the changes that are made to the file metadata. 6

(b) How is the cipher command–line tool used to manage EFS–encrypted files and folders? Also discuss different switches available with the cipher command and what tasks can be performed with it? 6

5. (a) What is BitLocker To Go? Explain the steps to configure and use BitLocker To Go for securing external drives. 6

(b) Explain the process of storing, retrieving and backing up BitLocker recovery keys securely. 6

UNIT–III

6. Describe the Windows permission architecture? How does it integrate user rights, group membership and access control? How does Windows process allow and deny permissions when a user has multiple permission entries? 12

7. (a) Explain the components and features that FSRM adds to file server management. 6

(b) What is a file group in FSRM and how is it used in file screening and quota templates? Describe the process of creating a custom file group to monitor or block specific file extensions. 6

UNIT–IV

8. (a) How does the DNS address resolution process work from a client query to the final IP address retrieval? What role do recursive and iterative queries play in DNS resolution? 6

(b) How do you create and configure a new DNS zone on a Windows DNS server? 6

9. How do you create and configure DNS resource records using the DNS Manager? What are the key considerations when assigning values to resource records in a DNS zone? How does the SOA record influence zone transfers and DNS replication? Explain. 12

Roll No. ..... Total Pages : 2

TBCA/M-26 **3690**

CONTAINERIZATION USING DOCKERS

Paper–BCA–CTIS–405

Time allowed : 3 Hours] [Maximum Marks : 60

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 questions: 8×1½=12

   (i) Define a container in Docker.

   (ii) What are Docker image layers?

   (iii) Explain the difference between single–container and multi–container deployment.

   (iv) What is the role of an application server in a containerized application stack?

   (v) What is the use of Docker APIs in managing containers?

   (vi) Which Docker network is the default for standalone containers?

   (vii) How does Docker support service discovery natively?

   (viii) What is Fleet in Docker orchestration?

UNIT–I

2. Explain in detail the components of Docker architecture. How do these components work together to manage containerized applications? 12

3. Describe the concept of Docker Registry. How is it used to share Docker images? Explain the difference between Docker Hub and private registries. 12

UNIT–II

4. Discuss in detail how to build and test a full web application using Docker, including Dockerfile creation, image build, running containers and testing. 12

5. Illustrate how Docker supports multi–configuration jobs in CI/CD. Explain how containers enable consistent builds and test environments across platforms. 12

UNIT–III

6. Describe in detail the different types of Docker networks (none, bridge, host and overlay). Include how containers communicate in each case with practical examples. 12

7. Discuss how to manage Docker containers and images using the Docker Engine API. Include HTTP methods, endpoints and real–world use cases. 12

UNIT–IV

8. Explain in detail the role of Docker Compose in orchestrating multi–container applications. Include an example and key commands. 12

9. Explain how Consul integrates with Docker for service discovery and health checks. Include its components and workflow. 12

Roll No. ..... Total Pages : 3

TBCA/M-26 **3691**

INTERNET OF THINGS

Paper–BCA–CTIS–407

Time allowed : 3 Hours] [Maximum Marks : 60

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 questions in brief: 4×3=12

   (i) What are the key privacy concerns associated with IoT data collection?

   (ii) What are the major global standardization efforts for IoT?

   (iii) What are the advantages of adopting open-source architectures for IoT development?

   (iv) Why is the Web of Things considered an evolution of the Internet of Things?

UNIT–I

2. (a) What is the Internet of Things (IoT)? Explain characteristics of IoT. 6

   (b) How do IoT devices, sensors and actuators interact within an IoT system? Explain. 6

3. (a) What are the major business drivers motivating companies to adopt IoT solutions? 6

(b) What are the major security challenges in IoT deployments? Explain. 6

UNIT–II

4. (a) What is the role of Wireless Sensor Networks (WSN) in IoT and what protocols are commonly used? 6

(b) What is IEEE 802.15.4, and why is it important for low-power IoT communication? 6

5. (a) What are the key functions of the network layer in IoT architecture? Explain. 6

(b) How does KNX support smart home and building automation in IoT? 6

UNIT–III

6. (a) What are the key layers of a typical IoT architecture and what are their respective functions? 6

(b) What are the different categories of IoT devices and what are their use cases? 6

7. (a) What is IoTivity? What are the main goals of the IoTivity project? 6

(b) Describe the major components of the IoTivity stack. 6

UNIT–IV

8. (a) What are the two core pillars of the Web and how do they relate to the Web of Things? 6

(b) What are the layers in a unified multitier Web of Things architecture? 6

9. (a) What is brownfield IoT and how is it different from greenfield IoT deployments? 6

(b) How do smart applications interact with multiple smart objects to deliver intelligent services? 6

Roll No. ..... Total Pages : 3

TBCA/M-26 **3692**

DESIGNING ENTERPRISE NETWORK

Paper–BCA–CTIS–408

Time allowed : 3 Hours] [Maximum Marks : 60

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

UNIT–I

1. Answer any four of the following questions in brief:

   (i) State two major differences between the TCP/IP and OSI models.

   (ii) What is the significance of port numbers in TCP/IP communication?

   (iii) In a network with an IP address of 192.168.1.0/24, what would the subnet mask be?

   (iv) What does the IP route command accomplish in router configuration?

   (v) Name one command used to verify end–to–end host connectivity.

   (vi) What is the primary advantage of IPv6 over IPv4?

UNIT–I

2. (a) Give an overview of Ethernet LANs with a focus on its physical specifications.

   (b) What are the primary features and benefits of Cisco LAN switches? Discuss the configuration of a Cisco switch in an Ethernet LAN environment.

3. (a) Describe the structure of an IPv4 address. Also, give an overview of routing process.

   (b) What is the purpose of the Transport and application layers in the TCP/IP model?

UNIT–II

4. (a) How does subnetting enhance network efficiency and security?

   (b) Compare and contrast classful and classless IPv4 addressing.

5. Describe how to determine if two IP addresses are within the same subnet or belong to different subnets, using an example.

UNIT–III

6. Describe the steps to verify host connectivity. What tools can be used to diagnose connectivity issues at Layer 3?

7. (a) How does CIDR (Classless Inter–Domain Routing) improve IP address allocation?

   (b) How can you determine the operational status of a serial interface on a router?

UNIT–IV

8. (a) Describe the structure of an IPv6 address.

   (b) What are the functions of an IPv4 Access Control List (ACL)?

9. (a) Describe the differences between SNMP v2, and v3.

   (b) Define the term "First Hop Redundancy Protocol (FHRP)." How do FHRPs enhance network availability and resilience?

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Total Pages : 3

TBCA/M-26

3693

LOGICAL REASONING & THINKING

Paper–BCA–CTIS–410(i)

Time allowed : 3 Hours]

[Maximum Marks : 40

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:

   (a) Give one-word substitutes for the following:

   (i) A place where animals are kept

   (ii) A person who eats too much.

   (b) Define rational, irrational and real numbers. Give 3 examples of each.

   (c) At what time between 3 and 4 o'clock are the hands of the clock at right angles?

   (d) Find the sum of the first 20 terms of the arithmetic progression: 3, 7, 11, ...

UNIT–I

2. (a) Identify the odd number in each of the following sets and explain:

   (i) 121, 144, 169, 225, 242 (ii) 7, 11, 13, 17, 22.

(b) In each group below, find and explain the number that breaks the common mathematical property:

(i) 2, 3, 5, 7, 10

(ii) 16, 25, 36, 45, 64.

3. (a) Define "one-word substitute." Why is it used in formal writing?

(b) Identify the odd one out and explain your reasoning:

(i) Apple, Mango, Orange, Carrot

(ii) Train, Truck, Bus, Ship

(iii) Honesty, Integrity, Wisdom, Greed.

UNIT–II

4. (a) A and B can complete a task in 12 days. A alone can do it in 20 days. How many days will B take to do it alone?

(b) Form a pair of linear equations from this problem and solve it: "A number consists of two digits. The digit in the tens place is twice the digit in the units place. If 18 is added to the number, the digits interchange their places."

5. (a) A bag contains 3 red, 4 green, and 5 blue balls. One ball is drawn at random. What is the probability it is not blue?

(b) Two numbers are in the ratio 3:4 and their LCM is 240. Find the numbers.

UNIT–III

6. (a) A says, "Either B is lying or I am." If A is telling the truth, what can you conclude about B?

   (b) Five people A, B, C, D, and E are sitting in a row. B is to the right of A but to the left of C. D is to the right of C but not at the end. Who is sitting where? Explain.

7. (a) All cats are animals. Some animals are dogs. Write the valid conclusions from these premises.

   (b) A introduces B saying, "She is the daughter of the only son of my father." How is B related to A?

UNIT–IV

8. (a) Create a frequency distribution table (inclusive and exclusive class intervals) for the following data on marks obtained by 30 students:

   12, 18, 25, 22, 19, 24, 28, 30, 33, 35, 31, 37, 39, 40, 42, 45, 41, 47, 49, 50, 53, 55, 57, 60, 62, 63, 65, 67, 69, 70.

   (b) Discuss the main steps in data interpretation. Illustrate them using an example involving student attendance and academic performance.

9. Explain the difference between:

   (a) Qualitative interpretation and quantitative interpretation.

   (b) Descriptive and inferential data interpretation.