

**Priyadarshini College of Engineering, Nagpur**  
**Sessional Examination (2023-24) Odd Semester**  
**B.Tech. Fifth Semester (Computer Science and Engineering) (C.B.C.S.)**  
**Design and Analysis of Algorithm**

**P. Pages: 2**

**PCE/KW/22/BECSE502T/SET-A**

**Time: Three Hours**

**Max. Marks: 70**

Notes:

1. All questions carry marks as indicated.
2. Solve Question 1 or Question 2.
3. Solve Question 3 or Question 4.
4. Solve Question 5 or Question 6.
5. Solve Question 7 or Question 8.
6. Solve Question 9 or Question 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data wherever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

Q. No.	Question	CO	BT	Marks
1.	a) Solve the following equation by using characteristic root method $a_n - 2a_{n-1} + a_{n-2} = 1, a_0 = 2, a_1 = 5.$	CO1	2	7
	b) What are the different Asymptotic notations? Explain them briefly. Find upper bound, lower bound & tight bound for following. $3n + 2$ ii) $20n^2 + 8n + 10$	CO1	2	7
	<b>OR</b>			
2.	a) Explain principles of designing on algorithm in brief.	CO1	2	8
	b) Solve the following recurrence relation using master theorem method 1. $T(n) = 4T(n/2) + n$ 2. $T(n) = 2T(n/2) + n^2$	CO1	2	6
3.	a) Generate the Huffman code for following 6 characters given below: $a = 45, b = 13, c = 12, d = 16, e = 09, f = 05$	CO2	2	7
	b) Sort the given array using Quick Sort algorithm: $a = [9, 21, 7, 10, 16, 8, 50, 11]$ Also explain the time complexity of quick sort.	CO2	2	7
	<b>OR</b>			
4.	a) For the following Knapsack sequence of objects find profit by three methods capacity = 15, Number of elements = 07. ( $P_1, P_2, P_3, P_4, P_5, P_6, P_7$ ) = (10, 5, 15, 7, 6, 18, 3) ( $W_1, W_2, W_3, W_4, W_5, W_6, W_7$ ) = (2, 3, 5, 7, 1, 4, 1)	CO2	2	7
	b) 6, 3, 4, 11, 16, 2, 15, 7, Find the minimum and Maximum using Divide and Conquer method and Also write the Algorithm for Divide and Conquer method	CO2	2	7
5.	a) What is travelling salesman problem. Implement travelling salesman problem for following matrix $\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & & 9 & 0 \end{bmatrix}$	CO3	3	7
	b) Find the longest common subsequence for input sequence	CO3	3	7

sequence 1 - A G G T A B Z

sequence 2 - G X T X A Y B

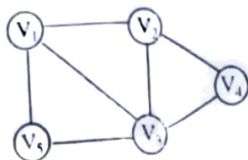
Also state the length of longest common subsequence.

OR

6. a) Compute probability matrix, evolutionary & root matrix for optimal binary search tree. CO3 3 8  
Construct the optimal binary search tree & cost of successful and unsuccessful search

	0	1	2	3	4
$P_i$	-	3	3	1	1
$q_i$	2	3	1	1	1

- b) Find the minimum no. of multiplication required to multiply the matrices of given dimension.  $A = 10 \times 20$ ,  $B = 20 \times 13$ ,  $C = 13 \times 15$ ,  $D = 15 \times 12$  CO3 2 7
7. a) Write the algorithm for depth first search. CO3 3 7
- b) Perform Graph Coloring on the given graph. State the total number of possible solutions.



OR

8. a) Find the Hamiltonian cycle in the given graph. Also draw the solution tree showing all possible paths. CO4 3 7



- b) 8 Queens in  $8 \times 8$  matrix such that no two queens are in same row, same column or diagonally opposite. CO4 3 7
9. a) Write the algorithm for non-deterministic searching. CO5 2 7
- b) Explain the following NP problem with respect to graph. CO5 2 7
- Clique
  - Graph partitioned into triangle
  - Independent set problem

OR

10. a) Explain the relationship between P, NP, NP-complete and NP-hard. CO5 2 7
- b) Write an algorithm for non-deterministic searching & sorting? CO5 2 7

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**Priyadarshini College of Engineering, Nagpur**  
**Sessional Examination (2023-24) Even Semester**  
**B.Tech Fifth Semester Computer Science and Engineering Engineering (C.B.C.S.)**  
**Subject : Artificial Intelligence**

P. Pages : 2

PCE/KW/23/BTECHCSE501T / 8

Time : Three Hours

Max. Marks : 70

Notes:

1. All Questions are compulsory.
2. All questions carry marks as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.

Q. No.	Question	CO	BT	Marks
1. a)	Define AI. Explain typical Task Domains of AI.	CO1	2	7
b)	State and explain different problem characteristics with example.	CO1	3	7

OR

2. a)	What is production system? Explain its characteristics.	CO1	2	6
b)	There are two jugs called four and three ; four holds a maximum of four gallons and three a maximum of three gallons. How can we get 2 gallons in the jug four.	CO1	3	8

3. a)	Compare and Contrast between Depth First Search (DFS) and Breadth First Search (BFS)	CO2	3	6
b)	What is constrain satisfaction? Trace the constrain satisfaction procedure solving the following crypt arithmetic problem: CROSS + ROADS ----- DANGER	CO2	3	8

OR

4. a)	Explain uninformed and informed search strategies.	CO2	2	6
b)	What is A* search? Explain various stages of A* search with an example.	CO2	2	8

5. a) What is knowledge? Explain the types of knowledge. CO3 2 6
- b) Represent the following statements in predicate calculus. Also CO3 3 8  
convert them to equivalent clause form:
1. Everyone is loyal to someone.
  2. All Romans were either loyal to Caesar or hated him.
  3. No mortal lives longer than 160 years.
  4. The spouse of every married person in the club is also in the club

OR

6. a) Design a Script for taking admission into an engineering college. CO3 3 7  
Illustrate all components with the help of suitable block diagram.
- b) Explain the differences with example: CO3 2 7
- i. Procedural vs Declarative knowledge.
  - ii. Forward vs Backward reasoning.

7. a) What is uncertainty? How to resolve the issue of uncertain CO4 2 7  
knowledge?
- b) Explain Bayes theorem with example. CO4 2 7

OR

8. a) Explain in detail, the structure of different intelligent agents. CO4 2 8
- b) Write short notes on: CO4 3 6
- i. Axioms of probability.
  - ii. Bayesian Networks.
  - iii. Fuzzy Logic.
9. a) What is learning? Draw and explain the block diagram of general CO5 2 6  
learning model
- b) Explain in brief Natural Language Processing. What are different CO5 2 8  
types of grammar used for designing of Natural Language  
processing?

OR

10. a) Explain learning by discovery. CO5 2 6
- b) What is expert system? Explain with block diagram. Explain why CO5 2 8  
control unit is separated from knowledge base in the expert system.



# PRIVADARSHINI COLLEGE OF ENGINEERING, NAGPUR

SESSIONAL EXAM (2023-2024) ODD SEMESTER

B.TECH. V SEMESTER (COMPUTER SCIENCE AND ENGINEERING) (C.B.C.S.)

ELECTIVE-I: TCP/IP (A&B)

P. Pages: 2

Duration: Three Hrs

PCE/KW/23/BTECHCSE703T/SET-A

Max. Marks: 70

Notes:

1. All questions carry marks as indicated.
2. Solve Question 1 or Question 2.
3. Solve Question 3 or Question 4.
4. Solve Question 5 or Question 6.
5. Solve Question 7 or Question 8.
6. Solve Question 9 or Question 10.
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8. Assume suitable data wherever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

Q No.	Questions	CO	BT	Marks
Q1	<del>a)</del> Describe TCP/IP model with suitable diagram. <del>b)</del> Describe the basic concepts in Networking.	CO1	2	8
		CO1	2	6
OR				
Q2	a) Write a short note on: i. NAP ii. Internet Standards b) Give an overview: (i) IFC (ii) RFC	CO1	2	7
		CO1	2	7
Q3	<del>a)</del> What is IP addressing? Discuss its types. <del>b)</del> Write a short note on VLSM and its benefits.	CO2	2	8
		CO2	2	6
OR				
Q4	a) Describe the working of DHCP Protocol with suitable diagram. b) Describe the working of BOOTP Protocol with suitable diagram and discuss the limitations of BOOTP protocol.	CO2	2	7
		CO2	2	7
Q5	a) Define and explain TCP Headers in brief. b) Describe Interactive Data Flow and Bulk Data Flow briefly.	CO3	2	7
		CO3	2	7

**OR**

Q6	a)	Explain connection establishment and termination in TCP.	CO3	2	8
	b)	Explain PIM and OTDR in detail.	CO3	2	6
Q7	a)	Describe MPLS Fundamentals in detail.	CO4	2	7
	b)	Give an overview of Carrier Ethernet.	CO4	2	7

**OR**

Q8	a)	Write a short note on Routing Extensions for Traffic Engineering.	CO4	2	7
	b)	Write short notes on: i. Equal-Cost Multi-Path ii. Subscriber Bandwidth Management	CO4	2	7
Q9	a)	State and explain IPv6 Addresses.	CO5	2	8
	b)	Explain Multicast and Anycast.	CO5	2	6

**OR**

Q10	a)	Explain the interoperation between IPv4 and IPv6.	CO5	2	7
	b)	Describe Access Control Lists (ACLs) in short.	CO5	2	7

Q. No.	Question	CO	BT	Marks
b)	Write a note on Modularity.	CO3	1	7
7.	a) What is software testing? What are the objective of performing testing? What is the basic difference between verification & validation?	CO4	1	9
	b) What is cyclomatic complexity, how it is computed?	CO4	1	5
OR				
8.	a) Differentiate between white box testing & Black box testing.	CO4	2	7
	b) Explain how unit testing is performed for software.	CO4	2	7
9.	a) Explain McCall's Quality factors	CO5	2	7
	b) What is software Risk? Explain their types.	CO5	1	7
OR				
10.	a) An application has 10 Low External I/P , 12 High External O/P Average Different External Queries 20 Low Internal Logical files and 15 High Legacy system Interface. Assume value of CAF is 1.1. Compute FP.	CO5	3	7
	b) Explain the layers of SCM process.	CO5	2	7

Priyadarshini College of Engineering, Nagpur  
Sessional Examination (2023-24) Odd Semester  
B.Tech. Fifth Semester (Computer Science & Engineering) (C.B.C.S.)  
Software Engineering & Project Management

PCE/KW/23/BTCHCSE503T

P. Pages: 2

Time: Three Hours

Max. Marks: 70

Notes:

1. All questions carry marks as indicated
2. Solve Question 1 or Question 2.
3. Solve Question 3 or Question 4.
4. Solve Question 5 or Question 6.
5. Solve Question 7 or Question 8.
6. Solve Question 9 or Question 10.
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8. Assume suitable data wherever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

Q. No.	Question	CO	BT	Marks
1.	a) Comment on "Software engineering a layered technology".	CO1	2	7
	b) Explain various software characteristics in detail.	CO1	2	7
OR				
2.	a) Explain RAD model of software development. State its advantages & disadvantages	CO1	2	7
	b) Explain the phases of Unified process & modeling	CO1	2	7
3.	a) What are the rules of thumb that should be followed when creating the analysis model.	CO2	1	7
	b) Explain different components of computer Based system	CO2	2	7
OR				
4.	a) Explain in detail, What is SRS? Also explain its contents.	CO2	2	7
	b) Write short notes on: <ol style="list-style-type: none"> <li>i) Scenario-based modeling</li> <li>ii) Object-oriented analysis.</li> <li>iii) Behavioral Model</li> </ol>	CO2	1	7
5.	a) Explain Architecture Design in Design Engineering in detail	CO3	2	
	b) Write short note on Coupling and Cohesion.	CO3	1	
OR				
6.	a) Write short notes on : <ol style="list-style-type: none"> <li>i) Design model.</li> <li>ii) Design Engineering concepts</li> <li>iii) User Interface analysis and design</li> </ol>	CO3	1	



Subject: Effective Technical Communication

Semester: V Section: A/B  
Max. Marks: 35

Duration: 2 Hrs

Note: 1) All questions carry marks as indicated.

Q.No	Question	Marks	CO	BT
1 a)	Correct the following sentences: (Any three) i) Neither of them are sick ii) She has a beautiful house, has she? iii) Rahul is a MBA student iv) The city were destroyed by earthquake v) He is suffering of typhoid	3	1	3
1 b)	Do as Directed: (Any three) i) The tsunami wave killed hundreds of people. (Change the voice) ii) Mrs Bhushan said, "I've been looking for you for almost an hour." (Change the narration) iii) Mr. Hen will teach English. (Change the voice) iv) I asked, "Why is he working outside?" (Change into Indirect speech) v) I was too tired to do any work. (Change into compound sentence)	3	1	3
1 c)	Use following idioms and phrases to make meaningful sentences. (Any two) i) blessing in disguise ii) cry over the spilt milk iii) to take care of iv) to catch red handed	2	1	3
2 a)	Do as directed. (Any three) i) Explain the meaning and origin of the word 'coconut'. ii) Make two words using the prefix 'un' iii) Make two words using the suffix 'ness' iv) Write any two technical jargon related to IT industry. v) Write any two words formed by clipping. <i>turnip to varsity (university)</i>	3	2	3
2 b)	Choose the correct option. (Any two) i) Synonym of the word 'belief' a. faith b. religion c. promise d. value ii) Antonym of the word 'abrupt' a. slow b. gradual c. Sudden d. instant iii) analogy pair of Hero: Coward :: Ideal: ? a. bad b. leader c. supreme d. perfect	2	2	2
2 c)	Explain different types of interview.	4	2	2
3 a)	You are Mr Aditya Roy living in House No 7322, Sector 12, RK Puram, New Delhi. You have seen an advertisement in the newspaper for the post of a 'Software Engineer' in the National Software Company. Write an application with resume to the Manager of the company. OR Write a letter to the Sales Manager, Bharat Electronics and Domestic Appliances Ltd., New Delhi, as a Hostel Supervisor, placing an order for fans, refrigerators, ovens etc. that you wish to purchase for the hostel. Also write a complaint letter for the defective items received.	5	3	3
3 b)	Read the following passage and answer the following questions: Opera refers to a dramatic art form, originating in Europe, in which the emotional content is conveyed to the audience as much through music, both vocal and instrumental, as it is through the lyrics. By contrast, in musical theater an actor's dramatic performance is primary, and the music plays a lesser role. The drama in opera is presented using the primary elements of theater such as scenery, costumes, and acting. However, the words of the opera, or libretto, are sung rather than spoken. The singers are accompanied by a musical ensemble ranging from a small instrumental ensemble to a full symphonic orchestra. i) Where did opera originate from? ii) Mention some primary elements of opera theatre. iii) Find from the passage a word nearest in meaning to 'sensitive' iv) Suggest a suitable title for the passage.	4	3	3
4 a)	i) There has been a fire accident in Petrochemical Industry injuring four labours. As Supervisor, submit a report covering the details of the incident to the Project head along with suggestions. OR ii) Prepare the user manual of a laptop.	5	4	3
b)	i) Assume that your organization has been spending Rs. 5,00,000 per annum on getting its various documents such as brochures, reports, proposals, manuals, etc. printed by outside agency. The organization has decided to have its own publishing unit to cater to all the above printing needs. As the Office Manager, draft a proposal for setting up of publishing unit. OR ii) Describe essential components of an effective research paper.	4	4	3

**Subject: Effective Technical Communication**

**Duration: 2 Hrs**

**Note: 1) All questions carry marks as indicated.**

**Semester: V Section: A/B**

**Max. Marks: 35**

Q.No	Question	Marks	CO	BT
1 a)	<b>Correct the following sentences: (Any three)</b> i) Neither of them are sick ii) She has a beautiful house, has she? iii) Rahul is a MBA student iv) The city were destroyed by earthquake. v) He is suffering of typhoid.	3	1	3
1 b)	<b>Do as Directed: (Any three)</b> i) The tsunami wave killed hundreds of people. (Change the voice) ii) Mrs. Bhushan said, "I've been looking for you for almost an hour." (Change the narration) iii) Mr Ben will teach English. (Change the voice) iv) I asked, "Why is he working outside?" (Change into Indirect speech) v) I was too tired to do any work. (Change into compound sentence)	3	1	3
1 c)	<b>Use following idioms and phrases to make meaningful sentences. (Any two)</b> i) blessing in disguise ii) cry over the spilt milk iii) to take care of iv) to catch red handed	2	1	3
2 a)	<b>Do as directed. (Any three)</b> i) Explain the meaning and origin of the word 'coconut'. ii) Make two words using the prefix 'un' iii) Make two words using the suffix 'ness' iv) Write any two technical jargon related to IT industry. v) Write any two words formed by clipping. <i>turnip to varsity (university)</i>	3	2	3
2 b)	<b>Choose the correct option. (Any two)</b> i) Synonym of the word 'belief' <i>a. faith</i> b. religion c. promise d. value ii) Antonym of the word 'abrupt' a. slow <i>b. gradual</i> c. Sudden d. instant iii) analogy pair of Hero: Coward :: Ideal: ? a. bad b. leader c. supreme d. perfect	2	2	2
2 c)	Explain different types of interview.	4	2	2
3 a)	You are Mr. Aditya Roy living in House No 7322, Sector 12, RK Puram, New Delhi. You have seen an advertisement in the newspaper for the post of a 'Software Engineer' in the National Software Company. Write an <b>application with resume</b> to the Manager of the company. OR Write a <b>letter</b> to the Sales Manager, Bharat Electronics and Domestic Appliances Ltd., New Delhi, as a Hostel Supervisor, <b>placing an order</b> for fans, refrigerators, ovens etc. that you wish to purchase for the hostel. Also write a <b>complaint letter</b> for the defective items received.	5	3	3
3 b)	<b>Read the following passage and answer the following questions:</b> Opera refers to a dramatic art form, originating in Europe, in which the emotional content is conveyed to the audience as much through music, both vocal and instrumental, as it is through the lyrics. By contrast, in musical theater an actor's dramatic performance is primary, and the music plays a lesser role. The drama in opera is presented using the primary elements of theater such as scenery, costumes, and acting. However, the words of the opera, or libretto, are sung rather than spoken. The singers are accompanied by a musical ensemble ranging from a small instrumental ensemble to a full symphonic orchestra. i) Where did opera originate from? ii) Mention some primary elements of opera theatre. iii) Find from the passage a word nearest in meaning to 'sensitive' iv) Suggest a suitable title for the passage.	4	3	3
4 a)	i) There has been a fire accident in Petrochemical Industry injuring four labours. As Supervisor, submit a <b>report</b> covering the details of the incident to the Project head along with suggestions. <b>OR</b> ii) Prepare the user manual of a laptop.	5	4	3
b)	i) Assume that your organization has been spending Rs. 5,00,000 per annum on getting its various documents such as brochures, reports, proposals, manuals, etc. printed by outside agency. The organization has decided to have its own publishing unit to cater to all the above printing needs. As the Office Manager, <b>draft a proposal</b> for setting up of publishing unit. <b>OR</b> ii) Describe essential components of an effective research paper.	4	4	3