

24/12/22

**MKSSS's**  
**Cummins College of Engineering for Women, Pune**

(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

**T. Y. BTech**

**End-Semester Examination- December -2022**

**Subject: Project Management**

**Subject Code: 20OEHS 501F**

**Time: 2 Hours**

**Maximum Marks: 50**

**Instructions to candidates:**

1. Answer all questions.
2. Neat diagrams must be drawn wherever necessary.
3. Assume suitable data if necessary

<b>Q. No.</b>	<b>Question</b>	<b>Marks</b>																																								
Q. 1	What are the phases of Project Life Cycle?	2																																								
Q. 2	Explain in detail the various steps involved in forming a project team with the help of appropriate example and diagram.	2																																								
Q. 3	Construct network diagram and compute in a tabular form:- a) Expected time for each activity b) Calculate forward & backward pass c) Calculate Variance & Standard deviation of critical activities. d) Critical path and it's duration	8																																								
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Activity</th><th style="text-align: center;">Predecessor</th><th style="text-align: center;">Optimistic</th><th style="text-align: center;">Most Likely</th><th style="text-align: center;">Pessimistic</th></tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td><td style="text-align: center;">-</td><td style="text-align: center;">12</td><td style="text-align: center;">14</td><td style="text-align: center;">22</td></tr> <tr> <td style="text-align: center;">B</td><td style="text-align: center;">-</td><td style="text-align: center;">16</td><td style="text-align: center;">17</td><td style="text-align: center;">24</td></tr> <tr> <td style="text-align: center;">C</td><td style="text-align: center;">A</td><td style="text-align: center;">14</td><td style="text-align: center;">15</td><td style="text-align: center;">16</td></tr> <tr> <td style="text-align: center;">D</td><td style="text-align: center;">A</td><td style="text-align: center;">13</td><td style="text-align: center;">18</td><td style="text-align: center;">23</td></tr> <tr> <td style="text-align: center;">E</td><td style="text-align: center;">B</td><td style="text-align: center;">16</td><td style="text-align: center;">18</td><td style="text-align: center;">20</td></tr> <tr> <td style="text-align: center;">F</td><td style="text-align: center;">D, E</td><td style="text-align: center;">13</td><td style="text-align: center;">14</td><td style="text-align: center;">21</td></tr> <tr> <td style="text-align: center;">G</td><td style="text-align: center;">C, F</td><td style="text-align: center;">6</td><td style="text-align: center;">8</td><td style="text-align: center;">10</td></tr> </tbody> </table>	Activity	Predecessor	Optimistic	Most Likely	Pessimistic	A	-	12	14	22	B	-	16	17	24	C	A	14	15	16	D	A	13	18	23	E	B	16	18	20	F	D, E	13	14	21	G	C, F	6	8	10	
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Q. 4	Explain in detail the Qualitative & Quantitative Techniques of Risk Analysis.	7																																								

Q. 5	<p>Answer the following questions with the given characteristics of a project.</p> <ul style="list-style-type: none"> <li>• You are the project manager of a project to design graphics interface card.</li> <li>• You are to design 5 graphics interface cards per month for 12 months</li> <li>• Each graphics interface card is planned to cost Rs. 500/-</li> <li>• It is the beginning of 6<sup>th</sup> month.</li> <li>• You have designed 20 graphics interface cards and CPI is 0.75</li> </ul>	8
	<ol style="list-style-type: none"> <li>1. Analyze how is the project performing in terms of schedule and budget?</li> <li>2. What is the Actual Cost of Work Performed (ACWP) of the project right now?</li> <li>3. Estimate the Earned Value(EV) of the project.</li> <li>4. Determine budget at completion(BAC).</li> <li>5. Estimate the Planned Value of the project(PV).</li> <li>6. Determine the cost variance(CV) and schedule variance(SV) of the project.</li> <li>7. Estimate Schedule Performance Index(SPI) of the project.</li> <li>8. Estimate cost of completion of the project (EAC).</li> </ol>	
Q.6	What is Project Audit Life Cycle? Explain the contents of project closure report.	7
Q.7	<p>An Indian company and a German company are developing a robotics project for an American client. The hardware is to be developed at the German center and testing of software development happens at Indian center.</p> <ol style="list-style-type: none"> <li>a) Elaborate the challenges involved in the project.</li> <li>b) Discuss the benefits of the project.</li> </ol>	6
Q.8	Explain difference between quality and grade with help of an example.	4
Q.9	Explain any one quality tool in detail with appropriate example and diagram.	6

Total No. of Questions = 10

Total No. of Pages = 02

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A.Y. 2022-23, Semester: I

22/12/22

Third Year

END semester Examination (ESE), December- 2022

Course Code: 20PIECE 502A

Course Name: Software Testing

Time: 2:00 Hour

Maximum Marks: 50

**Instructions to candidates:**

1. All questions are compulsory.
2. Use of scientific calculator is allowed.
3. Draw diagrams wherever necessary.
4. Assume suitable data wherever necessary.
5. Follow sequence of questions
6. Neat and clear handwriting is expected.

**Questions**

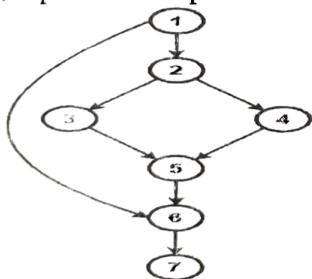
Q1 Show Graph structural coverage criteria subsumption with the help of tree. [5M]

Explain Node coverage with example

Tree: 3 marks, Explanation of Node coverage (2 marks)

Q2 Calculate Cyclomatic Complexity of the given graph.[2M] [5M]

Explain Basic path testing.[3M]



Q3 "Clause Coverage does not subsume predicate coverage" State True or false [1M]. [5M]

Justify your answer with example [4M]

Q4

```
int find_square_of_large_no( int no1, int no2)
{
    int temp;
    if(no1 > no2)
    {
        temp = no1*no1;
    }
    return(temp);
}
```

← Refer to the code given here.

Write any 4 different mutants [4M].

Is there any dead mutant amongst the mutants that you have generated? If yes , which one? [1M]

Q5 While doing online bank transactions, we often get the message "Do not press back or refresh button". Explain the significance of this [2M]. Compare it with other types of transitions. [3M] [5M]

Q6 An web page of Aadhar Card registration website is accepting following fields... [5M]

Person Name	Age	City	Submit.
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Identify significance of Bypass testing done on the client side to the given part of a web page [3M]. Compare the effect of Bypass testing done at the client side and server side with respect to the given example. [2M]

Q7 Consider an Object Oriented Software with 4 different classes. To test more than one class at the same time which type of testing is used. [1M] Justify your answer. [2M] [5M]

Compare the Intra-method testing and Inter-Method Testing. [2M]

Q8 [5M]

```
1 Sum(a,b,c)
2     x = a+b ;
3     y = b+c;
4     z = x+y-b;
5     return(z);
6 end
```

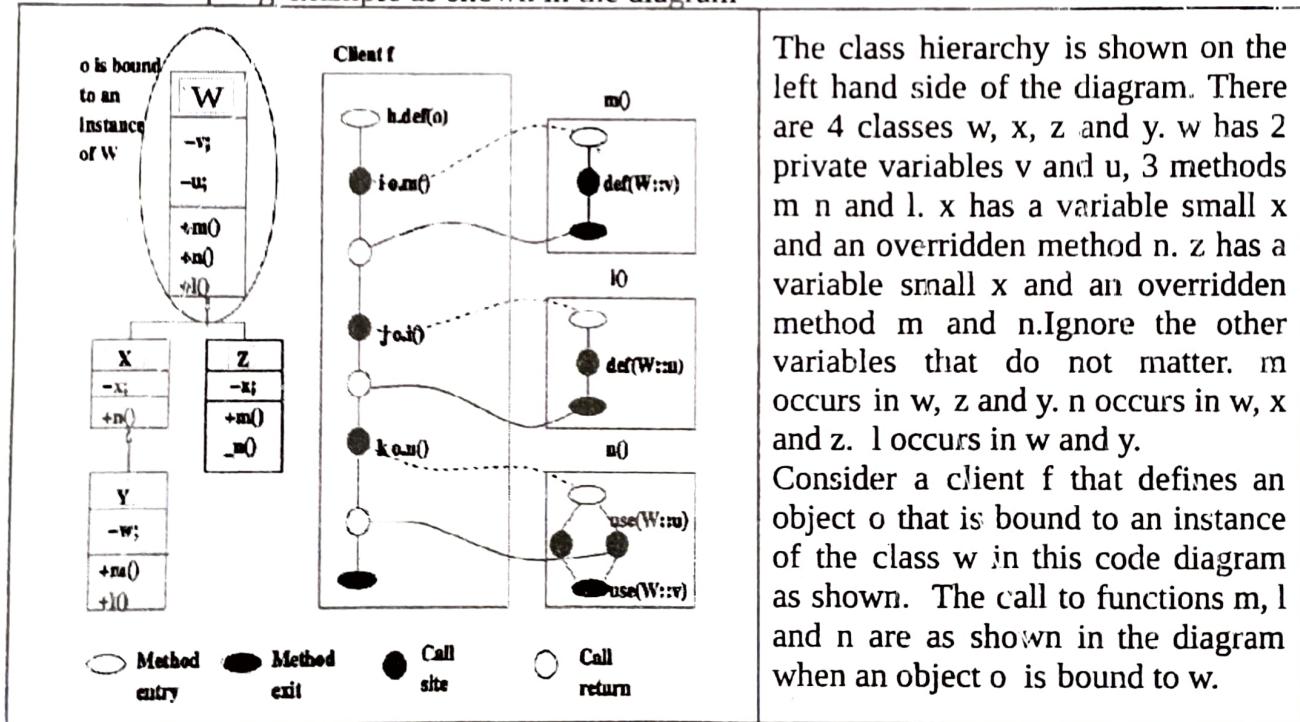
Consider program fragment  $\text{Sum}(a,b,c)$  as shown. Explain how symbolic execution is useful to understand path constraint (PC). Generate a table showing symbolic execution of sum.  
Hint: Symbolic execution explanation [2M]. Table [3M]

Q9 Consider any C or Java code. [5M]

How DART is useful in testing such code [2M]

Explain the role of the DART execution model. [3M]

Q10 Consider Coupling example as shown in the diagram [5M]



Examine the diagram and write how the scenario of variable coupling will change when a client f defines an object o that is bound to an instance of the class z instead of w. [3 marks]

Explain "All coupling sequences" criteria. [2 marks]

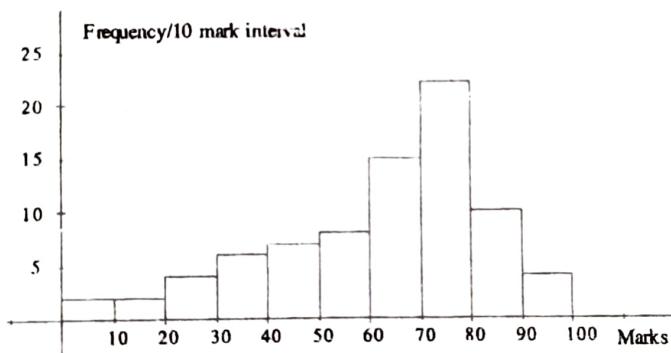
**Cummins College of Engineering for Women, Pune**

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A.Y. 2022-23, Semester: I

**Third Year****End semester Examination, December - 2022****Course Code: 20PECE501 Course Name: Statistics for Computer Science****Time: 2:00 Hour****Maximum Marks: 50*****Instructions to candidates:***

1. All questions are compulsory.
2. Use of scientific calculator is allowed.
3. Draw diagrams wherever necessary.
4. Assume suitable data wherever necessary.

**Q1**

- a) Analyse the given representation of data.
- i) Identify the graph. (1)
  - ii) Which statistical information can be inferred from this graph? (2)
- b) 10 bags were weighed in a weighing machine. The mean weight was 50.5 kg and the standard deviation was 2.5. Later it was found that the calibration of the weighing machine was faulty and the real weight of every bag was twice of the weighted value. What will be the new mean and standard deviation? (2)

**Q2**

- a) Two judges evaluated 10 cakes in a competition. The ranks they gave are as follows

Judge1	2	9	1	3	10	4	6	8	5	7
Judge2	6	9	2	1	8	4	3	10	7	5

Find Spearman's rank correlation coefficient. (2)

- b) From the following information find a regression equation and estimate the production when the capacity utilisation is 70%. (3)

	Average (Mean)	Standard Deviation
Production (in lakh units)	42	12.5
Capacity Utilisation (%)	88	8.5

The correlation coefficient between production and capacity is 0.72.

Q3

- a) What do you mean by hypothesis and level of significance? Explain the steps of hypothesis testing. (5)
- b) 10 persons were appointed in an IT job position in an office. Their performance was noted by giving a test and the marks recorded out of 50. They were given 6 month's training and again they were given a test and marks were recorded out of 50. (5)

Employees	A	B	C	D	E	F	G	H	I	J
Before Training	25	20	35	15	42	28	26	44	35	48
After Training	26	20	34	13	43	40	29	41	36	46

By applying t-test can it be concluded that employees have benefited by the training? (You are given for  $v=9$ ,  $t_{0.05}=2.262$ )

Q4

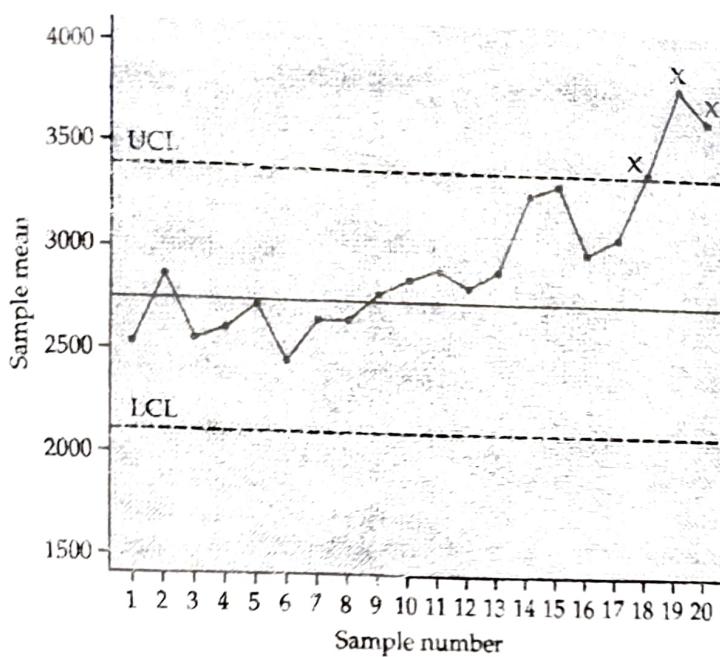
- An experiment was conducted on types of soil plots and fertilizers on the yield of sugarcane. The yield in tons per acre was noted as follows.

(15)

Variety	Plots				
	1	2	3	4	5
1	1.9	2.2	2.6	1.8	2.1
2	2.5	1.9	2.3	2.6	2.2
3	1.7	1.9	2.2	2.0	2.1
4	2.1	1.8	2.5	2.3	2.4

Use the appropriate statistical procedure to determine whether the variety of fertilizer and type of the soil have a significant effect on the yield of sugarcane. An alpha criterion of .05 should be used for the test. {Given table value is  $F(3,11)=3.59$ ,  $F(4,11)=3.36$ }

Q5 Following figure shows the  $\bar{x}$  chart.



- i) What do you infer from it? (1)  
 ii) Write the formula for UCL and LCL. (2)
- b) Weekly orders of a stationary company around 10 km radius of its office were noted as below.

Week	1	2	3	4	5
Orders	120	90	100	75	110

Prepare the forecast using exponential smoothing taking  $\alpha = 0.5$  and initial trend value = 0 (8)

- c) Calculate the price index number from the following data by  
 i) Fisher method ii) Passche method (4)

	Base Year		Current year	
	Price	Quantity	Expenditure	Quantity
A	6	50	560	56
B	2	100	240	120
C	4	60	360	60
D	10	30	288	24
E	8	40	432	36

# Cummins College of Engineering for Women, Pune

(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

A.Y. 2022-23, Semester: I

Third Year B. Tech.

End Semester Examination, December - 2022

**Course Code: 20CE 503 Course Name: Software Design and Architecture**

**Time: 02:00 Hours**

**Maximum Marks: 50**

***Instructions to candidates:***

1. All Questions are compulsory.
2. Please read each question carefully.
3. Draw neat diagrams wherever necessary.
4. **SHORT, PRECISE and CONCISE answers are expected.**
5. The ANSWER must be clear, lucid and SPECIFIC TO the QUESTION asked.
6. Most questions are based on hypothetical systems / examples. MAKE SUITABLE ASSUMPTIONS about scope of such systems / examples, wherever relevant. (IMPORTANT INSTRUCTION)
7. Please Manage/Plan your time carefully for All Questions.

Q. 1 A) In the context of Software Requirement Specification (SRS), explain the following terms/concepts.

i) Design and Implementation Constraints      ii) Product Scope      (3)

Q. 1 B) Justify that incremental and iterative models lead to better software than waterfall model in terms of managing change and ensuring customer satisfaction.      (3)

Q. 1 C) Consider a hypothetical online cloud and mobile based system for proctored online examinations which has features like students can download questions, upload answers to cloud, use mobiles as client etc. For this system, identify and write on ANY ONE User-friendly feature for supervisors and ANY ONE User-friendly feature for students respectively. How does the above identified each feature improve the user experience?      (3)

Q. 1 D) Write briefly on "Authorize Actors" as one of the Security tactics.  
Justify with example, how above tactic improves the security of the system. (3)

Q. 2 A) For an "Online Hospital Management System", consider a use case "Take Covid Vaccination appointment". For the implementation of this use case, identify and give ONE relevant example for ANY 2 types of CLASSES from the following:  
- Boundary Classes, Entity Classes, Control Classes  
Also give the details in terms of one or two attributes and one or two methods for each of the above identified CLASSES. (2)

Q. 2 B) Consider a use case "Register for a Course" for a typical "Online Course Management Portal". This use case involves the steps like validating the user, selecting the course, checking prerequisites, checking whether the course is full, checking the schedule of the course, paying the fees of the course using mechanisms like credit card or UPI and sending course registration confirmation. For this above use case, Draw an ACTIVITY DIAGRAM using full and correct notations. Ensure that your diagram shows use of "Fork and Join" concept. Make suitable assumptions about the scope of the above system. (4)

Q. 3 A) Explain the "Intent" and the "Applicability/use" of the Singleton Design Pattern. (4)

Q. 3 B) Consider an Examination system, which needs to show Bar and Pie charts for examination results. Make suitable assumptions. Justify the need/use of Observer Pattern with the help of its advantages, in the above example.  
Explain the working of Observer pattern in the context of above application. (4)

Q. 3 C) Consider a program/object responsible to calculate percentage of total marks of a student in various subjects. To calculate percentage of marks the client needs to use the following function:

**calcPercentage(total\_marks, percentage\_marks)**

However an implementation that is useful exactly as client wants is already available in the form of a calculator program object with an existing method with prototype signature of **computePercentage(total\_marks, percentage\_marks)**.

Which design pattern is relevant and useful to apply in the above scenario?  
Using a class or sequence diagram explain working of the above design pattern. (4)

Q. 3 D) Justify the need/use/importance of Iterator Pattern with the help of its advantages/consequences/implementation aspects. (4)

Q. 4 A) What do you mean by “Code coverage testing”? (1)

Q. 4 B) Consider a typical “Online Tours and Travel Management System”. Identify and write ANY TWO test cases for this system by applying ANY ONE of the Black Box testing techniques. (Hint: Equivalence Class Partitioning and/or Boundary Value Analysis).

Make suitable assumptions about the functionality of the above system. (2)

Q. 4 C) Consider a code fragment as given below.

```
int fun(int x, int y) {  
    while(x != y) {  
        if(x > y) then  
            x = x - y;  
        else y = y - x;  
    }  
    return x; }
```

For the above code fragment, Draw the Control Flow Graph. Compute the Cyclomatic Complexity of the graph. Also, Identify and list down all the Independent Paths, for the drawn graph. (4)

Q. 5 A) Analyse the strengths/advantages and appropriateness of the two approaches viz. Validation and Verification. (3)

Q. 5 B) Given a use case "Book a show" for a typical “Online Movie Ticket Booking System”. This use case involves the steps like Selection of Show, Checking availability of tickets and Making payment.

For the above use case, identify / generate ANY THREE test cases and write the description of these three test cases.

(Hint: test case id, scenario/condition, input data, expected result etc.). (3)

Q. 5 C) In a project, Black box testing has been successfully completed. Yet you want to convince the project manager for the additional need for also doing White box testing. In this context, Justify the need for additional White box testing in terms of its ability to discover certain kind of faults, errors. (3)

**MKSSS's Cummins College of Engineering for Women, Pune**  
**(An Autonomous Institute Affiliated to Savitribai Phule Pune University)**  
**T. Y. BTech. (Department of Computer Engineering)**  
**End Semester Examination, December 2022**  
**Subject: 20 CE 502 Design and Analysis of Algorithms**  
**Time: 2 Hr. Maximum Marks: 50**

**Instructions to candidates:**

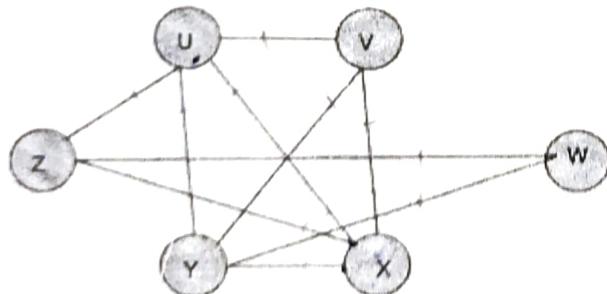
1. All questions are compulsory.
2. Draw diagrams wherever necessary.
3. Assume data wherever necessary.
4. Figures to right indicate full marks

**Q. 1** Solve given recurrence relation. Choose an appropriate method of recurrence solving to **5M** give a stepwise solution.

$$T(n) = 8T\left(\frac{n}{2}\right) + 1000n^2$$

**Q. 2** Make use of the given graph to find **5M**

1. Minimum vertex cover
2. Optimal Clique
3. Apply the concept of reducibility to convert vertex cover problem (NP Hard) to Clique decision problem.



**Q 3.** Apply a greedy method to merge more than 2 files. Such a merger can be accomplished by repeatedly merging sorted files in pairs, and creating a single file (Assume that initially, such files are totally empty). **5M**

The files X1, X2 and X3 are the three sorted files of length 30, 20 and 10 records each. Write different merge patterns to merge these 3 files, by computing the number of record moves required to create a single file. Identify merging patterns with less number of moves.

- Q. 4 A. Examine a given set of probabilities of successful search and unsuccessful search to decide the RCOT node of Optimal Binary Search Tree (OBST). Calculate cost of OBST Where, **10M**  
**(6 Marks)**

**Identifiers (a1,a2,a3,a4) = (do, if, int, while)**

**Successful search p(1:4) = (3, 3, 1, 1)**

**Unsuccessful search q(0:4) = (2, 3, 1, 1, 1)**

- B. Examine a given set of weights and profits to organize the items in KNAPSACK. Give selection of items to maximize profit using 0/1 knapsack dynamic programming as algorithm design strategy. Consider Bag Capacity of 5. **(4 Marks)**

Item	1	2	3	4
Weight	2	3	4	5
Profit	3	4	5	6

- Q.5 A. Consider the following weights for the Sum of Subset problem. Draw a pruned state space tree. Analyze and state implicit and explicit constraints. Indicate answer node/nodes. **W1 = 3, W2 = 4, W3 = 5, W4 = 6 , Sum = 13 15M (6 Marks )**
- B. A traveller wants to visit all cities and return back to the starting city with minimum distance to travel. Examine details of locations and distances given in the table below **(9 marks)**
- 1) Obtain the reduced cost matrix
  - 2) Apply Least Cost Branch and Bound (LCBB) as algorithm design strategy at each level to solve the problem. Compute the distance travelled and corresponding path.

$\infty$	7	3	12	8
3	$\infty$	6	14	9
5	8	$\infty$	6	18
9	3	5	$\infty$	11
18	14	9	8	$\infty$

- Q.6 A. Build a stepwise parallel solution for prefix computation problems. Solve the same considering  $\oplus$  as addition operator for 4 processors and 16 input as [ 5, 12, 8, 6, 3, 9, 11, 12, 1, 5, 6, 7, 10, 4, 3, 5]. Clearly mention the local sums, global computation and final update done by parallel processors. **10M**
- B. Explain approximation algorithm technique. Assume a suitable graph to apply an approximation algorithm. Justify how the vertex cover problem is approximated by maximal - matching problem.

Total No. of Questions = 04

Total No. of Pages = 03

MKSSS's

**Cummins College of Engineering for Women, Pune**  
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A.Y. 2022-23, Semester: I

Third Year B. Tech.

## **End semester Examination, December - 2022**

Course Code: 20CE501

## **Course Name: Computer Networks**

**Time: 2:00 Hours**

**Maximum Marks: 50**

*Instructions to candidates:*

1. All questions are compulsory.
  2. Use of scientific calculator is allowed.
  3. Draw diagrams wherever necessary.
  4. Assume suitable data wherever necessary.

Q1) A Assume sender wants to send 4 frames (1,2,3,4) .During transmission, ACK of Frame 1 is lost, and frames 2 and 3 are sent and ACK is received for frame 3.  
Depict diagrammatically the transmission if Go back N protocol is used and explain the sequence of events occurred.

B (2 Marks)  
Identify the type of address required for  
a) Hop to hop communication  
b) Communication between source to destination in a network

**Q2) A** A sender has sent a UDP datagram to a receiver .Receiver has received the UDP datagram with the following UDP header in HEX format. (6 Marks)

## **DC040043001B001B**

Extract the following fields for the above UDP header used for the dataflow.

1. The source port number.
2. The destination port number.
3. The total length of the user datagram.

B

When Two systems are communicating using TCP, How can you identify whether the source port number or the destination port number belongs to the client or the server? (6 Marks)

Given the following TCP header,

**0620 0015 0000 0004 0000 0100 5010 07FF 0043**

Identify

1. The source port address
2. The destination port address
3. If packet directed from client to server or vice versa

C

Out of the available **transport layer protocols**, identify the **transport layer protocol** used in scenarios given below. Compare and choose the appropriate one. (4 Marks)

1. A third year comp. Engg. student uploading 3 assignment files (PDF) on CN Moodle site.
2. Geeta is watching '3 Idiots' movie on Netflix.

Q3)  
A

A client wants to store a text file of ASCII type at the server with path 'user/ user1/data'. Show the FTP communication between client and server with appropriate messages for the same. (4 Marks)

B Reema writes mail from her mail id reema@gmail.com to her friend Smita, at smita91@gmail.com, inviting Smita to attend a virtual presentation. Show the messages sent by SMTP client to SMTP server in this case. (4 Marks)

C Name the available application layer protocols for the given scenarios. Compare and choose the appropriate one. (9 Marks)

a) Seema is downloading a product specification file from amazon.com for a laptop.

b) A student is demonstrating an experiment on an embedded board. She downloads an executable file of size 2KB from her laptop to the board.

Q 4) A Diydv dn ht xjpiomt  
Find the plaintext for the above given ciphertext if caesar cipher is used and the key is 5. (4 Marks)

B Kirti wants to have more than 2 operating systems on her recently bought laptop. What are the techniques available to do the same. Also differentiate these techniques (3 Marks)

C Classify various attacks with respect to security goals. (3 Marks)