Gandaki College of Engineering and Science

Level: Bachelor | **Internal Exam** | Year: 2024
Program: Computer Engineering | Semester: Spring | Full Marks: 100
Course: Advanced Programming in Java | Time: 3 hrs.
Pass Marks: 45

Candidates are required to give their answer in their words as for as practicable.

The figures in the margin indicate full marks.

Attempt all the questions

1. a) Describe Java Architecture with diagram. 8
   b) Define the importance of setting up class path. What is the importance of package? 7
2. a) Differentiate between Java abstract class and interface with a sample program. 8

   OR

   Define subclass and superclass. How can we achieve multiple inheritance in Java? Explain with example.
   b) Explain upcasting and downcasting with an example. 7
3. a) Differentiate between AWT and Swing. Write the GUI program using components to find the sum of two numbers 8
   b) Why do you need event handling? Explain the use of action event with an example. 7
4. a) Define Java Socket Programming. Write a java program to create own client and server. 8
   b) Define RMI stubs and skeleton. Explain RMI architecture layer in detail. 7

   OR

   Why CORBA is important? Compare CORBA with RMI.
   a) What is JDBC? Draw JDBC architecture and explain JDBC drivers with their advantages and disadvantages. 8
   b) WAP to connect a JAVA program with database successfully. 7
5. a) What is Servlet? Explain the life cycle of servlet. 7
   b) Write a simple JSP file to display "GCES" five times. 8

Write short notes on: *(any two)* 2*5

i) ORM
ii) OOP Principle
iii) HTTP methods- GET POST

Gandaki College of Engineering and Science

Pokhara - 16, Lamachour

Level: Bachelor | Year 2024

Programme : BE Computer | Full Marks: 100

Course: Applied Mathematics | Pass Marks: 45

Semester: IV (Spring) | Time: 3 hrs

Candidates are required to give their answer in their own words as far as practicable.

Attempt all the questions.

Q. 1 a) Define harmonic function. check

$U(x, y) = 3x^2y + x^2 - y^3 - y^2$ is harmonic or not?. If yes, find a function V (x, y) such that $u + iv$ is an analytic function. (7)

b) Define bilinear transformation. find a bilinear transformation which maps the points i, - i, 1 of the z - plane into 0, 1, ∞ of the w - plane respectively. (8)

Q. 2 a) State Cauchy integral formula for derivative. Evaluate $\oint_C \frac{cotz}{(z-\frac{\pi}{2})^2} dz$

Where C is the ellipse $4x^2 + 9y^2 = 36$ (7)

or

Find the Laurent's or Taylor's series which represents the function. $f(z) = \frac{z^2-1}{(z+2)(z+3)}$

i) When $|Z| < 2$ ii) When $2 < |Z| < 3$ iii) When $|Z| > 3$

Q. 2 b) State Cauchy residue theorem.; Integrate $\oint_C \left(\frac{z-23}{z^2-4z-5}\right) dz$; where: $|Z-2| = 4$ (8)

3. a) State and prove first shifting theorem of Z - transform. Using it evaluate the Z transform of $a^n \cos bt$ and $a^n \sin bt$ (7)

b) Solve the difference equation by using Z- transform.

$U_{x+2} - 2\cos\propto U_{x+1} + U_x = 0$: Where $U_0 = 0, U_1 = 1$ (8)

4. Show th

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b)

c)

d)

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Full marks: 100
Pass marks: 45

4. Show that : a. $\int_0^\infty \left[\frac{\cos xw + w \sin xw}{1+w^2}\right] dw = \begin{cases} 0 & if\ x < 0 \\ \frac{\pi}{2} & if\ x = 0 \\ \pi e^{-x} & if\ x > 0 \end{cases}$ (7)

b) Find the Fourier transform of the function $f(x) = \begin{cases} e^x & if\ x < 0 \\ e^{-x} & if\ x < 0 \end{cases}$ (8)

5 a) Derive one dimensional wave equation; $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ with necessary assumption. (7)

b) Define partial differential equation find the solution of one dimensional heat equation under certain initial and boundary condition. (8)

6 a) Find the temperature in a laterally insulted bar of length L whose ends are kept at temperature O^0 C, assuming that the initial temperature is

$$f(x) = \begin{cases} x & if \quad 0 < x < \frac{L}{2} \\ L - x & if \quad \frac{L}{2} < x < L \end{cases}$$ (7)

b) Express the Laplacian; $\nabla^2 u = \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}$ in polar co-ordinates. (8)

7. Attempt all the questions: (4×2.5=10)

a) Find Z - transform of n.

b) Show that $f(z) = z^2$ is an analytic function.

c) Solve the partial differential equation $u_{xy} = u_x$

d) Expand $f(z) = \frac{2-z}{(1-z)^2}$ by using Maclaurin's series expansion.

-Best of Luck-

Pokhara University
Faculty of Science and Technology

Full marks:
Pass marks: 45
Total Lectures: 45 hrs
Program: BE (Computer)

GANDAKI COLLEGE OF ENGINEERING AND SCINECE

Level: Bachelor
Programme: BE
Course: Theory of Computation

Semester: Spring
Year : 2024
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Give the formal definition of DFA. Design a DFA that accepts a set of string such that string contains string not ending with aba over alphabet {a,b}. 8

   b) Convert the following R.E. to equivalent E-NFA 7

      1. a*(a+b)*bb
      2. (0+1)* (00+11)* (0+1)*

2. a) State the pumping lemma for regular set. Show that L = {$a^n b^n$| n>0 } is not regular. 7

   b) Convert the following CFG into Chomsky Normal Form. 8

   S →Sbb|aabb|Aa|Bb

   A →Aa|a

   B →Bb|b|Ɛ

a) Define Context Free Grammar. Check whether the given grammar S→aB|ab 7

A→aAB | a

B→AB | b is ambiguous or not.

b) Design a PDA for the language $L=\{a^n b^{2n}$, where $n>=1$. 8

4. a) "TM is functionally stronger than PDA and FA". Explain this statement with their suitable block diagram. 8

b) State the pumping lemma for context free language. Prove that $L=\{a^n b^n c^n$, not context free language$\}$. 7

5. a) Construct a Turing Machine that recognizes the language $L=\{ a^n b^n c^n>=0\}$. Check the acceptance of string aaabbbccc. 8

b) Convert the following CFG to equivalent PDA 7

$S \rightarrow 0S1|0AA|1BB$

$A \rightarrow 1A|0$

$B \rightarrow 0B|1$

6. a) Write Turing machine used for computing of a function with example. 5

b) Differentiate between Recursive and Recursively enumerable languages. 5

c) Define computational complexity theory. Define class P and class NP. 5

7. Write short notes on: (**Any two**) 2×5

d) Halting problem is undecidable

e) Write about Church Turing thesis and universal Turing machine.

f) Chomsky hierarchy.

Gandaki College of Engineering and Science

Level: Bachelor — Semester – Spring — Year : 2024
Programme: BE (Computer and Software) — Full Marks : 100
Course: Research Fundamentals — Time : 3 hrs

Candidates are required to give their answer in their words as for as practicable.
The figures in the margin indicate full marks.
Attempt all the questions

1. a) What do you mean by research? What are the types of research? Explain any one. 7

   b) Compare research with project. What are the reasons for doing research? Explain in brief. 8

2. a) What is a literature review in research? How do you conduct a literature review? 8

   b) Explain in brief about the different strategies to answer research question? 7

   OR

   What are the different types of referencing systems? Explain any one type of Referencing systems and citation.

3. a) How do you develop research questions in Research? How can a researcher evaluate a research process? 7

   b) What are the different data generation methods in research process? Explain the types of method triangulation in a research project. 8

   OR

   Explain the different types of data analysis in research project.

4. a) Who are the participants of research? What are the different laws which must be followed by an ethical researcher? 7

b) How are the respondents of a research project? What are the responsibilities of an ethical researcher? 8

5. a) What is a research proposal? Why do we need to write research proposal? 8

b) Highlighting the major component of research proposal, write a proposal on "Establishing an IT park in Gandaki Provence". 7

6. a) What is research report? Why do we need to write a research report? 7

b) What is research paper? Differentiate peer reviewed article with report. 8

7. Write short notes on (any two). 2*5

a) 6 Ps in Research

b) Conceptual Framework of research process

c) Plagiarism

GANDAKI COLLEGE OF ENGINEERING AND SCIENCE
INTERNAL ASSESMENT

Level: Bachelor | Semester: 4th | Year : 2024
Programme: BE Computer/Software | Full Marks: 100
Course: Numerical Methods | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

1. a) What are the drawbacks of Newton Raphson Method? Solve the following equation $f(x)= xe^x-\cos x$ by Newton Raphson Method upto 4 decimal places. (2+6)

   b) Using secant method, find a positive real roots of the equation $x^3 - 3x+1=0$, correct to 4 decimal places. 7

2. a) Fromt the given data evaluate f(2.5) by using Lagrange method. 8

x	1	2	4	5	7
F(x)	1	1.414	1.732	2.00	2.6

OR

a) What is interpolation ? Find the value of f(1.2) using appropiate interpolation technique.

x	1	1.4	1.8	2.2
F(x)	50	70	100	120

b) Use the suitable method to fit a curve $y=ae^{bx}$ for the following data. 7

x	-2	-1	0	1	2	3	4
y	38	6	0	-5	-41	130	300

3. a) Compute the following using Simpson's 1/3 rule for n= 8 with an accuracy to five digit. 8

$$\int_1^5 e^{-x^2}\,dx$$ 7

b) Evaluate the following using Gaussian three point Integration formula:

$$\int_2^4 (x^4 + 1)\, dx$$

4. a) Solve the following system of Linear equations using partial pivoting method. 8

$x + y + z = 4,\ x + 4y + 3z = 8, x + 6y + 2z = 6$

b) Solve the following system of equations using Gauss Jacobi's method. 7

$3x + 2y + z = 10, 2x + 3y + 2z = 14, x + 2y + 3z = 14$

5. a) From the following differential equation estimate the value of y(1) using RK 4th order. 8

$dy/dx + 2x^2y = 4$ with $y(0) = 1$ take $h = 0.5$

b) Find the dominant eigen value and corresponding eigen vectors of the matrix below using Power method. 7

$$\begin{pmatrix} 1 & 2 & 0 \\ 2 & 1 & 0 \\ 0 & 0 & -1 \end{pmatrix}.$$

6. a) Solve the Poisson equation $\nabla^2 f = -10(x^2 + y^2 + 10)$ over the square with $0 \le x \le 3; 0 \le y \le 3$ and $f = 0$ on boundary. Use $h = 1$. 8

b) Solve the following differential equation for $y(0.4)$ using Heun's method. 7

$d^2y/dx^2 + 2dy/dx - 3y = 6x$; with $y(0) = 0$ and $y'(0) = 1$ (take $h = 0.2$).

7. Write short notes on: (**Any two**) 10

a) Initial Value problems and Boundary value problems

b) Algorithm for Matrix factorization method

c) Schimidit method for Heat equation.

Gandaki College of Engineering and Science

Internal Assessment

Semester : IV

Level: Bachelor — Full Marks: 100

Program: BE Computer — Pass Marks: 45

Course: **Computer Architecture (CMP 262)** — **Time:3hrs**

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain in brief about the various components and functions of computer. 4+4

   b) Explain various shift micro-operations in detail with examples. 7

2. a) What is the instruction cycle? Explain various sub cycles involved in instruction cycle with the help of T states. 2+5

   b) Explain how Microprogrammed control unit generates control signal with example. 8

3. a) Verify the operation (-3) x (-5) using Booth's algorithm. 8

   b) Solve 11/4 using unsigned binary division algorithm. 7

4. a). Register Windowing and Register Renaming is the techniques used in RISC pipeline, explain this in detail with example. 8

   b) Write in brief about direct cache memory mapping technique. 7

5. a) What are the drawbacks of programmed I/O and Interrupt driven I/O. How does DMA overcomes it explain in detail. 3+5

   b). Explain Flynn's classification of computer system in detail. 7

6. a) Explain different hardware and software performance issues in multicore computers. 4+4

b) Explain the instruction pipelining in detail with examples. 7

7. Write short notes on: (Any two) 2x5

a) GPU and TPU

b) RISC Vs CISC

c) Design principles for Modern system.