Patuakhali Science and Technology University

B.Sc.Engg. (CSE) 3rd Semester (Level-2, Semester-I.), Jan-June-2023, Session: - 2021-22

Course Code: CIT-213 Course Title: Software Engineering

Mid Exam Credit Hour: 3.00 Full Marks: 15 Duration: 1.00 Hours

1.	a)	Differentiate between white Box retesting and Black Box testing with both advantage and disadvantage.	3
	b)	How to measure software cyclomatic complexity? Show the formula to calculate program module.	2
	c)	Show the software requirement elicitation Process.	2
2.	a)	Write down the Project Estimation Techniques. List the necessary steps require for project scheduling.	3
	b)	Show the waterfall model with its phases and problem. Define evolutionary development.	3
	c)	Distinguish between software Validation vs. software Verification and manual vs. automated testing.	2

∴ e-n+2

Mid Examination

Course Title: Electrical Technology Sessional **Course Code:** EEE 212

Time: 30 minutes **Marks:** 15

1. **Which** type of motor is used in the pump for an Arduino based project? **Describe** the working principle of that motor with proper figures. **Draw** the equivalent circuit of any type of that motor.

1+2+2 = 5

2. Suppose you are in a spaceship (Zero Gravity). Now you need a motor for showering where you need constant speed of water and you have three phase AC sources and also DC sources. Then, **which** type of motor you will choose and **why**? **Describe** how real and reactive power generation is controlled in that machine. **Show** the power house diagram of that machine which is sharing load with an infinite bus and explain briefly.

1+1+2+1 = 5

3. Suppose you are a project director of a project in PSTU. You have to use a motor in your project where you have a three phase AC source but no DC source. Then, **which** type of motor will you choose and **why**? **Draw** the equivalent circuit of that motor.

1+2+2= 5

Patuakhali Science and Technology University

Department of Computer Science and Information Technology(CSIT)

3rd Semester (Level-2, Semester-I), Mid-Term Examination of B.Sc. Engg. (CSE)

Course Code: CIT-211 Course Title: Data Structures and Algorithms

Credit Hour: 3.0 Full Marks: 15 Session: 2021-2022 Time: 01 Hour

[Figures in the right margin indicate full marks. Write answer of the following questions]

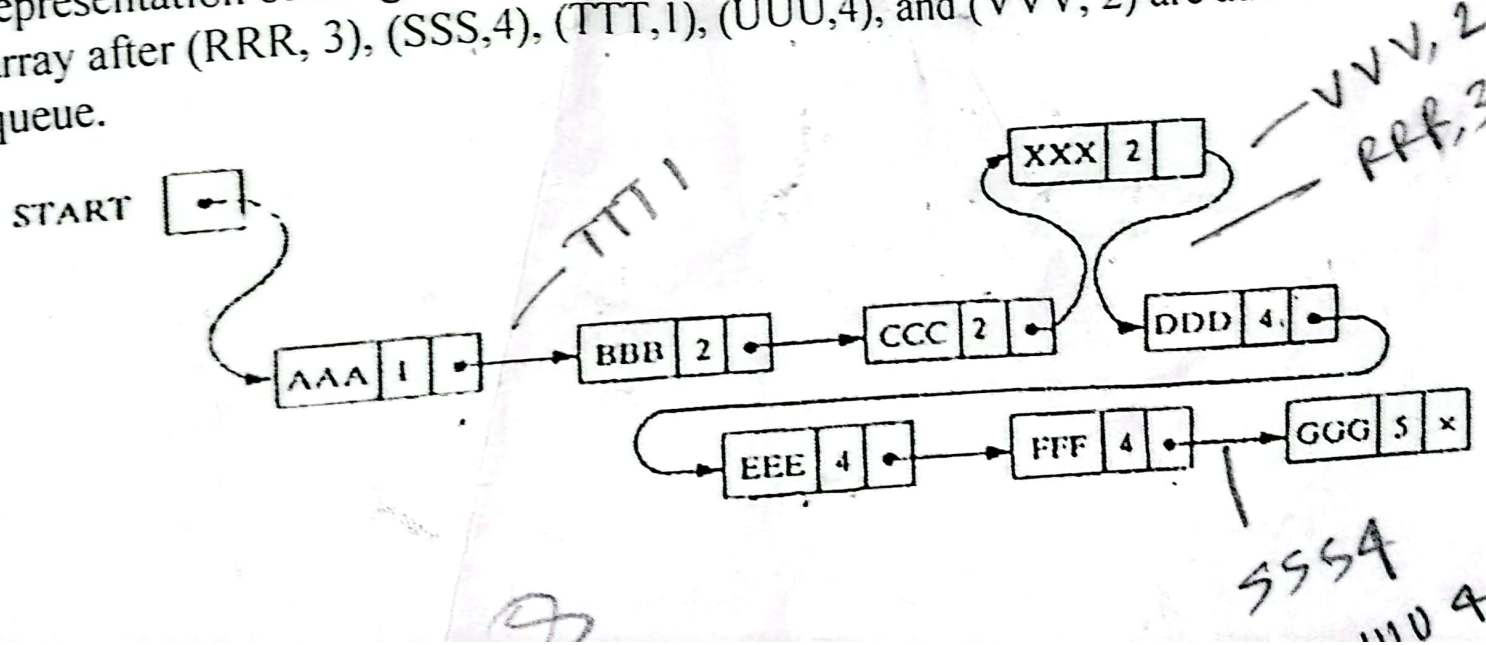
1. a) Define data structure. Write the operations of the data structure. 03

   b) What is word processing? State the pattern matching algorithm with example. 04

2. a) What is recursion? Translate, by inspection and hand, each infix expression into its equivalent prefix expression. 04

   (A+B↑D)/(E-F)+G

   b) Define deque. Consider the priority queue below, show the two-dimensional array representation of the given queue. Describe the structure with two-dimensional array after (RRR, 3), (SSS,4), (TTT,1), (UUU,4), and (VVV, 2) are added to the queue. 04



Dept. of Computer and Communication Engineering
Patuakhali Science and Technology University
3rd Semester (Level-2, Semester-II), Midterm Examination of B.Sc. Engg. (CSE), January June 2023
Course Code: CCE 211 Course Title: Data communication Engineering
Credit Hour: 3.0 Full Marks: 15 Duration: 90 Minutes

1 a) Draw five main components of a data communications system, and explain how do they work together to facilitate the transfer of data between devices? 3

b) Explain how the number of cable links required in a network varies with the number of n devices for a mesh, ring, bus, and star topology. 2

c) What are the four levels of addresses used in an internet following the TCP/IP protocols, and how do they contribute to the functioning of the network? 3

2 a) Define the analog hierarchy used by telephone companies and list different levels of the hierarchy. 1

b) Assume that a voice channel occupies a bandwidth of 4 kHz. We need to multiplex 10 voice channels with guard bands of 500 Hz using FDM. Calculate the required bandwidth. 1

c) We need to use synchronous TDM and combine 20 digital sources, each of 100 Kbps. Each output slot carries 1 bit from each digital source, but one extra bit is added to each frame for synchronization. Answer the following questions: 3

a. What is the size of an output frame in bits?
b. What is the output frame rate?
c. What is the duration of an output frame?
d. What is the output data rate?
e. What is the efficiency of the system (ratio of useful bits to the total bits)?

d) What are Multilevel Multiplexing and Multiple-slot multiplexing? Give appropriate example diagram. 2

Patuakhali Science and Technology University

Faculty of Computer Science and Engineering

Dept. of Computer and Communication Engineering (SET C)

Examination of B. Sc. Engineering in CSE Level: 1 Semester: II Session: 2021-2022

Course Code	Course Title	July December 2022	Credit: 1.50
CCE-122	Object Oriented Programming Sessional		Time: 2.30 Hr
			Marks: 70

1. Viva Voce — 15
2. Java Project — 15
3. Lab problem Solved — 5
4. Write a Java program to display the following character rhombus structure. — 15

Test Data
Input the number: 7
Expected Output :

```
    A
   ABA
  ABCBA
 ABCDCBA
ABCDEDCBA
ABCDEFEDCBA
ABCDEEGFEDCBA
ABCDEFEDCBA
 ABCDEDCBA
  ABCDCBA
   ABCBA
    ABA
     A
```

5. We have to calculate the area of a rectangle, a square and a circle. Create an abstract class 'Shape' with three abstract methods namely 'RectangleArea' taking two parameters, 'SquareArea' and 'CircleArea' taking one parameter each. The parameters of 'RectangleArea' are its length and breadth, that of 'SquareArea' is its side and that of 'CircleArea' is its radius. Now create another class 'Area' containing all the three methods 'RectangleArea', 'SquareArea' and 'CircleArea' for printing the area of rectangle; square and circle respectively. Create an object of class 'Area' and call all the three methods. Repeat the process for 4 rectangles, 4 squares and 5 circles. — 15

210204 - SHARIFAT

Patuakhali Science & Technology University (PSTU)
Department of Computer Science and Information Technology(CSIT)
Final Examination: January-June 2023
Course Code: CIT 212 | Course Title: Data Structures and algorithms Sessional
Session: 2021-22, Program: B.Sc. Engg.(CSE), Semester: 3rd

Marks – 70

[Answer the marked questions]

Section A

1. Implement Insertion sort algorithm. 25
2. Implement Merge-sort algorithm. 25
3. Implement Quick sort algorithm. 25
4. Implement DFS algorithm. 25
5. Implement BFS algorithm. 25
6. Implement dijkstra algorithm. 25
7. Implement Prims and Kruskal algorithm. 25
8. Implement Bellman-Ford algorithm. 25
9. Write a program to evaluate any given postfix expression. 25
   P: 3, 1, +, 2, ↑, 7, 4, -, 2, *, +, 5, -
10. Implement Tower of Hanoi Recursion with Stack. 25
11. Implement DEQUE. 25
12. Implement Warshall's algorithms to find shortest path. 25

Section B

13. A. Write a program to compare the computational time of the linear search and the binary search algorithms. 10

    B. Write a program that provides the post-order tree traversing from the following list of numbers 44, 30 50, 22, 60, 55, 77, and 57.

Section C

14. Suppose you have a linked list *L* and a vail list *A*. You want to insert a new item *N* from avail list *A* to the linked list at the position after X and before *Y* where *X* and *Y* are the consecutive items in the linked list *L*. Write a program to insert this new item *N* into the list *L* and update the avail list. 15 20

15. Viva-Voce

lution for Tower of

Patuakhali Science and Technology University
B.Sc. Engg. (CSE) 3rd Semester, (Level-2, Semester-I)
Course Code: CIT-213 Course Title: Software Engineering
Session :2021-2022, Final Examination Jan-June-2023 Credit Hour: 3.00, Full Marks:70, Duration: 3.00 Hours

[Figures in the right margin indicate full marks. **Split answering of any question is not recommended.**

Answer any 5 of the following questions

1. a) What is the role of the software quality assurance (SQA) group? Show the Six Sigma in statistical quality control. 4
   b) Illustrate the four organizational paradigms for software engineering teams. 3
   c) Define the five points of measures metrics and indicators in software engineering. 3
   d) List out the factors you must be considered when selecting a software project team structure. 2
   e) What are the four P's of an effective software project management? Who are stakeholders in software engineering? 2

2. a) What are the different types of risks in software project development? show the 5 steps in the risk management process. 3
   b) Why is project management important in software process? Describe the core qualities and responsibilities of a successful project manager. 3
   c) Show the available tools, which aid for effective software project management? 2
   d) How function point (FP) analysis is used in estimation of software project? Give proper example. 2
   e) Briefly describe the seven phases of the software development life cycle. 4

3. a) Suppose you are open a new startup business agency. Now you want to develop a customized ERP solution for your business venture. So how to write a software requirement specification as per analysis of your business solution? 3
   b) Write down the advantages of domain analysis in software engineering. Define data modeling. 3
   c) What are data objects and data attributes in software engineering? Show the ERD notation with an example. 3
   d) Define class in software engineering. Difference between method hiding and encapsulation. 2
   e) Show the use case diagram, activity diagram and swimlane diagrams in software engineering. 3

4. a) Explain the phases involved in software testing life cycle. List out the roles and responsibilities of a test manager. 3
   b) What does a typical test report contain? Explain the benefits of test reports. 3
   c) How to do security testing in software engineering? Describe the six basic principle of security testing. 3
   d) Define the states of a system. Show the State Diagram for the Control Panel Class. 3
   e) Differentiate between association and dependency? Define package analysis with example. 2

5. a) List out the steps in software project execution & monitoring. 3
   b) How to step by step effectively communicate in project management? 4
   c) What is UI/UX design in software engineering? Write down the steps for interface analysis and user analysis. 3
   d) Illustrate evolutionary development in software engineering process with its problem and applications. Show incremental development process. 4

6. a) Distinguish between plan-driven development approach and agile development approach. 3
   b) Find out the agile method specific problem with its applicable area. 3
   c) Define extreme programming (XP) with its release cycle and principle of practice. 3
   d) Difference between regression testing and acceptance testing. 2
   e) Show the benefits of software performance testing.

Faculty of Computer Science and Engineering
Patuakhali Science and Technology University
3rd Semester (L-2, S- I) Class Test of CSE January-June 2023, Session: 2021-22
Course Code: AIS 211; Course Title: Accounting and Management

Full Marks: 15 **Duration: 01 Hour**

[Figures in the right margin indicate full marks. Answer all of the following questions. Split answering is not recommended.]

01 Explain the concept of management and analyze its nature by highlighting at least four key characteristics. How would you apply these management principles in a tech startup focused on developing innovative software solutions?" 03

02 Imagine you are a middle manager in a tech company. A new project is being initiated. How would you coordinate with top management to ensure alignment with company goals and first-line managers for smooth implementation? 03

03 ***Write down the appropriate answer from the available alternatives.*** 03

a) Management tries to make effective utilization of various _____.

I. Resources
II. Men
III. Materials
IV. Method

b) Administration is a _____ function.

I. Decision –making.
II. Executed.
III. Executory.
IV. Execution.

c) _____ may be defined as a process by which a manager guide and influences the work of subordinates in desired direction

I. Leadership
II. Supervision
III. Planning
IV. Controlling

04 **Use the accounting equation to answer each of the following questions.** 03

(a) The liabilities of Olga Company are $90,000. Common stock account is $150,000; dividends are $40,000; revenues, $450,000; and expenses, $320,000. What is the amount of Olga Company's total assets?

330,000

(b) The total assets of Lafayette Company are $57,000. Common stock account is $23,000; dividends are $7,000; revenues, $50,000; and expenses, $35,000. What is the amount of the company's total liabilities?

26,000

Third Ser
Course
Time: 3 Hours
[Answer any FIVE of t
will take account of the
parts if any, of the same

(c) The total assets of Dierdorf Care $600,000 and its liabilities are equal to two-thirds of its total assets. What is the amnt of Dierdorf Co.'s stockholders' equity?

05 Legal Services Inc. was incorporated on July 1, 2023. During the first month of operations, the following transactions occurred.

1. Legal Services issued commostock in exchange for cash of $10,000.
2. Paid $800 for July rent on office space.
3. Purchased office equipment on account $3,000.
4. Performed legal services for clients for cash $1,500.
5. Borrowed $700 cash from a bank on a note payable.
6. Performed legal services for client on account $2,000.
7. Paid monthly expenses: salaries $500, utilities $300, and advertising $100.

Instructions:

Prepare a tabular summary of the transactions.

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Department of Accounting and Information Systems
Patuakhali Science and Technology University
Third Semester Final Examination of B.Sc. Engg. (CSE), January - June 2023
Course code: AIS 211; Course Title: Accounting and Management
Credit Hour: 3.0
Time: 3 Hours Full Marks: 70

[Answer any FIVE of the following questions. Figures in the right margin indicate full marks. Examiner will take account of the quality of language and of the way in which the answer is presented. Different parts if any, of the same question must be answered in one place in order of sequence.]

1. a. Discuss the steps in the recording process. 3
   b. Alma Gutierrez is a licensed dentist. During the first month of the operation of her business, the following events and transactions occurred.

April	1	Stockholders invested $50,000 cash in exchange for common stock.
	1	Hired a secretary-receptionist at a salary of $500 per week payable monthly.
	2	Paid office rent for the month $1,400.
	3	Purchased dental supplies on account from Whyte Company $4,500.
	10	Performed dental services and billed insurance companies $5,300.
	11	Received $1,200 cash advance from Sveta Pace for an implant.
	20	Received $2,300 cash for services completed and delivered to Nami Cho.
	30	Paid secretary-receptionist for the month $2,000.
	30	Paid $1,800 to Whyte Company for accounts payable due.

Instructions
(i) Journalize the transactions. 4
(ii) Post to the ledger accounts. 4
(iii) Prepare a trial balance on April 30, 2022. 3

2. Maquoketa River Resort opened for business on June 1 with eight air-conditioned units. Its trial balance before adjustment on August 31 is as follows.

MAQUOKETA RIVER RESORT
Trial Balance
August 31, 2022

Accounts Title	Debit	Credit
Cash	$ 19,600	
Supplies	3,300	
Prepaid Insurance	6,000	
Land	25,000	
Buildings	125,000	
Equipment	26,000	
Accounts Payable		$ 6,500
Unearned Rent Revenue		7,400
Mortgage Payable		80,000
Common Stock		100,000
Dividends	5,000	
Rent Revenue		80,000
Maintenance and Repairs Expense	3,600	
Salaries and Wages Expense	51,000	
Utilities Expense	9,400	
	$273,900	$273,900

PUSH and POP on stack.
...rithm of Tower of Hanoi and show the recursive solution for ... the following n...

Other data:

(i) Insurance expires at the rate of $300 per month.
(ii) A count on August 31 shows $800 of supplies on hand.
(iii) Annual depreciation is $6,000 on buildings and $2,400 on equipment.
(iv) Unearned rent revenue of $4,800 has been earned.
(v) Salaries and wages of $400 were unpaid at August 31.
(vi) Rentals of $4,000 were due from tenants at August 31. (Use Accounts Receivable.)
(vii) The mortgage interest rate is 9% per year. (The mortgage was taken out on August 1.)

Instructions

(a) Journalize the adjusting entries on August 31 for the 3-month period June 1–August 31.
(b) Prepare a ledger using the three-column form of account. Enter the trial balance amounts and post the adjusting entries. (Use J1 as the posting reference.)
(c) Prepare an adjusted trial balance on August 31.

3. The adjusted trial balance columns of the worksheet for Espinosa Company, owned by Jose Espinosa, are as follows.

ESPINOSA COMPANY
Worksheet
For the Year Ended December 31, 2022

Account Titles	Adjusted Trial Balance Dr.	Cr.
Cash	11,600	
Accounts Receivable	15,400	
Supplies	2,000	
Prepaid Insurance	2,800	
Equipment	34,000	
Accumulated Depreciation—Equipment		8,000
Notes Payable		20,000
Accounts Payable		9,000
Salaries and Wages Payable		3,500
Interest Payable		800
Common Stock		20,000
Retained Earnings		5,000
Dividends	10,000	
Service Revenue		85,000
Advertising Expense	12,000	
Supplies Expense	5,700	
Depreciation Expense	8,000	
Insurance Expense	5,000	
Salaries and Wages Expense	44,000	
Interest Expense	800	
Totals	151,300	151,300

Instructions

(a) Prepare an income statement, retained earnings statement, and a classified balance sh
(*Note:* $10,000 of the notes payable become due in 2023.)
(b) Prepare the closing entries. Use J14 for the journal page.
(c) Prepare a post-closing trial balance.

4. a. Discuss how modern technologies, like remote work and digital communication t are influencing traditional organizational structures.

Suppose, a rapidly growing technology company is facing challenges in managing communication and coordination across different departments. Propose an appropriate organizational structure to address these issues, explaining the reasoning behind your choice. 5

c. Explain the differences between formal and informal organizational structures. How do informal structures impact communication and decision-making within a company? 4

5. a As a new manager of a department with low employee morale, how would you use directing skills (leadership, communication, motivation) to improve team performance? Illustrate with example. 5

b. Evaluate the challenges of directing employees in a global IT firm. How can cultural differences affect the directing function? 5

c. How does feedback play a role in the direction process? Explain its importance in employee development and performance management. 4

6. a. What is Controlling? How can modern technologies, such as automation and data analytics, enhance the controlling function in organizations? 5

b. A manager of a company is finding it difficult to monitor team performance due to a lack of clear performance standards. How would you help the manager develop and implement effective control measures? 5

c. Explain how the controlling function can lead to employee resistance. What strategies can managers use to minimize resistance while implementing controls? 4

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sharafat

Patuakhali Science and Technology University

3rd Semester (Level-2, Semester-1) B.Sc. Engg. (CSE) Final Examination, (January-June-2023)

Course Code: CIT-211 Course Title: Data Structures and Algorithms

Credit Hour: 3.00 Session: 2021-22 Full Marks:70 Duration: 3 Hours

[Figure in the right margin indicates full marks. Split answering of any question is not recommended.]

*Answer any 5 of the following questions. The answer must be **brief, relevant, and neat**.*

1. (a) Define data structure. Give example of entity and attribute. Explain algorithm complexity, a time-space tradeoff. 4

(b) Which kind of logarithms are mainly concerned on the data structure? Illustrate a formal flowchart of finding the largest element in the list. Generally speaking, strings are stored in three types of structures. Explain and demonstrate the fixed-length structures and variable-length structures for string storage. 6

(c) What is word processing? Write the operations of word processing. Suppose, a text T and a pattern P are in memory. Write an algorithm that deletes every occurrence of P from T. 4

2. (a) What is the difference between linear and non-linear data structure? Write the application of array. Let LA be a linear array in memory of the computer, demonstrate the general representation of multi-dimensional arrays in memory. 4

(b) Suppose multidimensional array A and B are declared using A (-2:2, 2:22) and B (1:8, -5:5, -10:5) 5

i) Find the length of each dimension and the number of elements in A and B.

ii) Consider the element B [3, 3, 3] in B. Find the effective indices E1, E2, E3, and the address of the element, assuming Base (B) = 400 and there are w = 4 words per memory location.

(c) State the steps of the binary search algorithm. What are the limitations of the binary search algorithm? Suppose the following numbers are stored in an array A: 32, 51, 27, 85, 66, 23, 13, 57. You are asked to apply the bubble sort algorithm to array A and discuss each pass separately. 5

3. (a) Mention the disadvantages of an array. How to recover them using a linked list. Show the representation of the linked list in memory including the free-storage list. 3

(b) Let LIST be a linked list in memory with successive nodes A and B and node N is to be into the list between A and B. Show the schematic diagram of such an insertion operation. Write a procedure or algorithm to insert an ITEM after a given node A and before node B. 3

(c) Consider the following tree T, you are asked to simulate the preorder traversal algorithm with T and show the content of STACK at each step. 4

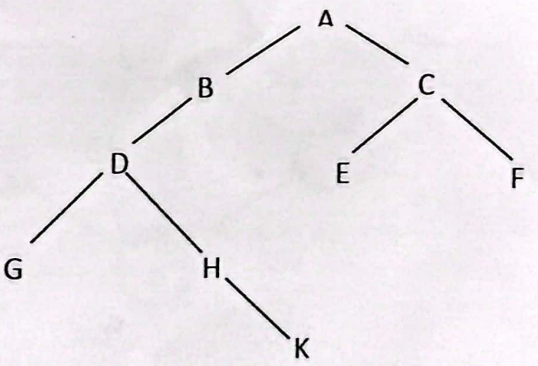


Fig: Tree, T

(d) Define and demonstrate the following terms in your own words. Complete binary tree, extended binary tree, depth of a tree, binary search tree, and general tree. Show the linked representation of the binary tree in memory. 4

4. a) Define stack. Illustrate the array representation of stack and write down the algorithm for PUSH and POP on stack. 4

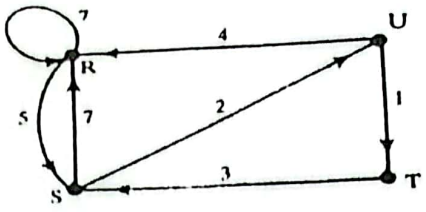
b) Write down the algorithm of Tower of Hanoi and show the recursive solution for Tower of Hanoi problem for $n = 4$. 5

c) Write down the quicksort algorithm and show the full trace to sort the following numbers. 5

44, 33, 11, 55, 77, 90, 40, 60, 99, 22, 88, 66

5. a) Define finite graph and multi graph. Distinguish between BFS and DFS. 2

b) Write down the Warshall's algorithm to find the shortest path from a weighted graph. Find the shortest path of the following graph. 6



c) Consider the following figure A2, find a minimum path P from A to K using BFS where each edge has length 1. 3

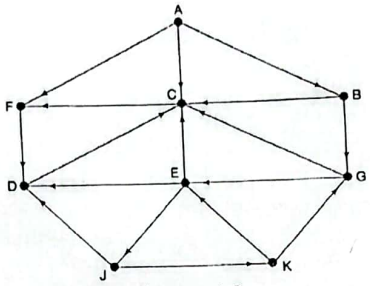
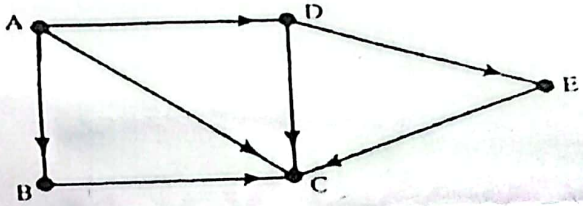


Figure: A2

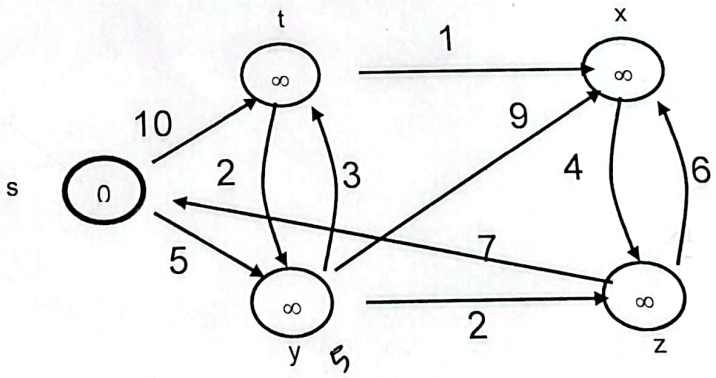
d) What is the minimum spanning tree? Show the link representation of the following graph. 3



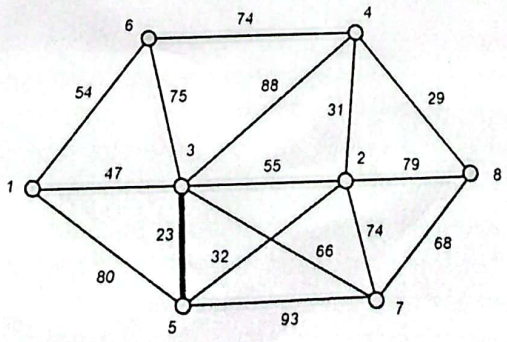
6. a) Write the INSERTION-SORT algorithm and sort the following dataset in increasing order. 5

5	2	4	6	1	3

b) Explain Dijkstra's algorithm for finding the shortest path in a given graph. 5



c) Write down the Kruskal's algorithm to find the minimum spanning tree of the following graph, show the full trace.



Patuakhali Science and Technology University

B.Sc. Eng. (CSE) 3rd Semester (Level-2, Semester-I) Final Examination-2023 (Jan-June)

Course Code: EEE 211 Course Title: Electrical Technology

Credit Hour: 3.0 Full Marks: 70 Duration: 3 Hours.

[Figures in the right margin indicate full marks. Split answering of any question is not recommended]

Answer any 5 of the following questions.

[1]

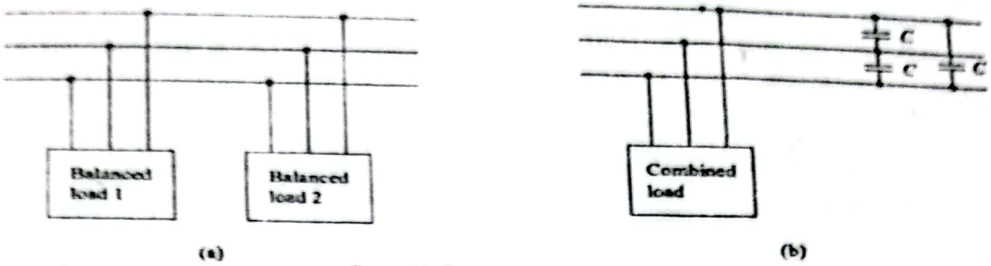


Figure 1: Question 1

Assume that the two balanced loads in the above figure 1(a) are supplied by a 900-V rms 50-Hz line. Load 1 is Y-connected with 40 + j50 Ω per phase, while load 2 is a balanced three-phase motor drawing 50 kW at a power factor of 0.8 lagging. Assuming the abc sequence,

(a) **Calculate** the complex power absorbed by the combined load. 04

(b) **Determine** the kVAR rating of each of the three capacitors Δ-connected in parallel with the load to raise the power factor to unity. 04

(c) **Calculate** the current drawn from the supply at unity power factor condition. 02

(d) **Calculate** the capacitance of each capacitor. 04

[2] A 480-V, 50-Hz, Y-connected, six-pole synchronous generator has a per-phase synchronous reactance of 1.0 Ω. Its full-load armature current is 60 A at 0.8 PF lagging. This generator has friction and windage losses of 1.5 kW and core losses of 1.0 kW at 60 Hz at full load. Since the armature resistance is being ignored, assume that the i^2R losses are negligible. The field current has been adjusted so that the terminal voltage is 480 V at no load.

(a) **What** is the speed of rotation of this generator? 01

(b) **What** is the terminal voltage of this generator if the following are true? 06

i) It is loaded with the rated current at 0.8 PF lagging.

ii) It is loaded with the rated current at 1.0 PF.

iii) It is loaded with the rated current at 0.8 PF leading.

(c) **What** is the efficiency of this generator (ignoring the unknown electrical losses) when it is operating at the rated current and 0.8 PF lagging? 02

(d) **How** much shaft torque must be applied by the prime mover at full load? **How** large is the induced counter-torque? 02

(e) **What** is the voltage regulation of this generator at (i) 0.8 PF lagging? (ii) At 1.0 PF? (iii) At 0.8 PF leading? 03

[3] (a) **Why** parallel operation of generators is necessary? **What** are the conditions required for parallel operation of generators. 05

(b) **Describe** the general procedure for paralleling generators with proper figures. 05

(c) **Write** short notes on the following topics: 04
(i) Infinite bus, (ii) Speed Droop, (iii) Power House Diagram, (iv) Torque angle

[4]

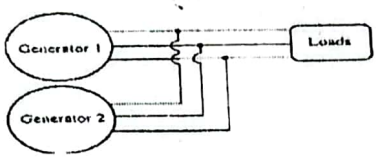


Figure 2: Question 2

Above figure shows two generators supplying a load. Generator 1 has a no-load frequency of 61.5 Hz and a slope Sp_1 of 1 MW/Hz. Generator 2 has a no-load frequency of 61.0 Hz and a slope Sp_2 of 1 MW/Hz. The two generators are supplying a real load totaling 2.5 MW at 0.8 PF lagging.

(a) **Draw** the power-frequency or house diagram with proper labelling. 05
(b) At **what** frequency is this system operating, and **how** much power is supplied by each of the two generators? 02
(c) Suppose an additional 1 MW load was attached to this power system. **What** would the new system frequency be, and **how** much power would G1 and G2 supply now? 02
(d) With the system in the configuration described in part c, **what** will the system frequency and generator powers be if the governor set points on G2 are increased by 0.5 Hz? 02
(e) **Describe** the idea about how you can adjust the real power sharing between generators without changing the system frequency and how you can adjust V_T without changing the reactive power sharing. 03

[5] (a) **What** are the types of DC machine? **Draw** the equivalent circuit of short & long shunt compound DC motors. 05

(b) **Why** a DC series motor is always started with a load? 03

(c) A DC series motor operates at 900 rpm with a line current of 200A from 220V mains. Its armature circuit resistance is 0.15 Ω and its field resistance 0.1Ω. **Find** the speed at which the motor runs at a line current of 50 A, assuming that the flux at this current is 50% of the flux at 200A. (Drawing the equivalent circuit and showing calculation are needed). 06

[6] (a) **Why** the induction motor is called rotating transformer and **what** is the main difference between a transformer and an induction motor? **Draw** the equivalent circuit of an induction motor. 04

(b) A 600-V, 60-Hz, 60-hp three-phase induction motor is drawing 60 A at 0.8-PF lagging. The stator copper losses are 1 kW, and the rotor copper losses are 750 W. The friction and windage losses are 1673 W, the core losses are 1700 W, and the stray losses are negligible. **Find** the (i) air-gap power and (ii) efficiency of the motor. 04

(c) A 220-V, 30-hp, eight-pole, 50 Hz, Y-connected induction motor has a full-load slip of 6 percent. 06

(i) **What** is the synchronous speed of this motor?
(ii) **What** is the rotor speed of this motor at the rated load?
(iii) **What** is the rotor frequency of this motor at the rated load?
(iv) **What** is the shaft torque of this motor at the rated load?

Patuakhali Science and Technology University

Faculty of Computer Science and Engineering

...emester (L-2, S-I) Final Examination of B.Sc. in Engg. (CSE), Jan-June-2023, Session: 2021-22

Course Code: MAT-211, Course Title: Mathematics-III

Marks-70, Time: 3 hours, Credit: 3.00

[Figure in the right margin indicates full marks. Split answering of any question is not recommended]

Answer any 5 of the following questions

1. a) Define Differential equation, order and degree of differential equation. 02

   b) Solve the differential equations 12

   (i) $x\sqrt{1+y^2}dx + y\sqrt{1+x^2}dy = 0$ (ii) $(x-y)^2\frac{dy}{dx} = a^2$ (iii) $y - x\frac{dy}{dx} = a(y^2 + \frac{dy}{dx})$

2. a) Define homogeneous differential equation. 02

   b) Solve the differential equations 08

   (i) $(x^2+y^2)dy = xydx$ (ii) $\frac{dy}{dx} = x^3y^3 - xy$

   c) Define Integrating factor. Solve the linear differential equation: $\frac{dy}{dx} + Py = Q$, where P and Q are the function of x or constant. 04

3. a) Write some applications of differential equation. 02

   b) Solve the Exact differential equation: $(2y-x-1)dy + (2x-y+1)dx = 0$ 04

   c) Solve the following 08

   (i) $(D^3 - 3D^2 + 4D - 2)y = 0$ (ii) $(D^2 - 13D + 42)y = 0$

4. a) Define frequency distribution and write down the name of graphs that are used to represent the frequency distribution. 03

   b) The following frequency distribution shows the length of hilsa fish caught on a certain day at a certain point of the Padma: 05

   Class interval (Length in cm): 25-30, 30-35, 35-40, 40-45, 45-50, 50-55, 55-60

   No. of fishes caught: 39, 45, 52, 75, 15, 08, 05

   Draw (i) Histogram and locate the mode and (ii) Frequency polygon by the above distribution.

   c) The following frequency distribution below gives the cost of production of computers in different brands: 06

   Cost (Tk. in Lacs): 10-14, 14-18, 18-22, 22-26, 26-30, 30-34, 34-38, 38-42

   No. of Computers: 11, 27, 42, 45, 50, 55, 65, 70

   Compute quartiles Q_1, Deciles D_4 and Percentiles P_{80}

5. a) Write short notes on Moments, Skewness and Kurtosis 03

   b) Calculate the standard deviation and co-efficient of variation from the following frequency distribution: 05

   Class Interval: 50-60, 60-70, 70-80, 80-90, 90-100, 100-110, 110-120

   Frequency: 05 09 13 20 19 09 05

   c) A distribution of short term computer credit disbursement from 10 branches of a bank is given below- 06

Amount of credit (Lac Tk.):	0-5,	5-10,	10-15,	15-20,	20-25
No. of branches :	01	02	04	02	01

   Find the coefficients of skewness and kurtosis and thus comment on the shape and nature of the distribution.

6. a) Discuss about the terms: Event, Sample, Census and Pilot survey 04

b) Establish the relation between correlation coefficient and regression coefficient 04

c) Per week weight (in pounds) of a calf from its birth is given bellow: 06

Age in week (x):	01	02	03	04	05	06	07	08	09	10
weight (g):	52.5	58.7	65.0	70.2	75.4	81.1	87.2	95.5	102.2	108.0

Estimate the least square regression of weight on age and also estimate the weight when the age in 8.5 weeks.

$y = a + bx$

$$\frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2} \Big/ \frac{\sum xy - \frac{\sum x \sum y}{N}}{\sum x^2 - \frac{(\sum x)^2}{N}}$$

Dept. of Computer and Communication Engineering
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Patuakhali Science and Technology University
Dumki, Patuakhali-8602, Bangladesh

Final Examination of B. Sc. Engineering in CSE Level: 2 Semester: I Session: 2020-2021

Course Code 211 **Course Title** **Data Communication and Engineering** January-June 2023 **Credit:** 03 **Time:** 03 Hr **Marks:** 70

Answer any 05 out of 06 Questions (Split answers are highly discouraged)

1 [A.] What information does the amplitude of a signal convey about the signal's characteristics? How does the frequency of a signal affect its behavior and interpretation? In what way does the phase of a signal influence its overall properties and relationship with other signals? 3

[B.] i)If a periodic signal is decomposed into five sine waves with frequencies of 100, 300, 500, 700, and 900 Hz, what is its bandwidth? Draw the spectrum, assuming all components have a maximum amplitude of 10 V. 4

ii) A device is sending out data at the rate of 1000 bps.
a. How long does it take to send out 10 bits?
b. How long does it take to send out a single character (8 bits)?
c. How long does it take to send a file of 100,000 characters?

[C.] How is the Nyquist theorem relevant to communications, and what role does Shannon capacity play in determining communication system performance? 3

[D.] i) We have a channel with a 1-MHz bandwidth. The SNR for this channel is 63. What are the appropriate bit rate and signal level? 4

ii) We have a channel with 4 KHz bandwidth. If we want to send data at 100 Kbps, what is the minimum SNRdB? What is the SNR?

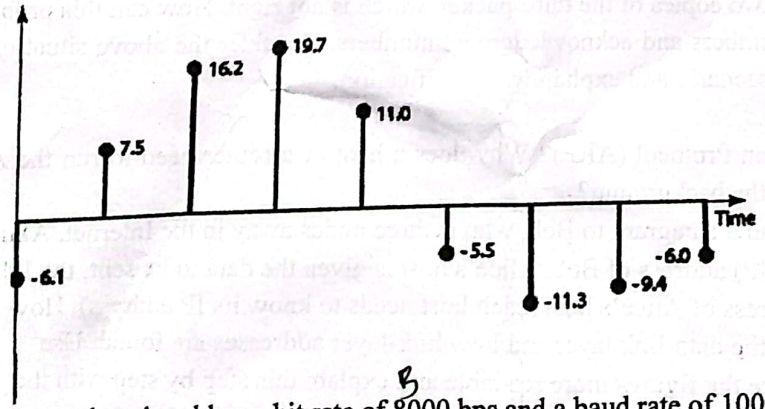
2 [A.] What are the differences between a signal element and a data element in the context of digital communications? Additionally, how do data rate and signal rate differ in terms of their definitions, units of measurement, and implications for communication system performance? 3

[B.] Convert the digital data 010011 to various line coding technique. 6

[C.] Convert the digital data 3
i . 01011011
ii. 11111111 to MLT-3 scheme.

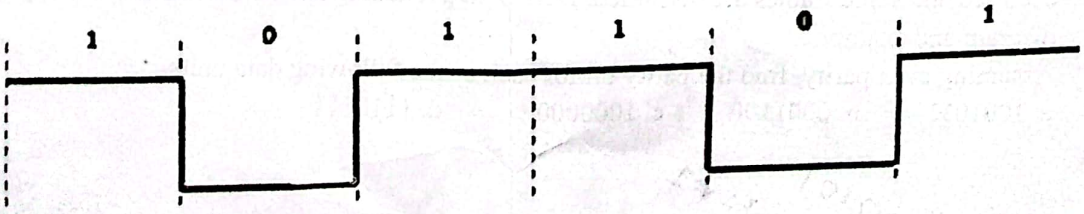
[D.] How do guided media differ from unguided media? What are the three major classes of guided media? 2

3 [A.] Define PCM. We have a sampled signal and the sample amplitudes are between −20 and +20 V as following figure. We decide to have eight levels. Explain Pulse Code Modulation (PCM) technique as analog signal to digital data with below sampled information. Sample value -6.1, 7.5, 16.2, 19.2, 11, -5.5, -9.4, -6.0. Calculate also the normlized error and quantized code and encoded words. 6



[B.] An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements do we need? 2

[C.] Convert the below analog message signal to ASK, FSK and PSK, 3



[D.] What is the number of bits per baud for the following techniques? 3
a. ASK with four different amplitudes
b. FSK with eight different frequencies
c. PSK with four different phases
d. QAM with a constellation of 128 points.

4 [A.] How does a virtual-circuit network blend the principles of circuit-switching with those of datagram networks? Describe how this hybrid model impacts connection establishment, data transmission, and network resource utilization. 3

[B.] What is the minimum Hamming distance? If we want to be able to detect two-bit errors, what should be the minimum Hamming distance? 2

[C.] Compare and contrast byte-stuffing and bit-stuffing. Which technique is used in byte-oriented? Which technique is used in bit-oriented protocols? Explain with example. 4

[D.] We need a three-stage space-division switch with N = 100. We use 10 crossbars at the first and third stages and 4 crossbars at the middle stage. 5
i. Draw the configuration diagram.
ii. Calculate the total number of crosspoints.
iii. Find the possible number of simultaneous connections.
iv. Find the possible number of simultaneous connections if we use a single crossbar (100 × 100).
v. Find the blocking factor, the ratio of the number of connections in part c and in part d.

5 [A.] Given the dataword 101001111 and the divisor 10111, show the generation of the CRC codeword at the sender site (using binary division). 4

[B.] Draw a suitable diagram to show how a frame from source A reaches destination B and how its Virtual-Circuit Identifier changes during the trip in a virtual circuit network. 4

[C.] Answer the following questions: 3
i. What is the polynomial representation of 101110?
ii. What is the result of shifting 101110 three bits to the left?
iii. Repeat part b using polynomials.
iv. What is the result of shifting 101110 four bits to the right?
v. Repeat part d using polynomials.

[D.] Assume a situation where the first frame is sent and acknowledged. The second frame is sent, but lost. After time-out, it is resent. The third frame is sent and acknowledged, but the acknowledgment is lost. The frame is resent. However, there is a problem with this scheme. The network layer at the receiver site receives two copies of the third packet, which is not right. How can this problem correct using sequence numbers and acknowledgment numbers. Consider the above situation to illustrate the transmitting scenario and explain with justification. 3

[A.] What is Address Resolution Protocol (ARP)? Why does a host or a router need to run the ARP program all of the time in the background? 2

[B.] Assume Alice needs to send a datagram to Bob, who is three nodes away in the Internet. Alice knows the network-layer (IP) address of Bob. Alice's host is given the data to be sent, the IP address of Bob and IP address of Alice's host (each host needs to know its IP address). How communication is done at the data-link layer and how link-layer addresses are found. Use symbolic addresses to make the figures more readable and explain this step by step with the figure. 6

[C.] Assume the first is the case where no error has occurred; the second is the case where an error has occurred and some frames are discarded. Define piggybacking and its usefulness with appropriate diagram and example. 4

[D.] Assuming even parity, find the parity bit for each of the following data units. 2
a. 1001011 b. 0001100 c. 1000000 d. 1110111

পটুয়াখালী বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয়

PATUAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY

Faculty of Computer Science & Engineering
Department of Electrical & Electronics Engineering
Midterm Examination
Course Code: EEE 211

Time: **45 minutes** **Marks: 15**

Answer all the questions

1. A 1000-VA, 230/115-V transformer has been tested to determine its equivalent circuit. The results of the tests are shown below; **5**

Open-circuit test (on secondary side)	Short-circuit test (on primary side)
$V_{OC} = 115$ V	$V_{SC} = 17.1$ V
$I_{OC} = 0.11$ A	$I_{SC} = 8.7$ A
$P_{OC} = 3.9$ W	$P_{SC} = 38.1$ W

(a) Find the equivalent circuit of this transformer referred to the low-voltage side of the transformer.

(b) Find the transformer's full load voltage regulation at 0.8 PF leading.

(c) Determine the transformer's full load efficiency at 0.8 PF lagging.

$P = \frac{I^2}{R}$ $I = \frac{V^2}{R}$

2. A Y-connected balanced three-phase generator with an impedance of **(0.4 + j0.3) ohm** per phase is connected to a Y-connected balanced load with an impedance of **(24 + j19) ohm** per phase. The line joining the generator and the load has an impedance of **(0.6 + j0.7) ohm** per phase. Assuming a positive sequence for the source voltages and that $V_{an} = 120\angle 30^*$, **determine** the total average power, reactive power, and complex power at the source and at the load of the above circuit. **5**

3. A three-phase motor can be regarded as a balanced Y-load. A three-phase motor draws 5.6 kW when the line voltage is 220 V and the line current is 18.2 A. Determine the power factor of the motor. **5**

$P = I^2R$ $P = V^2/R$ $P = VI$ $\frac{P}{V}$