Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-I

Paper-I [Communicative English]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. Why is communication important in society?
2. What is Mass Communication?
3. What is the difference between Resume and Bio-data?
4. Write a face-to-face Conversation between a teacher and a student?
5. Write a prepared speech on "Intolerance in Society".
6. Write a short note on misuse of Internet?
7. Write a short note on different barriers to communication in society.
8. Imagine present day life in this world without a mobile phone?

Nalanda Open University

Annual Examination - 2020

Bachelor in Computer Application (BCA), Part-I

Paper-II (Foundation Course in Social and Environmental Science)

Time: 3.00 Hrs. **Full marks: 80**

Answer any Five questions. Question No. 1 compulsory.
किन्हीं पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य हैं ।

1. (a) Tick (√) the correct answer or Cross (×) the wrong answer against each of the following sentences. (8x1=8)
अधोलिखित में से प्रत्येक के सामने सही (√) अथवा गलत (×) जैसी स्थिति हो, का चिह्न लगायें।

(i) The French word "Renaissance" means rebirth. (True/False)
फ्रांसिसी शब्द ''रिनायसांस'' का मतलब पुर्नजन्म होता है। (सही / गलत)

(ii) Galileo Galilee who invented telescope was a noted scientist of Germany. (True/False)
गैलिलियो गैलिली, जिन्होने टेलिस्कोप का आविष्कार किया, एक ख्यातिप्राप्त जर्मन वैज्ञानिक थे। (सही / गलत)

(iii) Vasco-da-Gama discovered a new sea route to India in 1650. (True/False)
वास्को–डा–गामा ने वर्ष 1650 ई० में भारत पहुँचने के एक नये समुद्री मार्ग की खोज की। (सही / गलत)

(iv) Dandi March was led by Mahatma Gandhi to break the Salt Laws imposed by the British Government. (True/False)
महात्मा गाँधी की अगुआई में आयोजित डाँडी मार्च ब्रिटिश सरकार द्वारा अधिरोपित नमक कानून को तोड़ने हेतु था। (सही / गलत)

(v) Article 51A of the Indian Constitution enumerates fundament rights of the citizens of India. (True/False)
भारतीय संविद्यान का अनुच्छेद 51A भारत के नागरिकों के मौलिक अधिकारों को बताता है। (सही / गलत)

(vi) 'Make in India' campaign was launched by the NDA Government in 2019. (True/False)
'मेक इन इंडिया' अभियान एन०डी०ए० सरकार द्वारा वर्ष 2019 में शुभारंभ किया गया। (सही / गलत)

(vii) 12th Five year plan of the government of India (2012-2017) was India's last five year plan. (True/False)
भारत सरकार का बारहवाँ पंचवर्षीय योजना (2012–2017) भारत का अंतिम पंचवर्षीय योजना था। (सही / गलत)

(viii) The Finance Commissions are constituted periodically by the President of India under article 280 of the Indian Constitution. (True/False)
भारत के संविद्यान के अनुच्छेद 280 के अंतर्गत् भारत के राष्ट्रपति द्वारा समय–समय पर फाइनान्स कमीशन का गठन किया जाता है। (सही / गलत)

(b) Fill in the blanks with appropriate word/term.
रिक्त स्थानों की पूर्ति उचित शब्द / पद से करें।

(i) Fossel fules are an example of ……..resources.
जीवाशम ईंधन ..... संसाधन का एक उदाहरण हैं।

(ii) Earth day is an annual event which is celebrated around the world on …… .
पृथ्वी दिवस एक वार्षिक कार्यक्रम है जो पूरे विश्व में ..... को मनाया जाता है।

(iii) Expanded form of CNG is …….. .
C.N.G. का विस्तारित रूप ..... है।

(iv) Intensity of Earthquake is measured on …….. Scale.
भूकम्प की तीव्रता को ..... स्केल पर मापा जाता है।

(v) SPM is a term used in the study of …… Pollution.
SPM एक पद है, जिसका उपयोग ..... प्रदूषण के अध्ययन में होता है।

(vi) Conservation of biodiversity with all their plants and animals protected and preserved in their natural habitats is called …….. .
समग्र पेड़–पौधों एवं जीव–जन्तुओं के साथ जैवविविद्यता का अपने प्राकृतिक वास में संरक्षण एवं परिरक्षण ..... कहलाता है।

(vii) Umbrella Act is the name given to the law ……. passed by the Indian Parliament in 1986.
अम्ब्रेला एक्ट भारतीय संसद द्वारा सन् 1986 ई० में पारित नियम को ..... नाम दिया गया है।

(viii) …….. is an example of natural disaster affecting large population of North Bihar almost every year.
..... प्राकृतिक आपदा का एक उदाहरण है जो लगभग प्रति वर्ष उत्तर बिहार की बड़ी आबादी को प्रभावित करता है।

2. What do you mean by Renaissance? Throw light on the various causes of Renaissance.
रिनायसांस (या पुर्नजन्म) से आप क्या समझते हैं? रिनायसांस के विभिन्न कारणों पर प्रकाश डालिए।

3. Describe the nature and outcome of the revolt of 1857.
1857 के विद्रोह की प्रकृति एवं इसके नतीजों का वर्णन कीजिए।

4. Write a short note on the Election Commission of India and its responsibilities.
भारत के चुनाव आयोग और इसकी जिम्मेदारियों पर संक्षिप्त टिप्पणी प्रस्तुत कीजिए।

5. Give a brief description of composition and responsibilities of NITI Aayog.
नीति आयोग के गठन एवं इसकी जिम्मेदारियों का संक्षिप्त विवरण प्रस्तुत कीजिए।

6. Describe the importance of study of Environmental Science and Ecology.
पर्यावरण विज्ञान एवं पारिस्थितिकी के अध्ययन के महत्व का वर्णन प्रस्तुत कीजिए।

7. Why does biodiversity need to be conserved?
जैवविविद्यता का संरक्षण क्यों आवश्यक है?

8. Distinguish between Renewable and Non-renewable energy resources. Why it is essential to work for renewable energy resources?
नवीकरणीय एवं अनवीकरणीय ऊर्जा संसाधनों में अन्तर बताइए। नवीकरणीय ऊर्जा संसाधनों पर कार्य करना क्यों आवश्यक है?

9. "Noise pollution is essentially a feature of the technology based society of modern times". Explain the statement.
''ध्वनि प्रदूषण प्रधानतः प्रौधोगिकी आधारित आधुनिक समाज का लक्षण है।'' इस कथन की व्याख्या कीजिए।

10. Write short notes on any two of the following:-
निम्नलिखित में से किन्ही दो पर टिप्पणी लिखिएः–
(a) Smog (स्मॉग)
(b) Quit India Movement, 1942 (भारत छोड़ो आंदोलन, 1942)
(c) Biodegradable Waste (जैव निम्नीकरणीय कचरा)
(d) Make in India Campaign (मेक इन इंडिया अभियान)

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-I

Paper-III [Fundamental of IT]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. Describe the basic components of a computer system with a block diagram.
2. Discuss at least 10 application areas of Computers.
3. Discuss some Input devices used in computers with their functions.
4. What is the role of memory in Computers? Discuss various types of memory used in computers.
5. Compare and contrast between Structured programming and Object Oriented Programming. Give examples of each.
6. What is networking? Why it is requited? Discuss LAN, MAN and WAN with examples.
7. Discuss some networking devices with their uses.
8. Differentiate between transmission mode and transmission media. Discuss some transmission modes.
9. Discuss some advantages and disadvantages of Computer system?
10. Write short notes on any **two** of the following:
    a. Operating System.
    b. Unguided transmission media.
    c. Output devices

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Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-I

Paper-IV [Mathematics]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. (a) If $f(x) = \log_e\left(\frac{1+x}{1-x}\right)$ where $-1 < x < 1$

then show that $f\left(\frac{2x}{1+x^2}\right) = 2f(x)$.

(b) If $A = \{1, 2, 3\}$, $B = \{2, 4, 5\}$ then find (i) $A \times B$ (ii) $B \times A$.

2. (a) Evaluate $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ bc & ca & ab \end{vmatrix}$.

(b) If $A = \begin{bmatrix} 2 & 4 & 1 \\ 3 & 2 & 4 \\ 4 & 1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -2 & 1 \\ 4 & 3 & -2 \\ 2 & 4 & 3 \end{bmatrix}$ then find (i) $A + B$ (ii) $5A - 3B$.

3. (a) Find the three consecutive terms of an A.P. whose sum is 21 and product of last two terms is 63.

(b) If a, b, c, d are in GP then prove that $(b - c)^2 + (c - a)^2 + (d - b)^2 = (a - d)^2$.

4. (a) Express the following in the form $a + ib$, a, b, ϵ R $\frac{(1+i)^3}{4+3i}$.

(b) If w be an Imaginary cube roots of unity then show that:
$(1 - w)(1 - w^2)(1 - w^4)(1 - w^5) = 9$

5. If α and β are the roots of the equations $ax^2 + bx + c = 0$ then, find the value of

(i) $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ (ii) $\left(\frac{\alpha}{\beta} - \frac{\beta}{\alpha}\right)^2$.

6. Solve the equation by Ferrar's method $x^4 - 3x^2 - 42x - 40 = 0$.

7. (a) Find the differential coefficient of $\sin x$ with respect to x with the help of first principle.

(b) Find the limits $\underset{x \to 4}{Lt} \frac{x^3 - 2x^2 - 9x + 4}{x^2 - 2x - 8}$.

8. Find the differential coefficient of the following:

(a) $y = \cos\sqrt{\sin\sqrt{x}}$ (b) $y + x = \text{Sin}(x + y)$

(c) $y = \frac{x \tan x}{\sin x + \cos x}$.

9. Integrate the following.

(a) $\int \frac{(\log x)^2}{x} dx$ (b) $\int \frac{3 - x^2}{1 + x^2} dx$ (c) $\int \frac{e^{2x} - e^{4x}}{e^x - e^{-x}} dx$.

10. Find the centricity of an ellipse if its latus rectum is equal to the one half its major axis.

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-I

Paper-V [Programming Methodology using C]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. What is an algorithm? Describe the properties of an algorithm. Write an algorithm to find the greater of two numbers entered from the keyboard.

2. Define flowchart. Describe the symbols used for drawing a flowchart. Draw a flowchart to print the series of even numbers upto given **n** terms.

3. What are keywords in C programming? Explain at least 10 keywords used in C programming.

4. Explain different types of primary **data types** used in C programming with examples.

5. Explain relational operators used in C language with examples.

6. Write a program of your own choice using **for** loop. How it is different from **while** loop? Discuss using an example.

7. Explain Loop Control statements with the help of an example.

8. How strings are handled in C language. Explain with the help of an example.

9. Define function. Differentiate between call by value and call by reference with the help of an example.

10. Write short notes on any **two**:
    (a) Automatic variables
    (b) Static variables
    (c) Bitwise operators
    (d) Pointers.

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-I

Paper-VI [PC Software and Office Automation]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. Describe the features of MS-Windows. What are the components of MS-Windows? Discuss.

2. What is the use of Control Panel? Discuss at least 10 important icons of the Control Panel.

3. What is WordPad? Discuss the features of WordPad.

4. Describe at least five features of MS-Word. What is Header, footer, bullets and numbering in MS-Word?

5. Define Mailmerge in MS-Word. Explain how documents are created and merged in Mailmerge.

6. Differentiate between WordArt and ClipArt in MS-Word. What is cropping a picture in MS-Word?

7. Compare and contrast the concept of tables in MS-word and MS-Excel. How formulas are entered in MS-Excel? Give an examples to enter different types of formulas.

8. What are different types of charts available in MS-Excel? Explain with the help of diagrams.

9. Describe the steps involved in creating a new PowerPoint presentation. Explain formatting in PowerPoint.

10. Write short notes on any **two**:

    (a) Recycle bin

    (b) Toolbar

    (c) MS-Paint

    (d) Taskbar.

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-I

Paper-VII [Computer Organisation]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. Convert the following:
   (i) $(2468)_{10}$ to its $()_8$
   (ii) $(ACDB5)_{16}$ to Decimal number.
   (iii) $(1243)_8$ to its Binary equivalent.
   (iv) $(1110101101101)_2$ to Hexadecimal number

2. Simplify the following Boolean function using Sum-of-Product form, by Karnaugh's map: **F (A, B, C, D) = Σ (0, 1, 2, 3, 6, 7, 8, 13, 14).** Also draw the circuit diagram for it.

3. Discuss all the fundamental gates with their truth tables and diagrams.

4. Draw a circuit of half adder and full adder and give their truth table. Discuss the application of adders.

5. Draw combinational circuit for the following expressions:
   (a) AB'C+ A'B'+ BC+ (A+C')
   (b) A+B'+C' +B'C' +ABC
   (c) ABCD +A'BC'D + BCD

6. What are encoders? Why are they used? Draw 8x3 encoder and give its truth table.

7. Differentiate between RS flip-flop and JK flip-flop. Draw their circuit diagrams and give their characteristic tables.

8. Discuss various types of memories used with computer system. What is RAM and ROM?

9. Describe status and control registers with their examples.

10. Write short notes on any **two** of the following:
    a. Interrupts
    b. Error detection and correction
    c. Von Neumann Architecture
    d. Universal gates.

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-I

Paper-VIII [System Analysis and Design]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions carry equal marks.

1. Define and describe System Development Life Cycle in detail.

2. What is Data Flow Diagram (DFD)? What are the components of a DFD? Draw a DFD for a "Library Information System".

3. What is feasibility study? Why it is required? Explain different types of feasibility study.

4. Who is a System Analyst? Discuss the quality and qualification of a System Analyst in system development.

5. What is Input design? Discuss the import points that should be considered during Input design. How it is different from output design?

6. Discuss the design principles used in software development with examples.

7. What is modularity? Differentiate between logical and physical design.

8. What is an ER diagram? Draw an ER diagram for Hospital Management system.

9. Discuss the rules for naming tables and fields.

10. Write short notes on any **two** of the following:
    a. Joint Application Development.
    b. Process modelling
    c. Data dictionary
    d. Decision Table.

NEW

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-II

Paper-IX (OPERATING SYSTEM CONCEPTS)

Time: 3.00 Hrs. **Full Marks: 80**

Answer any Five questions. All questions carry equal marks.

किन्हीं पाँच प्रश्नों के उत्तर दीजिए । सभी प्रश्नों के अंक समान हैं ।

1. Discuss different types of Operating System. Explain the services provided by an Operating System.
2. What are the differences between DOS and UNIX Operating System? What are FAT and NTFS file system?
3. **Explain in details Inter-process communication?** What is semaphores?
4. What do you mean by deadlock? How can we prevent the occurrence of a deadlock?
5. What is paging concept in memory management? Explain the difference between paging and segmentation?
6. How Operating System handles the page fault? What is demand paging?
7. Describe the role of Direct Memory Access to reduce hardware overhead.
8. Explain Hierarchical File Structure in UNIX. Distinguish between a foreground and a background process in UNIX.
9. Write at least 8 commands with their complete syntax in UNIX. Also explain the use of each command.
10. **Write Short notes on:**
    a. Shell & Kernel
    b. Vi Editor
    c. Mobile Operating System
    d. Multiprogramming

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NEW

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-II

Paper-X (Computer Networking)

Time: 3.00 Hrs. **Full Marks: 80**

*Answer any **Five** questions. All questions carry **equal marks**.*
किन्हीं **पाँच** प्रश्नों के उत्तर दीजिए । सभी प्रश्नों के **अंक समान** हैं ।

01. Explain the TCP/IP reference model in detail.

02. What are the basic goals that a Computer network should perform? List the basic equipment required to connect a computer to the Internet.

03. **Discuss different modes of Data Transmission in details.**

04. What is the difference between the bit rate and the baud rate? Explain with an example?

05. Explain pure ALOHA and slotted ALOHA in detail.

06. What is packet switching? How does it differ from circuit switching?

07. What are datagrams and how can they be used to transmit data?

08. What is the CRC? Why would you expect a CRC to detect more errors than a parity bit?

09. Discuss different types of Network in details.

10. **Write Short notes on:**
    a. Transmission Media
    b. Hub
    c. Router
    d. Bandwidth

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NEW

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-II

Paper-XI (DBMS using ACCESS)

Time: 3.00 Hrs. **Full Marks: 80**

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

1. Discuss the architecture of DBMS with diagram.

2. What are the components of DBMS? Explain.

3. What are the different types of users of DBMS? Discuss the role of Data Base Administrator.

4. Differentiate between Network model and Hierarchical model of DBMS. Give examples of each.

5. Explain the properties of Relational model. What are key constraints?

6. Differentiate between different second normal form and third normal form with the help of an example.

7. What is defense Mechanism? Discuss different levels of defense recognized for database security.

8. Describe various wildcards used in MS-Access with their uses.

9. Draw an ER- diagram for Library Information system. Explain the components of the ER-diagram.

10. Write short notes on any **two**:
    (a) ACID properties of a Transaction
    (b) E.F. Codd's rules
    (c) Generalization and Specialization.
    (d) Advantages of DBMS.

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NEW

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-II

Paper-XII (MULTIMEDIA AND ANIMATION)

Time: 3.00 Hrs. **Full Marks: 80**

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

1. What is a Word Processor? Discuss some Word Processing tools..

2. Define HTML. Describe Font editing and design tools used in Multimedia.

3. What is an image file? Describe at least five image file formats. Differentiate between lossy and lossless compression.

4. Explain the twelve basic principles of animation.

5. What is production phase of multimedia? Discuss the major stages of production.

6. What are the tips you will suggest for engaging movies? Also give some suggestions for shooting a movie.

7. What is Project planning? Discuss Sliding Window planning in detail.

8. What are the main attributes of designing a World Wide Web? How animation works on web? Explain.

9. Discuss about the Adobe multimedia structure. Explain five different tools used in Photoshop.

10. Write short notes on any **two**:
    (a) Authoring tools
    (b) CD-ROM Technology and standards
    (c) MS-Excel
    (d) Image editing in multimedia.

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NEW

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-II

Paper-XIII (Data Structure Using C)

Time: 3.00 Hrs. **Full Marks: 80**

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

1. Explain the approaches for designing an algorithm. What do you understand by efficiency of an algorithm?

2. Differentiate between graphs and trees with examples. What are the different types of operations applied on data structures.

3. Define Arrays. Explain different types of arrays with examples.

4. How Linked list is different from Stack data structure? Explain using an example.

5. Explain insertion and deletion operation on a single linked list with the help of an example.

6. Write a program that merges two Linked list and prints the number of non-zero elements in the list.

7. Discuss push and pop operation on Stack. What are the different application areas of Stack? Explain using examples.

8. Explain Pre-order, Post-order and In-order traversal in trees with the help of an example.

9. Define AVL trees. Describe the operations on AVL tree with an example. What are the applications of AVL trees?

10. Write short notes on any two:
    (a) Queue
    (b) B tree
    (c) Sorting
    (d) Searching

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NEW

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-II

Paper- XIV: Objected Oriented Programming Using C++

Time: 3.00 Hrs. **Full Marks: 80**

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

1. What is the Need of Object Oriented Programming? Explain.

2. Explain briefly at least three methods of Object Oriented design

3. What are different data types used in C++? Explain with the help of examples.

4. Discuss various looping statements in C++ with examples.

5. What are conditional statements in C++? Explain using proper examples.

6. Explain enumerated data types with examples. What is a function?

7. Differentiate between function overloading and function overriding with the help of an example.

8. What is data conversion? What are the shortcomings of data conversions? Write a program to find the largest element in an array of 10 numbers.

9. Differentiate between virtual, static and friend function with the help of an example.

10. Write short notes on any **two**:
    a. Loop Control statements
    b. Pointer
    c. Relational operators
    d. Constructors.

NEW

Nalanda Open University

Annual Examination – 2020

Bachelor in Computer Application (BCA), Part-II (NEW)

Paper- XV: (Statistical Methods and Linear Programming)

Time: 3.00 Hrs. **Full Marks: 80**

Standard Calculator is Allow

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

1. Define Statistics and write its characteristics.
2. What is 'discrete' series? Give an example of discrete series.
3. Draw cumulative frequency curve and find the median from the following data.

CI	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
f	4	6	10	15	22	14	9	5

4. Find the arithmetic mean from the following data.

x	64	65	66	67	68	69	70	71	72	73	74
f	1	6	10	22	24	17	13	5	4	2	6

5. From the following data find the median.

Mid value	115	125	135	145	155	165	175	185	195
Frequency	6	25	48	72	116	60	38	22	3

6. Calculate the standard deviation from the following data.

Marks more than	0	10	20	30	40	50	60	70
No. of Students	100	90	75	50	25	15	5	0

7. Discuss the relative merits of range standard deviations and mean deviations as measure of dispersion.
8. Find the Karl Pearson's coefficient of skewness from the following data.

x	4	6	8	10	12	14	16	18
f	2	3	5	7	10	4	6	3

9. Explain the following terms.

   (a) Random Experiment (b) Sample Space (C) Trial and Events

10. Given P(A) = 3/8, P(B) = 5/8 and P(AUB) = 3/4 find P(A/B) and P(B/A).

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Bachelor in Computer Application (BCA), Part-II (NEW)

Paper- XVI: (Internet and Web Technology)

Time: 3.00 Hrs. **Full Marks: 80**

Answer any five questions. All questions are compulsory.

1. Explain the concept of Internet domain with the help of an example.

2. Discuss Internet Server Identities. Differentiate between VSAT and ISDN.

3. Explain Client IP address. What are the two principle functions served by IP address?

4. Compare and contrast between Simple Network Management Protocol (SNMP) and File Transfer Protocol (FTP).

5. Discuss Text formatting in HTML. Give examples.

6. How graphics are added in HTML? Describe different Image attributes.

7. Describe different types of data types used in Java with examples of each.

8. Explain the control statement in Java with examples. What are Arrays?

9. Differentiate between Servlet and JSP. Explain JSP Application Architecture with diagram.

10. Write short notes on any **two**:
    (a) Web Servers.
    (b) Frames
    (c) TCP/IP protocol
    (d) WWW.

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Bachelor in Computer Application (BCA), Part-III

Paper-XVII [Advanced Computer Networking]

Time: 3.00 Hrs. **Full Marks: 80**

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

Answer any FIVE questions .All questions carry equal marks.

1. Describe various classes of computer. Also discuss the role of computer in networking.

2. Discuss various storage devices used in computer system.

3. What is an operating system? Discuss the functions of kernel.

4. Explain different types of network topologies with diagram. Give examples for each.

5. **Differentiate between the following :**
   (i) Physical Addressing and Logical Addressing
   (ii) Access Layer distribution layer.

6. Explain the concept of LAN, MAN and WAN with examples.

7. What is the importance of Internet Protocol (IP) in Networking? Explain.

8. Discuss various types of transmission media used for networking with examples.

9. Discuss various devices used in Networking. Also state the layers they are used in.

10. **Write short notes on any two:**
    (i) Peer-to-peer networking
    (ii) Rules of Communication
    (iii) Message Encoding
    (iv) Message formatting.

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[Paper-XVIII: Software Engineering]

Time: 3.00 Hrs. **Full Marks: 80**

Answer any Five questions. All questions carry equal marks.

1. Define software engineering. Discuss the need of software engineering.
2. Define software. Describe the characteristics of a good software.
3. What is software metrics? Why it is important. Explain the scope of software metrics.
4. Define and describe Software Development Life Cycle (SDLC).
5. What is risk management? Discuss different types of risk. Why risk management is required during software development.
6. Discuss various project management tools. What is COCOMO model?
7. What is fact-finding technique? What are the tools used for fact-finding? Describe different types of requirements in detail.
8. Define modularization. Describe coupling and cohesion.
9. Draw a DFD for "Railway Reservation System".
10. **Write short notes on any two:**

    (a) Umbrella Activities in software engineering.

    (b) Waterfall model

    (c) Incremental model.

    (d) Spiral model

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Paper-[XIX: Java Programming]

Time: 3.00 Hrs. **Full Marks: 80**

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

1. Define Java. Discuss the features of Java.
2. Describe at least 10 keywords used in Java with their functions.
3. What is an array? Explain one dimension and two dimension arrays with an example in Java.
4. Discuss various data types used in Java programming with examples.
5. Define and discuss arithmetic operators and relational operators used in Java.
6. What is a class? Write a program in Java to explain the concept of class and objects.
7. Define Inheritance. Explain different types of Inheritance with examples.
8. What is the concept of constructor? How many types of constructors are there in Java? Explain with the help of an example.
9. What is an applet? Explain the importance of applet programming in Java and generate multiplication table of 5 through applet.
10. **Write short notes on any two:**
    (a) Function Overloading
    (b) Looping statements in Java.
    (c) Type Casting
    (d) Increment and decrement operators.

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Paper- XX: RDBMS

Time: 3.00 Hrs. **Full Marks: 80**

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

1. Define DBMS. Discuss the advantages of DBMS. What are the limitations of File based system?

2. Describe DBMS architecture. Explain the difference between logical independence and physical independence of data?

3. Explain E-R diagram with the help of an example. Discuss the components of an E-R diagram.

4. Explain the concept of Specialization, Generalization and Inheritance with the help of an example.

5. What is SQL? Describe at least 10 SQL commands with their syntax and use.

6. Define relation. Discuss the properties of relation. What are relational keys?

7. Explain DDL, DML and DCL with at least two examples of each.

8. What is Normalization? Explain 2NF and 3NF with the help of an example.

9. What is an index? Discuss different types of indexes with the help of examples.

10. **Write short notes on any two:**
    (a) Types of attributes
    (b) Relationship cardinality.
    (c) Views
    (d) Relational algebra.

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Bachelor in Computer Application (BCA), Part-III

Paper- XXI: Programming in VB.Net

Time: 3.00 Hrs. **Full Marks: 80**

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

1. Explain different fundamental properties & methods of Window forms?

2. Explain the implementation of inheritance in vb.net?

3. Explain the application class and message class of vb.net?

4. What is dialog box? Explain different types of dialog box used in vb.net?

5. What is attributes? Explain its properties. Discuss the targets of attributes.

6. Discuss on events and event handler. Explain the role of delegates on VB .NET.

7. Define validation. Discuss some common data validation required.

8. Explain different types of .NET Assemblies. What are the different types of information handled by these assemblies?

9. What is FileStream? Lists few commonly used *System.IO* namespace with its descriptions.

10. **Write short notes on any two:**
    (a) Elements of Windows Graphical Interface.
    (b) MDI (Multiple Document Interface).
    (c) Polymorphism
    (d) Class

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Paper-XXII [Computer Oriented Numerical Techniques]

Time: 3.00 Hrs. **Full Marks: 80**

*Answer any **Five** questions. All questions carry equal marks. **Calculator is allowed.***

1. (a) Using the Newton-Raphson method. Find the square root of 13 with initial approximation $x_o = 3$.

   (b) Find a real root of the Equation $x^3 - 4x - 9 = 0$ using the Bisection method.

2. Solve the system of equations using Gauss Elimination method.

$$3x_1 + 2x_2 + x_3 = 3$$
$$2x_1 + x_2 + x_3 = 0$$
$$6x_1 + 2x_2 + 4x_3 = 6$$

3. (a) Use Lagrange's formula to find the value of $f(8)$ given.

x	4	5	7	10	11	13
$f(x)$	48	100	294	900	1210	2028

   (b) Estimate the value of $f(1.45)$ from the given data.

x	1.1	1.2	1.3	1.4	1.5
$f(x)$	1.3357	1.5095	1.6984	1.9043	2.1293

4. (a) State and Prove Trapezoidal rule.

   (b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ subdividing the interval (0,1) into 6 equal parts and sing Simpson's $\frac{3}{8}$ th rule.

5. Using the third order Taylor's series method, find the solution of the differential equation.
   $xy' = x - y$, $y = 2$ at $x = 2$ taking $h = 0.1$

6. Solve the following system of equation by Jacobi's iteration method.

$$2x_1 + x_2 - 3x_3 + 9x_4 = 31$$
$$3x_1 - 4x_2 + 10x_3 + x_4 = 29$$
$$2x_1 + 12x_2 + x_3 - 4x_4 = 13$$
$$13x_1 + 5x_2 - 3x_3 + x_4 = 18$$

7. (a) Construct a difference table for the following data.

x	1.3	1.5	1.7	1.9	2.1	2.3	2.5
$f(x)$	3.669	4.482	5.474	6.686	8.166	9.974	12.182

   Taking $h = 0.2$, compute $f'(1.5)$

   (b) Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

8. Using the Fourth order Taylor's series method find the solution of the differential equations.
   $y^1 = x^2 + y^2$, y (o) = 0.5 find y (0.4) taking $h = 0.2$

9. Solve the following IVPS using Runge Kutta fourth order method.
   $y' = 1 - 2ty$, $y(0.2) = 0.1948$. Find $y(0.4)$ taking $h = 0.2$

10. Solve the following IVPS using Euler's method.

    $y' = \frac{1}{x^2 - 4y}$, $y(4) = 4$. Find $y(4.1)$ taking $h = 0.1$

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Bachelor in Computer Application (BCA), Part-III

Paper- XXIII: Theory of Computation

Time: 3.00 Hrs. **Full Marks: 80**

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

1. Define Regular expression. Write and explain the rules of writing a regular expression.

2. Write at least five Regular expressions and draw their finite automata.

3. Differentiate between Deterministic Finite Automata (DFA) and Non-Deterministic Finite Automata (NFA). Give examples for each.

4. Discuss Chomsky classification of Grammar with examples.

5. Define Context Free Grammar. Discuss closure properties of CFG with examples.

6. Explain pumping lemma for Regular Language. Give examples to explain the concept.

7. Define Turing Machine. Construct a Turing Machine for the following functions:

   f(m,n) : m x n (multiplication). Write all the steps in detail.

8. Discuss pushdown automata with the help of an example.

9. Discuss parse tree with the help of an example. Show ambiguity of grammar using parse tree.

10. **Write short notes on any two of the following:**

    (i) Null NFA
    (ii) Equivalence of PDA and CFG
    (iii) Undecidable languages.