

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

Patuakhali Science and Technology University
Mid Exam.-Jan-June 2023. Course Title: Mathematics-III, Marks-15, Time: 50 minutes

- 1 Solve the following differential equation $(x^3 + 3xy^2)dx + (y^3 + 3x^2y)dy = 0$ **6** 7
- 2 Establish the relationship among various types of means. **2** 3
- 3 The following frequency distribution shows the length of hilsa fish caught on a certain day at a certain point of the Padma: 5

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

Compute: (a) Q_3 , D_4 and P_{80} (c) Draw a histogram and locate the mode

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: 60 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
- What is the size of an output frame in bits? 100 —
 - What is the output frame rate? ==
 - What is the duration of an output frame?
 - What is the output data rate?
 - 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

Department of Computer Science and Information Technology(CSIT)

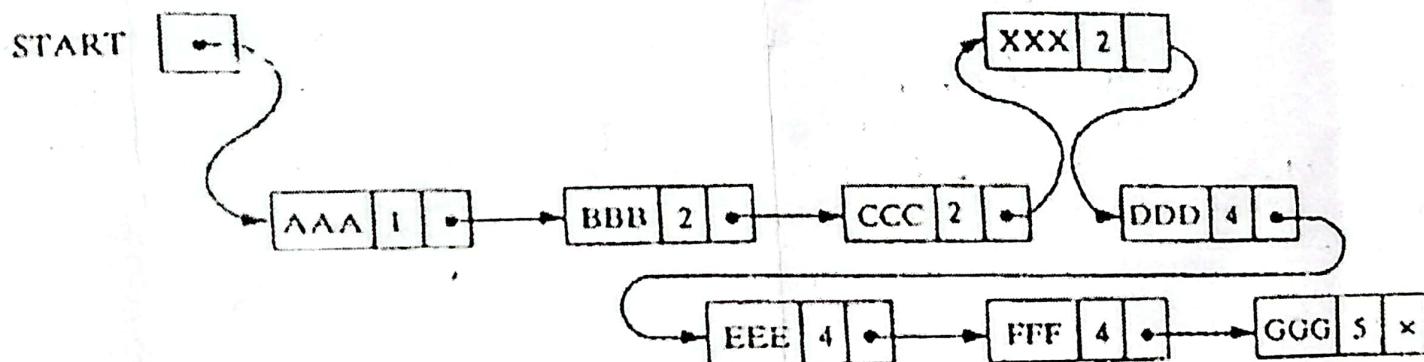
3rd Semester (Level-2, Semester-I), Mid-Term Examination of B.Sc. Engg. (CSE)

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





পটুয়াখালী বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয়

PATUAHALI 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

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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)
$V_{OC} = 115 \text{ V}$	$V_{SC} = 17.1 \text{ V}$
$I_{OC} = 0.11 \text{ A}$	$I_{SC} = 8.7 \text{ A}$
$P_{OC} = 3.9 \text{ W}$	$P_{SC} = 38.1 \text{ W}$

(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.

2. A Y-connected balanced three-phase generator with an impedance of $(0.4 + j0.3) \text{ ohm}$ per phase is connected to a Y-connected balanced load with an impedance of $(24 + j19) \text{ ohm}$ per phase. The line joining the generator and the load has an impedance of $(0.6 + j0.7) \text{ ohm}$ per phase. Assuming a positive sequence for the source voltages and that $\underline{V_{an}} = 120<30^\circ \text{ V}$, 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

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?"
- 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 **Write down the appropriate answer from the available alternatives.**

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.

(a) The liabilities of Olga Company are \$90,000. Common stock account is \$150,000; dividend are \$40,000; revenues, \$450,000; and expenses, \$320,000. What is the amount of Olga Company's total assets? $m \rightarrow 0,000$

(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?

- (c) The total assets of Dierdorf Co. are \$600,000 and its liabilities are equal to two-thirds of its total assets. What is the amount 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 common stock 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.

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

Section B

13.
 - A. Write a program to compare the computational time of the linear search and the b search algorithms.
 - B. Write a program that provides the post-order tree traversing from the followin 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 list A to the linked list at the position after X and before Y where X and Y are the items in the linked list L . Write a program to insert this new item N into the list L the avail list.
15. Viva-Voce

Figures in the right margin indicate full marks. Split answering of any question is not recommended.
 Answer any 5 of the following questions.

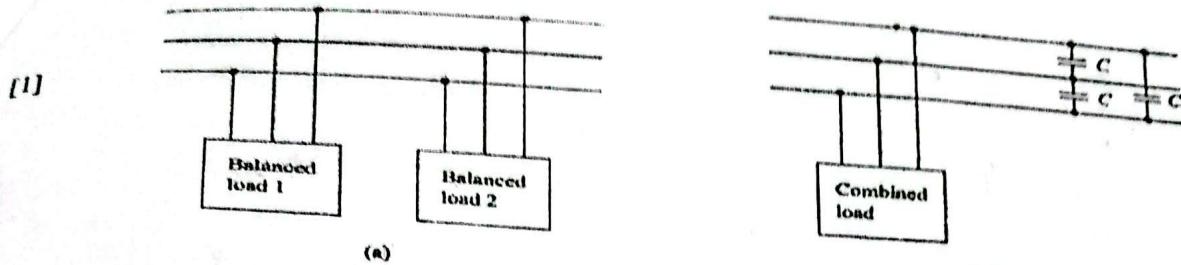


Figure 1: Question 1

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 $40 + j50 \Omega$ 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. $73707 + 67139j$ 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. 55.28 04
- (c) Calculate the current drawn from the supply at unity power factor condition. 17.28 02
- (d) Calculate the capacitance of each capacitor. $C = \frac{V^2}{\omega X}$ 04

[2] A 480-V, 50-Hz, Y-connected, six-pole synchronous generator has a per-phase synchronous reactance of 1.0Ω . 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? 1200 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? T_{input} 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? $16.93, 2.1, -10.31$ 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:
 (i) Infinite bus, (ii) Speed Droop, (iii) Power House Diagram, (iv) Torque angle

[4]

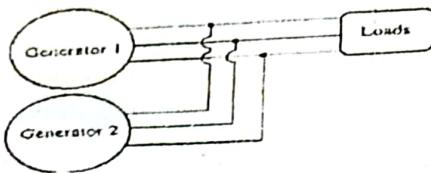


Figure 2: Question 2

Above figure shows two generators supplying a load. Generator 1 has a no-load frequency of 61.5 Hz and a slope S_{p1} of 1 MW/Hz. Generator 2 has a no-load frequency of 61.0 Hz and a slope S_{p2} 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
- ✓** (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 0.15Ω 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
- ✓** (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?

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

Answer any 5 of the following questions

- 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
- Q** 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
- Q** 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. 4
- e)** Briefly describe the seven phases of the software development life cycle. 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
- Q** 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. 2
- e)** Differentiate between association and dependency? Define package analysis with example. 3
- a)** List out the steps in software project execution & monitoring. 4
- b)** How to step by step effectively communicate in project management? 3
- c)** What is UI/UX design in software engineering? Write down the steps for interface analysis and user analysis. 4
- d)** Illustrate evolutionary development in software engineering process with its problem and applications. Show incremental development process. 3
- 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. 3

Time: 3 Hours

[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.]

Full Marks: 70

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.
 (ii) Post to the ledger accounts. 18/01/01
 (iii) Prepare a trial balance on April 30, 2022.

4
4
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	<u>Debit</u>	<u>Credit</u>
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	
	<u>\$273,900</u>	<u>\$273,900</u>

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. (Use Accounts Payable)

(vi) Rentals of \$4,000 were due from tenants at August 31. (The mortgage was taken out in January.) Interest rate is 9% per year.

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- a)** Journalize the adjusting entries on August 31. Enter the trial balance.

- b) Prepare a trial balance on August 31. amounts and post the adjusting entries. (Use J1 as an account number.)

c) Prepare an adjusted trial balance on August 31.

d) Prepare a balance sheet as of August 31, 2010, for Jose Company owned by Jose

- The adjusted trial balance:

- ESPINOSA COMPANY
are as follows.

Worksheet

Second Decem-

Ad - 1

<u>Account Titles</u>	<u>Dr.</u>	<u>Credit</u>
Cash	11,600	
Accounts Receivable	15,400	
Supplies	2,000	
Repaid Insurance	2,800	
Equipment	34,000	
Accumulated Depreciation—Equipment		8,000
Notes Payable		20,000
Accounts Payable		9,000
Common Stock		3,500
Retained Earnings		3,800
Dividends		20,000
Service Revenue		5,000
Advertising Expense		10,000
Supplies Expense		12,000
Depreciation Expense		5,700
Insurance Expense		8,000
Salaries and Wages Expense		5,000
Interest Expense		44,000
Total		800
		<u>151,300</u>
		<u>151,300</u>

Instructions

- a) Prepare an income statement, retained earnings statement, and a classified balance sheet.
(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 tools, 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.~~

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

Patuakhali Science and Technology University

Faculty of Computer Science and Engineering

Semester (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
 (i) $x\sqrt{1+y^2}dx + y\sqrt{1+x^2}dy = 0$ (ii) $(x-y)^2 \frac{dy}{dx} = a^2$ (iii) $y - x \frac{dy}{dx} = a(y^2 + \frac{dy}{dx})$ 12
2. a) Define homogeneous differential equation.
 b) Solve the differential equations
 (i) $(x^2 + y^2)dy = xydx$ (ii) $\frac{dy}{dx} = x^3y^3 - xy$ 08
- 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.
 b) Solve the Exact differential equation: $(2y-x-1)dy + (2x-y+1)dx = 0$ 02
 Solve the following 04
 (i) $(D^3 - 3D^2 + 4D - 2)y = 0$ (ii) $(D^2 - 13D + 42)y = 0$ 08
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:
 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. 05
 c) The following frequency distribution below gives the cost of production of computers in different brands:
 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} 06
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:
 Class Interval: 50-60, 60-70, 70-80, 80-90, 90-100, 100-110, 110-120
 Frequency: 05 09 13 20 19 09 05 05
 c) A distribution of short term computer credit disbursement from 10 branches of a bank is given below-
 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. 06
6. a) Discuss about the terms: Event, Sample, Census and Pilot survey 04

- b) Establish the relation between correlation coefficient and regression coefficient
c) Per week weight (in pounds) of a calf from its birth is given below:

Age in week (x):	01	02	03	04	05	06	07	08	09	10
weight (g):	52.5	58.	65.0	70.2	75.4	81.1	87.2	95.5	102.	108.

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

[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)
 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. 5
- (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 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 inserted 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

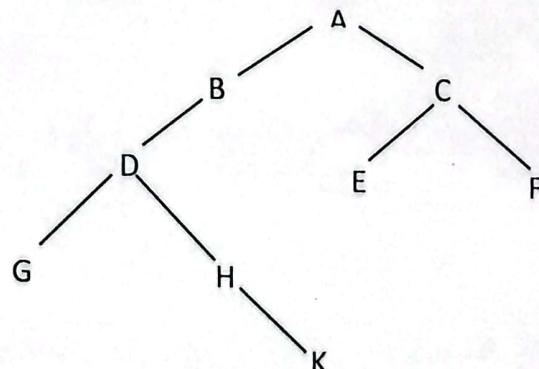
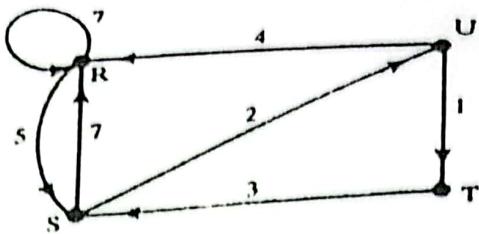


Fig: Tree, T

4. (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
5. 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.
 44, 33, 11, 55, 77, 90, 40, 60, 99, 22, 88, 66 5
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.

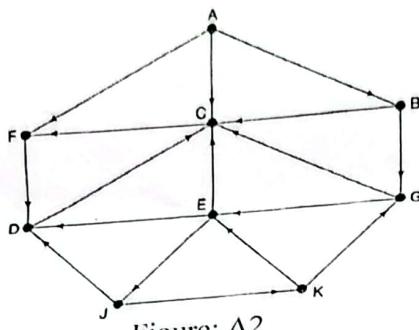
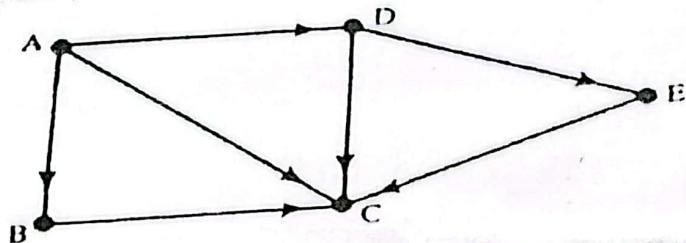


Figure: A2

3

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

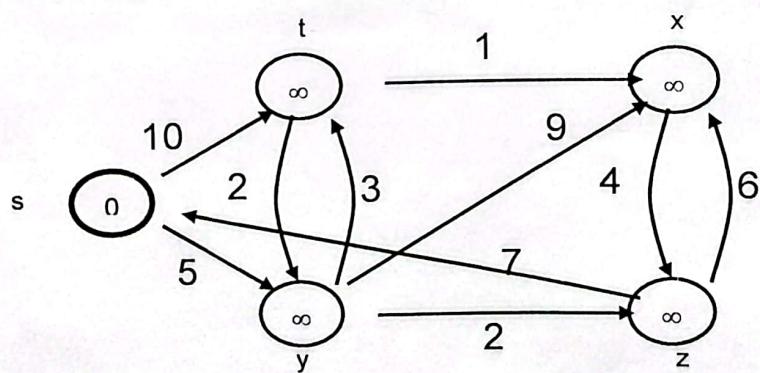


6. a) Write the INSERTION-SORT algorithm and sort the following dataset in increasing order.

5	2	4	6	1	3
---	---	---	---	---	---

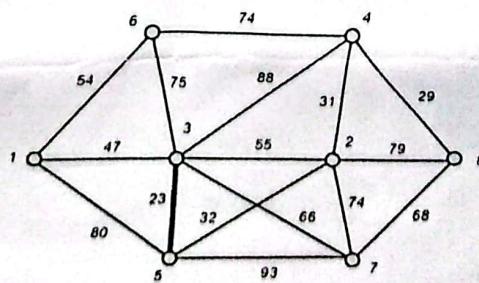
5

- 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.



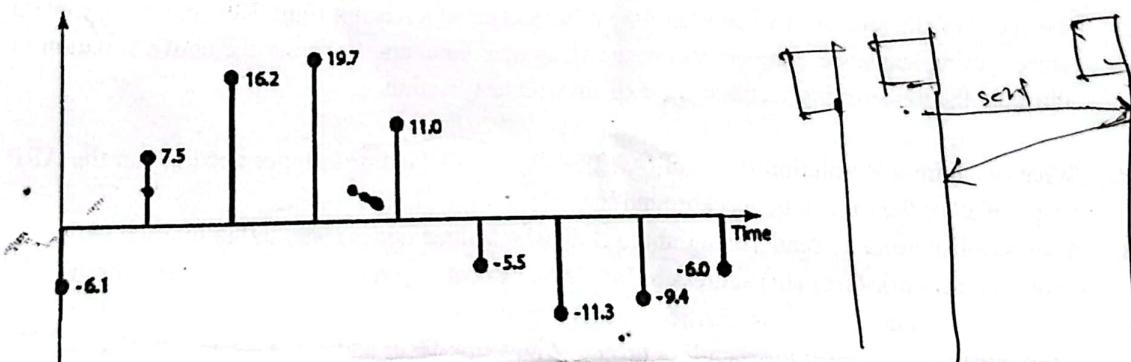
4

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

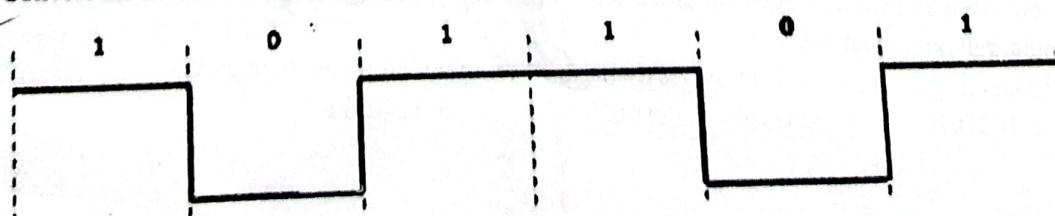
Final Examination of B. Sc. Engineering in CSE Level: 2 Semester: I Session: 2020-2021

Code: 211 Course Title: Data Communication and Engineering January-June 2023 Credit: 03
 Answer any 05 out of 06 Questions (Split answers are highly discouraged) Time: 03 Hr Marks: 70

- 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?
- (Q2)*
- [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
 i. 01011011
 ii. 11111111 to MLT-3 scheme. 3
- [D.] How do guided media differ from unguided media? What are the three major classes of guided media? 2
- (Q3)*
- [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 normalized 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,



- [D.]** What is the number of bits per baud for the following techniques?
 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
- Draw the configuration diagram.
 - Calculate the total number of crosspoints.
 - Find the possible number of simultaneous connections.
 - Find the possible number of simultaneous connections if we use a single crossbar (100×100).
 - 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:
 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. 3
- [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 acknowledgement 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 be corrected using sequence numbers and acknowledgment numbers. Consider the above situation to illustrate the transmitting scenario and explain with justification. 3

- 6** **[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.
- [D.]** Assuming even parity, find the parity bit for each of the following data units.
 a. 1001011 b. 0001100 c. 1000000 d. 1110111

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

Time: 30 minutes

Course Code: EEE 212

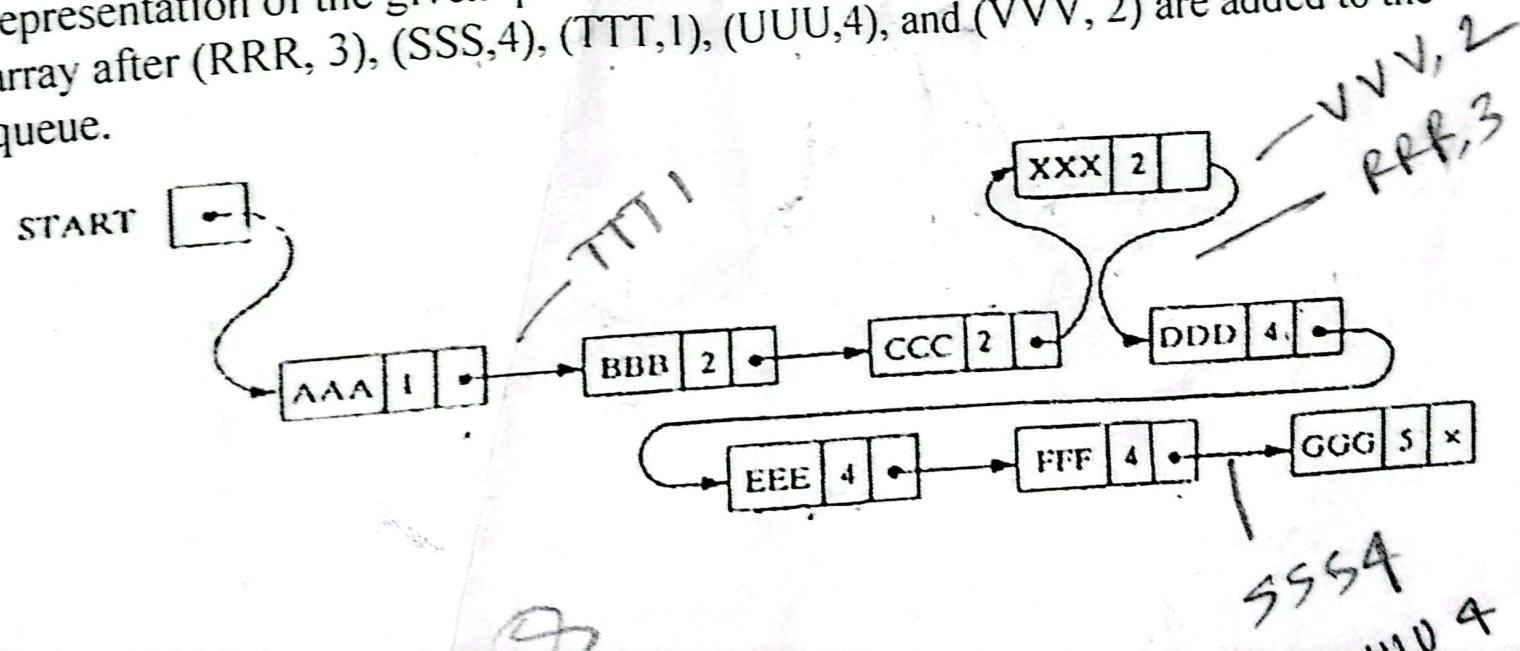
Marks: 15

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
 a) What is recursion? Translate, by inspection and hand, each infix expression into its equivalent prefix expression. 04
2. a) $(A+B \uparrow D)/(E-F)+G$
 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
- What is the size of an output frame in bits?
 - What is the output frame rate?
 - What is the duration of an output frame?
 - What is the output data rate?
 - 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
CCE-122

Course Title
Object Oriented Programming Sessional

July December 2022

Credit: 1.50
Time: 2.30 Hr
Marks: 70

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

15
15
5

Test Data

Input the number: 7

Expected Output :

A
ABA
ABCBA
ABCDGBA
ABCDEDCBA
ABCDEFEDCBA
ABCDEEGFEDCBA
ABCDEFEDCBA
ABCDEDCBA
ABCDCBA
ABCBA
ABA
A

(5.)

15

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.

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: 3rdMarks - 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.
P: 3, 1, +, 2, 1, 7, 4, -, 2, *, +, 5, - 25
10. Implement Tower of Hanoi Recursion with Stack. 25
11. Implement DEQUE. 25
12. Implement Warshall's algorithms to find shortest path. 25

x 24 9
6 9
16 17
m

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
15. Viva-Voce 20

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.
b) Illustrate the four organizational paradigms for software engineering teams.
c) Define the five points of measures, metrics and indicators in software engineering.
d) List out the factors you must be considered when selecting a software project team structure.
e) What are the four P's of an effective software project management? Who are stakeholders in software engineering?

2. a) What are the different types of risks in software project development? Show the 5 steps in the risk management process.
b) Why is project management important in software process? Describe the core qualities and responsibilities of a successful project manager.
c) Show the available tools, which aid for effective software project management?
d) How function point (FP) analysis is used in estimation of software project? Give proper example.
e) Briefly describe the seven phases of the software development life cycle.
- 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?
b) Write down the advantages of domain analysis in software engineering. Define data modeling.
c) What are data objects and data attributes in software engineering? Show the ERD notation with an example.
d) Define class in software engineering. Difference between method hiding and encapsulation.
e) Show the use case diagram, activity diagram and swimlane diagrams in software engineering.
- a) Explain the phases involved in software testing life cycle. List out the roles and responsibilities of a test manager.
b) What does a typical test report contain? Explain the benefits of test reports.
c) How to do security testing in software engineering? Describe the six basic principle of security testing.
d) Define the states of a system. Show the State Diagram for the Control Panel Class.
e) Differentiate between association and dependency? Define package analysis with example.
- a) List out the steps in software project execution & monitoring.
b) How to step by step effectively communicate in project management?
c) What is UI/UX design in software engineering? Write down the steps for interface analysis and user analysis.
d) Illustrate evolutionary development in software engineering process with its problem and applications. Show incremental development process.
- a) Distinguish between plan-driven development approach and agile development approach.
b) Find out the agile method specific problem with its applicable area.
c) Define extreme programming (XP) with its release cycle and principle of practice.
d) Difference between regression testing and acceptance testing.
e) Show the benefits of software performance testing.

Full Marks: 15

[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.

- 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.

- (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?

- (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?

Duration: 01 Hour

03

(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?

65 Legal Services Inc. was incorporated on July 1, 2003. During the first month of operations, the following transactions occur:

1. Legal Services issued common stock 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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Third Ser
Course

Time: 3 Hours

[Answer any **FIVE** of the questions. You will take account of the parts if any, of the same]

[Time: 3 Hours]
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.	70500
2	Paid office rent for the month \$1,400.	61500
3	Purchased dental supplies on account from Whyte Company \$4,500.	5620
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.
- (ii) Post to the ledger accounts.
- (iii) Prepare a trial balance on April 30, 2022.

4

4

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	5,000	
Dividends		80,000
Rent Revenue		400
Maintenance and Repairs Expense	3,600	
Salaries and Wages Expense	51,000	
Utilities Expense	9,400	
	<u>273,900</u>	<u>273,900</u>
		16500

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 sheet.
(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, 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

[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.

- (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
- (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)
 - 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.
 5
- (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
- (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 inserted 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

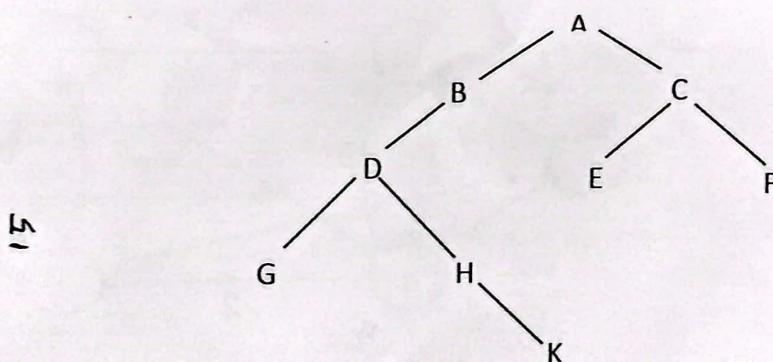


Fig: Tree, T

- (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
- 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 A.2, find a minimum path P from A to K using BFS where each edge has length 1.

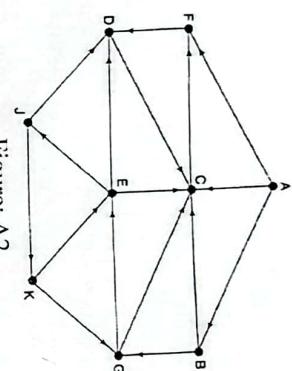
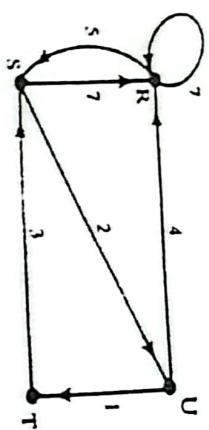
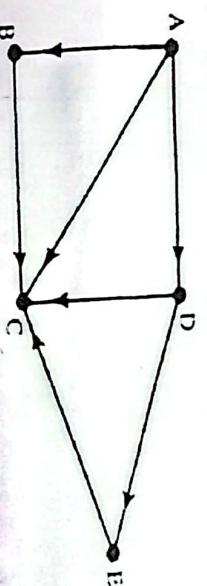


Figure: A.2

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

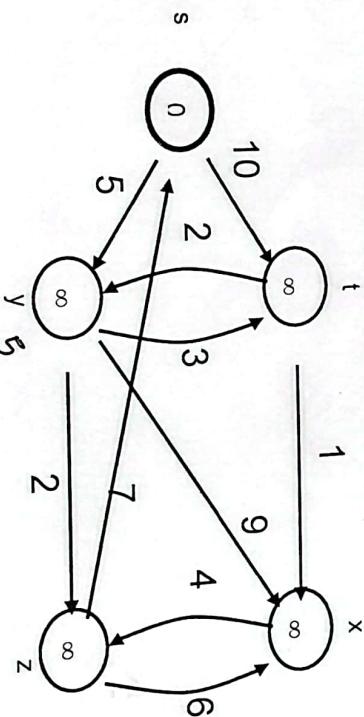


6. a) Write the INSERTION-SORT algorithm and sort the following dataset in increasing order.

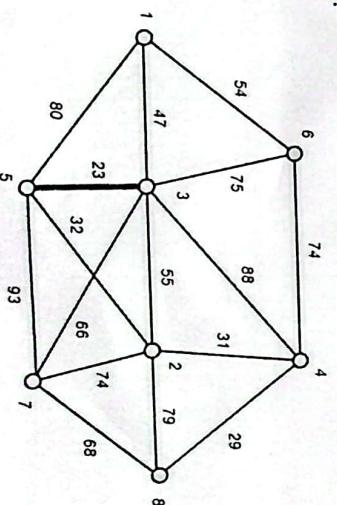
5	2	4	6	1	3
---	---	---	---	---	---

- 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.

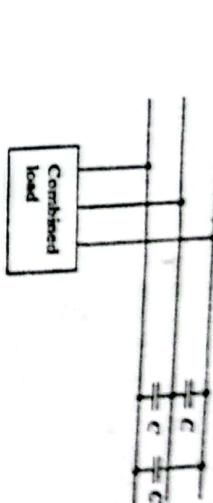
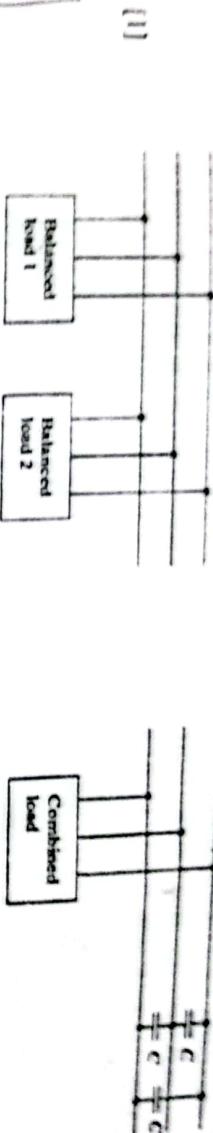


Patuakhali Science and Technology University

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.



(a)

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 $40 + j50 \Omega$ 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. $737.07 + 671.34j$ 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. 55.28 04
- (c) Calculate the current drawn from the supply at unity power factor condition. 17.28 02
- (d) Calculate the capacitance of each capacitor. 1.05 04

1.05

1

01

06

02

03

04

[2] A 480-V, 50-Hz, Y-connected, six-pole synchronous generator has a per-phase synchronous reactance of 1.0Ω . 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? 1440
- (b) What is the terminal voltage of this generator if the following are true?

- 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? 0.95

(d) How much shaft torque must be applied by the prime mover at full load? How large is the induced counter-torque? 1.5 Nm

- (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? $16.93, 2.1, -10.31$

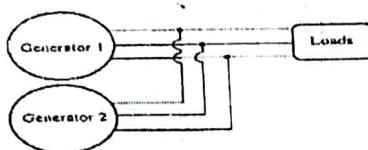
[3] (a) Why parallel operation of generators is necessary? What are the conditions required for parallel operation of generators. 05

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

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

04

[4]



122.5

$$P = S_p (f + m^{-1} \omega_0)$$

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 S_{p1} of 1 MW/Hz. Generator 2 has a no-load frequency of 61.0 Hz and a slope S_{p2} 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? $E = V - IaR_a$ 03
- (c) A DC series motor operates at 900 rpm with a line current of 200A from 220V mains. Its armature circuit resistance is 0.15Ω 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). 2297 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

Semester (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
 1. b) Solve the differential equations 12
 2. a) Define homogeneous differential equation. 02
 2. b) Solve the differential equations 08
- (i) $x\sqrt{1+y^2}dx + y\sqrt{1+x^2}dy = 0$ (ii) $(x-y)^2 \frac{dy}{dx} = a^2$ (iii) $y - x \frac{dy}{dx} = a(y^2 + \frac{dy}{dx})$
- 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
 3. b) Solve the Exact differential equation: $(2y-x-1)dy + (2x-y+1)dx = 0$ 04
 3. 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. 05
 4. 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 | 8 | 05 |
- Draw (i) Histogram and locate the mode and (ii) Frequency polygon by the above distribution.
5. a) The following frequency distribution below gives the cost of production of computers in different brands: 06
 5. b) Cost (Tk. in Lacs): 10-14, 14-18, 18-22, 22-26, 26-30, 30-34, 34-38, 38-42 (Ans)
 5. c) No. of Computers: 11, 27, 42, 45, 50, 55, 65, 70 (Ans)
- Compute quartiles Q_1 , Deciles D_4 and Percentiles P_{80} 03
- (Ans) $Q_1 = 17.5$, $D_4 = 34.5$, $P_{80} = 29.54$
5. a) Write short notes on Moments, Skewness and Kurtosis 05
 5. 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 |
|------------|----|----|----|----|----|----|----|
- 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. 06
6. a) Discuss about the terms: Event, Sample, Census and Pilot survey 04

- b) Establish the relation between correlation coefficient and regression coefficient
 c) Per week weight (in pounds) of a calf from its birth is given below:

Age in week (x):	01	02	03	04	05	06	07	08	09	10
weight (g):	52.5	58.	65.0	70.2	75.4	81.1	87.2	95.5	102.	108.

Estimate the least square regression of weight on age and also estimate the weight when the age is 8.5 weeks. ✓ 98

$$y = a + bx$$

$$\sum (x - \bar{x})(y - \bar{y})$$

$$\sum (x - \bar{x})^2$$

$$\sum xy - \frac{\sum x \sum y}{N}$$

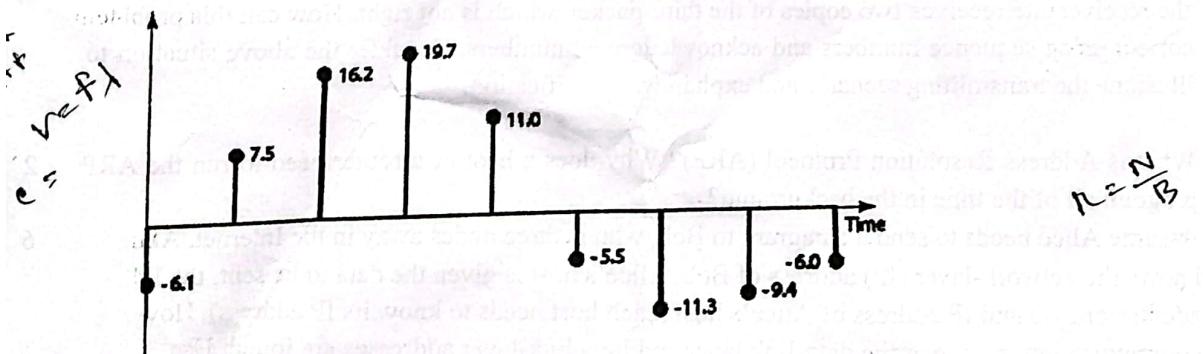
$$\sum x^2 - \frac{(\sum x)^2}{N}$$

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

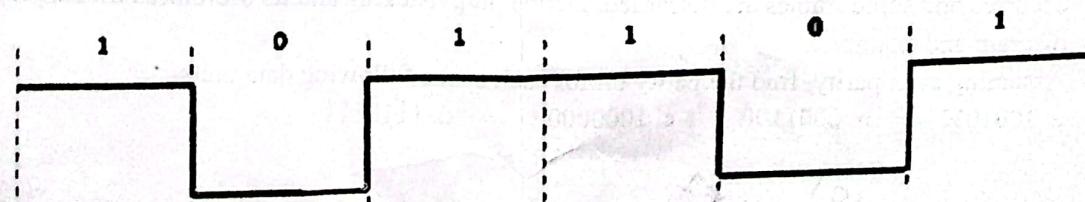
- 1 [A.] What information does the amplitude of a signal convey about the signal's characteristics? How does the frequency of a signal affect its behavior and interpretation? In what way does the phase of a signal influence its overall properties and relationship with other signals? 3
- [B.] i) If a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

- 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 normalized error and quantized code and encoded words.



- [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
- ASK with four different amplitudes
 - FSK with eight different frequencies
 - PSK with four different phases
 - 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
- Draw the configuration diagram.
 - Calculate the total number of crosspoints.
 - Find the possible number of simultaneous connections.
 - Find the possible number of simultaneous connections if we use a single crossbar (100×100).
 - 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
- What is the polynomial representation of 101110?
 - What is the result of shifting 101110 three bits to the left?
 - Repeat part b using polynomials.
 - What is the result of shifting 101110 four bits to the right?
 - 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 be corrected 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
- 1001011
 - 0001100
 - 1000000
 - 1110111

10111010
 9x 101110
 10101110

101110
 1110 | 101



পাটুখালী 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

Answer all the questions

1. A 1000-V_A, 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)
$V_{OC} = 115 \text{ V}$	$V_{SC} = 17.1 \text{ V}$
$I_{OC} = 0.11 \text{ A}$	$I_{SC} = 8.7 \text{ A}$
$P_{OC} = 3.9 \text{ W}$	$P_{SC} = 38.1 \text{ W}$

- (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 lagging.
- (c) Determine the transformer's full load efficiency at 0.8 PF lagging.
2. A Y-connected balanced three-phase generator with an impedance of $(0.4 + j0.3) \Omega$ per phase is connected to a Y-connected balanced load with an impedance of $(24 + j19) \Omega$ per phase. The line joining the generator and the load has an impedance of $(0.6 + j0.7) \Omega$ per phase. Assuming a positive sequence for the source voltages and that $V_{an} = 120<30^\circ$, 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

Marks: 15

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

$$Q = \frac{V^2}{X}$$

[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 manner in which the answers are presented. Different parts, if any, of the same question must be answered in one place in order of given sequence.]

1. a) What is an accounting information system? "An accounting information system applies only to a manual system." Do you agree? Explain with suitable example. 8.0

- b) What are common features of computerized accounting packages beyond recording transactions and preparing financial statements? 6.0

328938 - 10 Income, E, B, cash flow

2. a) Threet's Repair Shop was started on May 1 by Erica Threet. A summary of May transactions is presented below.

1. Invested Tk 10,000 cash to start the repair shop.
2. Purchased equipment for Tk 5,000 cash.
3. Paid Tk 400 cash for May office rent.
4. Paid Tk 500 cash for supplies.
5. Incurred Tk 250 of advertising costs in the Beacon News on account.
6. Received Tk 6,100 in cash from customers for repair service.
7. Withdrew Tk 1,000 cash for personal use.
8. Paid part-time employee salaries Tk 2,000. - 2
9. Paid utility bills Tk 170.
10. Provided repair service on account to customers Tk 750.
11. Collected cash of Tk 120 for services billed in transaction (10).

*refund
credit*

You are required to prepare a tabular analysis of the transactions in good form, using the following column headings: Cash, Accounts Receivable, Supplies, Equipment, Accounts Payable, Owner's Capital, Owner's Drawings, Revenues, and Expenses.

- b) Refer to data in question no. (a) above, prepare journal entries. 7.0

3. a) Refer to data in question no. 2(b) above, prepare necessary ledger accounts. 5.0

- b) Refer to data in question no. (a) above, prepare a trial balance. 2.0

- c) Refer to data in question no. (b) above, prepare financial statements. 7.0

*posting
trial balance*

*Math 700
financial statement*

4. a) What do you mean by management and manager? Discuss different kinds of managers 3.0 considering both level and area.

- b) Diagrammatically show the management in organization and management process. State the 3.0 skills of a good manager.

- c) Explain Henry Fayol's 14 principles of management and distinguish between: 8.0
 i) Unity of command and unity of direction ii) Centralization and decentralization.

5. a) Define leadership and leader. Classify leader according to power and authority. 3.0

- b) Write down different theories of leadership. 3.0

- c) Discuss any one theory from behavioral approach and another from situational approach. 8.0

6. a) What is planning? Write down the importance of planning. 3.0

- b) Write down the strategies that you can formulate at both business and corporate levels. 3.0

- c) Explain the Porter's generic strategy and BCG matrix with appropriate conclusion. 8.0

Ans 2

Ex 50

Management is considering the following independent alternatives for 2018.

1. Increase unit selling price 20% with no change in costs, expenses, and sales volume.
2. Purchase new automated equipment that will change the proportion between variable and fixed cost of goods sold to 54% variable and 46% fixed.

You are required to compute:

- | | |
|------------------------------------------------------------------------------------|---|
| (i) The break-even point in taka for 2017. | 2 |
| (ii) The break-even point in taka under each of the alternative courses of action. | 3 |
| (iii) Which course of action do you recommend? | 2 |
3. a) What is employee motivation? Explain the significance of motivation in an IT firm. 4
- b) Discuss safety and esteem needs with examples. 4
- c) Explain managerial Grid theory. 6
4. (a) Define controlling. Explain various steps of controlling process. 6
- b) What is the relationship between planning and controlling? 2
- c) Write down Short notes on:
i) Self-Management ii) TQM iii) IT Policy in Bangladesh iv) Digital Inclusion 6
5. a) "Management is the art of getting things done through others"- Explain 2
- b) Discuss various types of managerial skills of an IT manager. 5
- c) Define training. Difference between job description and specification. 3
- d) Distinguish between boss and leader 4
6. a) What is trial Balance. Why an organization prepared a trial balance. 3
- b) Lori Figgs is confused about the lack of agreement between the cash balance per books and the balance per the bank. Explain the causes for the lack of agreement to Lori, and give an example of each cause. 3
- c) On April 30, 2019 Smart Software Company had a cash balance per books of Tk 11,589.45. The bank statement from Standard Chartered Bank on that date showed a balance of Tk 15907.45. A comparison of the statement with the Cash account revealed the following facts. Outstanding checks at April 30, 2019 were Chq No- 453, Tk 3,000.00; Chq no.- 457, Tk 1,401.30; Chq no.- 460, Tk 1,502.70 and deposits in transit were Tk 2,201.40. Smart Software wrote check no. 443 for Tk 1,226.00 and the bank correctly paid that amount. However, Smart Software recorded the check as Tk 1,262.00. The statement included a debit memo of Tk 30 for the printing of additional company checks. On October 31, the bank statement showed an NSF check from J. R. Baron for Tk 425.60. A Tk 1,000 note receivable was collected by the bank for Smart Software Company on April 30 plus Tk 50 interest. The bank charged a collection fee of Tk 15. No interest has been accrued on the note.
- You are required to-
- (i) Prepare the bank reconciliation at April 30, 2019. 4
- (ii) Prepare the necessary adjusting entries for Smart Software Company at April 30, 2019. 4

- 4 A Suppose LIST is a linked list in memory consisting of numerical values. Write a procedure for each of the following:

i) Finding the maximum MAX of the values in LIST.

ii) Finding the average MEAN of the values in LIST.

- B Suppose a linked list is in memory as figure A1 where START=4 and AVAIL=3.

i) Find the sequence of characters in the list.

ii) Suppose F and then C are deleted from the list and then G is inserted at the beginning of the list. Find the final structure.

iii) Suppose G is inserted at the beginning of the list and then F and then C are deleted from the structure. Find the final structure.

	INFO	LINK
1	A	2
2	B	3
3		6
4	C	7
5	D	0
6		0
7	E	1
8	F	5

Figure: A1

- C Define linked list. Write an algorithm to insert a node in a sorted linked list.

- 5 A i) Write a procedure to delete an element from top of the stack. Sort the following array of elements by using insertion sort algorithm.

348, 143, 361, 423, 538, 128, 321, 543, 366

- B Distinguish between linear and nonlinear data structure. Analyze the complexity of quick sort algorithm.

- C Explain recursion with example. Translate, by inspection and hand, each infix expression into its equivalent postfix expression:

i) $(A + B * D) / (E - F) + G$

ii) $A * (B + D) / E - F * (G + H / K)$

HLS
LSP
LPT

- 6 A Define copy tree, 2-Tree, complete tree, multigraph and directed graph. Insert the following numbers in order into an empty binary search tree.

40, 60, 50, 33, 55, 11, 70

- B A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequences of nodes:

Inorder: EACKFHDBG

Preorder: FAEKCDHGB

Draw the tree T.

- C i) Build a Huffman tree from the list of elements.

Item	A	B	X	D	E	Z	F
Weight	4	15	16	5	8	0	16

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

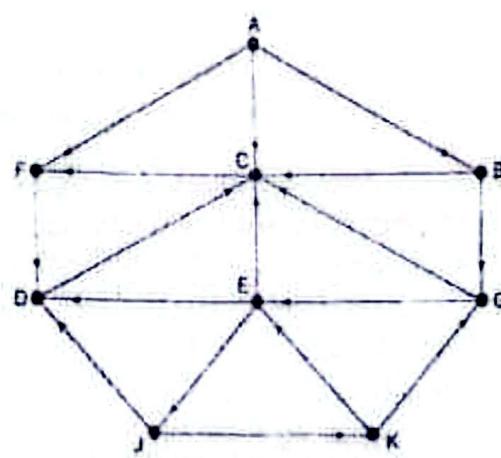


Figure: A2

**Faculty of Computer Science and Engineering
Patuakhali Science and Technology University**

**3rd Semester (Level-2, Semester-I) Final Examination of B.Sc. Engg. (CSE), January-June 2019
Course Code-AIS-211; Course Title- Accounting and Management**

Full Marks-70;

Time- 3 Hours.

[Answer any five of the following questions. Right margin indicates marks distribution. Different part of the same question (if any) must be answered in order of given sequence.]

- 1. a)** Define accounting. Briefly explain the importance of accounting. 3

- b) Maria Juarez is a licensed dentist. During the first month of the operation of her business, the following events and transactions occurred.

April 1 Invested Tk. 40,000 cash.

- 2 Hired a secretary-receptionist at a salary of Tk. 600 per week payable monthly.
- 3 Paid office rent for the month Tk. 1,000.
- 5 Purchased dental supplies on account from Smile Company Tk. 4,000 *A/P*
- 7 Provided dental services and billed insurance companies Tk. 5,100. *A/R*
- 15 Received Tk. 1,000 cash advance from Trudy Borke for an implant.
- 20 Received Tk. 2,100 cash for services completed and delivered to John Stanley.
- 25 paid secretary-receptionist for the month Tk. 2,400.
- 29 Paid Tk. 1,600 to Smile Company for accounts payable due.

You are required to:

- (i) Journalize the transactions. 3
- (ii) Post to the ledger accounts. 3
- (iii) Prepare a trial balance on April 30, 2019. 2

- c) The following information relates to Jake Peavy Co. for the year 2018.

Owner's capital, January 1, 2018	Tk 48,000	Advertising expense	Tk 1,800
Owner's drawings during 2018	6,000	Rent expense	10,400
Service revenue	63,600	Utilities expense	3,100
Salaries and wages expense	29,500 <i>p.e</i>		

You are required to prepare an Income Statement and an Owner's Equity Statement for the year ending December 31, 2018. 3

2. a) Briefly explain Marginal Cost and Opportunity cost with suitable example each. 3
- b) A company has sales of Tk. 32000, fixed costs Tk. 6000 and break-even point of Tk. 24000.

You are required to Compute:

- (i) The amount of profit earned by the company. 1
- (ii) Contribution Margin ratio. 2
- (iii) Profit Volume ratio. 1

- c) Magic Manufacturing's sales slumped badly in 2017. For the first time in its history, it operated at a loss. The company's income statement showed the following results from selling 600,000 units of product: Net sales Tk. 2,400,000; total costs and expenses Tk. 2,540,000; and net loss Tk. 140,000. Costs and expenses consisted of the amounts shown below.

	<u>Total</u>	<u>Variable</u>	<u>Fixed</u>
Cost of goods sold	Tk. 2,100,000	1,440,000	660,000
Selling expenses	240,000	72,000	168,000
Administrative expenses	200,000	48,000	152,000
Total	2,540,000	1,560,000	980,000

Patuakhali Science and Technology University

3rd Semester (Level-2, Semester-1) B.Sc. Engg (CSE) Final Examination-2019 (January-June)

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

Credit Hour : 3.00 Session: 2017-18 Full Marks: 70 Duration: 3 Hours

[Figures in the right margin indicate full marks. Split answering of any question is not recommended. Answer must be brief, relevant and neat. Write the full question number e.g. 2(B) (ii)(b) before the answer paragraph]

Answer any 3 of the following questions

- 1 A** Suppose the following numbers are stored in an array A: 07
132, 151, 127, 185, 166, 123, 113, 157
Apply the bubble sort to the array A and discuss each pass separately.
- B** Suppose a corporation keeps a linear array YEAR(1920, 1971) such that YEAR[K] contains the 07 number of employees born in year K. Write a module for each of the following tasks:
- To print each of the years in which no employee was born.
 - To find the number NNN of years in which no employee was born.
 - To find the number N50 of employees who will be at least 50 years old at the end of the year. (Assume 1985 is the current year.)
 - To find the number NL of employees who will be at least L years old at the end of the year. (Assume 1985 is the current year.)
- 2 A** Consider the linear arrays AAA(5:50), BBB(-5: 10) and CCC(18) 07
i. Find the number of elements in each array. vi
ii. Suppose Base (AAA) = 400 and w = 4 words per memory cell for AAA. Find the address of AAA [25], AAA [35] and AAA [45].
- B** i. A sanatorium maintains a patient file in which each record contains the following data: 07
Patient Name, Admission Date, Voter ID, Room, Bed Number, Doctor
a) Which items can serve as primary keys?
b) Which pair of items can serve as a primary key?
c) Which items can be group items?
- ii. Give a brief description of
a) traversing,
b) sorting and
c) searching.
- 1000 X 25
35 X 1000
q5 X 1000
- 3 A** Discuss whether a stack or a queue is the appropriate structure for determining the order in which elements are processed in each of the following situations. 07
i. Batch computer programs are submitted to the computer center.
ii. Program A calls subprogram B, which calls subprogram C, and so on.
iii. Employees have a contract which calls for a seniority system for hiring and firing.
- B** i. Write an algorithm for Linear Search. 07
ii. Briefly describe the notions of
a) the complexity of an algorithm and
b) the space-time tradeoff of algorithms.

Patuakhali Science and Technology University

B.Sc Engg.(CSE) 3rd Semester (Level-2, Semester-I) Final Examination-2019 (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] a. Define polyphase circuits. Why do we use polyphase circuits instead of single phase? 03
b. Derive the power equation of 4-wire 3-phase system. 03
c. A balanced star connected load of $(10+j5)\Omega$ per phase is connected to a balanced 3-phase 400v supply. Find the line current, power factor, power and total volt-ampere. 06
d. Differentiate between alternator and generator. 02
- [2] a. What are the interconnections of three phase circuits? Describe mesh connection of three phase circuit to find line and phase current. 05
b. "The impedance in star connected circuit is equivalent to one-third of the impedance in delta connected circuit". Justify the statement. 04
c. A 200v, 3-phase voltage is applied to a balanced delta connected 3-phase load of phase impedance $(10+j15)\Omega$. Find the phasor current in each line, power consumed in each phase, and phasor sum of three line currents. Why does it have this value? 05
- [3] a. Define electric generator. Derive the E.M.F. equation of D.C. generator. 05
b. What are the losses of D.C. generator? For a D.C. generator, justify the expression $\eta_c = \eta_m \times \eta_e$, where, all symbols represents proper meanings. 06
c. An 8-pole, lap-wound armature rotated at 300 r.p.m. is required to generate 250 V. The useful flux per pole is 0.08 wb. If the armature has 150 slots, calculate the number of conductors per slot. 03
- [4] a. What is logic analyzer? Classify and describe different types of logic analyzer. 03
b. Differentiate between logic analyzer and oscilloscope. Write down the key characteristics of logic analyzer. 05
c. Write short notes on: Differential amplifier, logarithmic amplifier, and chopper amplifier. 06
- [5] a. "The efficiency of a D.C. generator will be maximum when the load current is such that variable loss is equal to the constant loss". Justify the statement with appropriate symbols. 05
b. Define back E.M.F. Write down the significance of back E.M.F. 04
c. What are the troubles that may arise in the operation of a D.C. motor? 03
d. Write down the key characteristics of a D.C. motor. 02
- [6] a. What is D.C. motor? Explain the expression $T_a = I_a^2$, where symbols denotes appropriate meanings. 06
b. Write down the applications of D.C. motor. 03
c. "The mechanical power developed by the motor is maximum when back E.M.F. is equal to half of the applied voltage". Explain the statement with appropriate symbols. 02
d. The armature of a 6-pole, 800 r.p.m. lap-wound generator has 90 slots. If each coil has 4 turns, calculate the flux per pole required to generate an e.m.f. of 280 volts. 03

Patuakhali Science and Technology University

3rd Semester (Level-2 Semester-I)

Final Examination-2019 (January-June)

Patuakhali Science and Technology University

B.Sc.Engg.(CSE) 3rd Semester (Level-2, Semester-I) Final Examination-2019 (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 allowed.
Answer any 5 of the 6 questions.]

M

- 6 a) Explain the operation of TCP and IP. Mention the components of PDU.
b) Write short notes on following topics
i) UTP
ii) Line of sight
c) i) What are some major advantages and disadvantages of microwave transmission?
ii) Describe ATM and frame relay in the field of data communication.

Patuakhali Science and Technology University

3rd Semester (Level-2, Semester-1) B.Sc.Engg (CSE) Final Examination-2019 (January-June)

Course Code: CCE-211 Course Title : Data Communication and Engineering

Credit Hour : 3.00 Session: 2017-18 Full Marks:70 Duration: 3 Hours

[Figures in the right margin indicate full marks. Split answering of any question is not recommended. Answer must be brief, relevant and neat. Write the full question number e.g. 2(b) (ii) before the answer paragraph]

Answer any 5 of the following questions

- | | | |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1 | a) Why synchronization is the problem in data communications? | 4 |
| | b) Discuss the relationship between the sampling rate and the received signal. | 5 |
| | c) Assume a data stream is made as 0110 1101, show the encoding using the encoding scheme of NRZ-L, NRZ-I, RZ, Manchester, AMI. | 5 |
| 2 | a) What is the advantages of QAM over ASK and FSK? | 3 |
| | b) Show the constellation diagram of 16-QAM. | 4 |
| | c) How does TDM combine multiple signals into one? | 4 |
| | d) Discuss about interleaving in multiplexing and de-multiplexing | 3 |
| 3 | a) What is burst error? Show the performance of two-dimensional parity check | 3 |
| | b) Show how error is corrected through Hamming encoding algorithm. | 4 |
| | c) Show the performance of CRC generator if divisor is 1101 and data stream is 1000100. | 4 |
| | d) How orthogonal sequences are suitable for CDMA? | 3 |
| 4 | a) i) Define spectrum, fundamental frequency and bandwidth.
ii) Explain the features of each layer in TCP/IP protocol. | 3+2 |
| | b) i) Distinguish between LAN and WAN.
ii) Suppose, a computer A wants to communicate computer B, explain the tasks that are needed to perform this communication. | 2+2 |
| | c) Consider the following equation of composite periodic signal. | 5 |

$$s(t) = \frac{4}{\pi} \sum_{k=1}^{\infty} \frac{1}{k} \sin(2\pi kf)t$$

Analyze the bandwidth and data rate for the following cases.

- i) k=(1, 2, 3, 4) and f=1MHz
- ii) k=(1, 3, 5) and f= 4MHz

- | | | |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 5 | a) Define communication. Explain the mandatory issues for modern data communication. | 4 |
| b) | i) The USA and North Korea presidents need to come to an agreement by telephone, but neither speaks the other's language. Further, neither has on hand a translator that can translate to the language of the other. However, both prime ministers have English translators on their staffs. Draw a diagram to depict the situation, and describe the interaction and each level.
ii) Distinguish between guided and unguided media. | 3+2 |
| c) | Distinguish between data and signal. Explain about analog transmission and digital transmission. | 2+3 |

Patuakhali Science and Technology University

B.Sc. Engg.(CSE) 3rd Semester (Level-2 Semester-I) Final Sessional Examination of January-June 2020

Course Code: CIT-212 Course Title: Data Structures and Algorithms Sessional

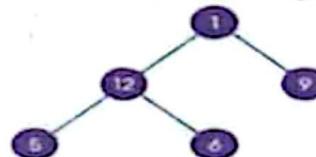
Session 2016-17 Credit Hour: 1.5 Full Marks: 70 Duration: 2 Hours.

There are two problems in each question. Implement one from each Lab work.

- 01 Suppose NAME is an 8-element linear array with five names: Brown, Davis, Johnson, Smith, and Wanger, are in the array. Observe that the names are listed alphabetically, and we want to keep the names in array alphabetically at all times. Implement the array in the following two situations: a) Ford and Taylor are added to the list. b) David is deleted from the array. 10

Suppose that N integers are stored in *increasing* order in an array. How many comparisons are necessary in the worst case to determine if a given integer k occurs in the sequence? The values of array are given: 3, 6, 21, 22, 25, 32, 37, 41, 49, 50, 53, 56, 58, 65, 72, 75, and the given integer k is equal to 25. Implement the above scenario using binary search algorithm.

- 02 Implement pre-order, in-order, and post-order traversal on the following tree. 10



Implement and build a heap H from the following list of numbers: 44, 30, 50, 22, 60, 55, 77, 55. How to delete the number 60 from the heap H.

- 03 Suppose a graph G is input by means of an integer M, representing the nodes 1, 2, ..., M, and a list of N ordered pairs of the integers, representing the edges of G. Write a program to find the $M \times M$ adjacency matrix A of the graph G. 10

Test the above using the following data:

- (i) $M = 5 ; N = 8$ (3, 4), (5, 3), (2, 4), (1, 5), (3, 2), (4, 2), (3, 1), (5, 1).
- (ii) $M = 6 ; N = 10$; (1, 6), (2, 1), (2, 3), (3, 5), (4, 5), (4, 2), (2, 6), (5, 3), (4, 3), (6, 4)

Write a program using stack and/or queue to implement a more powerful version of the *is_palindrome()* function

""" Return True if text is a palindrome, False otherwise. A palindrome is a string that is identical to itself when reversed. For example, "madam", "dad", and "abba" are palindromes. Note: the empty string is a palindrome, as is every string of length one. """

- 04 Write a program in which a user populated an array of integers and then it was sorted using insertion sort. Finally, the program printed out the sorted array to the console. 10

Tests and Results

Test Case	Test Input	Result
A reversed order array	7 6 5 4 3 2 1	1 2 3 4 5 6 7
An in-order array	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Random order array	2 4 3 1 6 5 7	1 2 3 4 5 6 7
A larger random order array	10 7 5 6 4 2 3 1 9 8	1 2 3 4 5 6 7 8 9 10
Negative size was entered	-1 for the size	The program quits

Write a program to sort an array of 20 integer values using insertion and selection sort algorithms and compare them in terms of time and space complexity.

- 05 List the given problems which have been solved by you in the sessional classes. 10
06 Viva-voce. 20

Patuakhali Science and Technology University
End Exam.-Jan-June 2020, Course Title: Mathematics-III, Marks-15, Time: 40 minutes

1. Give the following differential equation $\frac{dy}{dx} = \frac{y}{x} + \tan \frac{y}{x}$ 8

2. Define Primary and secondary data. What is the difference between population and sample give your own example? 4

What is Rank correlation? prove that Rank correlation coefficient $r = 1 - \frac{6 \sum d^2}{n(n^2-1)}$ 3

MAT-mid

cam

Patuakhali Science and Technology University

Department of Computer Science and Information Technology

Semester (Level-2, Semester-I), Midterm Examination of B.Sc. Engg.(CSE), January-June/2020, Session: 2018-19

Course Code: CIT-213 Course Title: Software Engineering

Full Marks: 15 Duration: 50 minutes

[Figures in the right margin indicate full marks]

Answer all the following questions.

1. Software engineering is not only concerned with issues like system heterogeneity, business and social change, trust, and security, but also with ethical issues affecting the domain. Give some examples of ethical issues that have an impact on the software engineering domain. 5
2. Imagine that a government wants a software program that helps to keep track of the utilization of the country's vast mineral resources. Although the requirements put forward by the government were not very clear, a software company was tasked with the development of a prototype. The government found the prototype impressive, and asked it be extended to be the actual system that would be used. Discuss the pros and cons of taking this approach. 5
3. When emergency changes have to be made to systems, the system software may have to be modified before changes to the requirements have been approved. Suggest a model of a process for making these modifications that will ensure that the requirements document and the system implementation do not become inconsistent. 5

Patuakhali Science and Technology University

3rd Semester (Level-2, Semester-I), Final Examination of B.Sc. Engg.(CSE), January-June/2020, Session: 2018-19

Course Code: CTT-213 Course Title: Software Engineering

[Figures in the right margin indicate full marks, Splitting answer if highly discouraged]

Time: 03 Hours

Total Marks: 70

Answer any five of the following questions

- ✓ a) What is the most important difference between generic software product development and custom software development? What might this mean in practice for users of generic software products? [4]
- ✓ b) Briefly discuss why it is usually cheaper in the long run to use software engineering methods and techniques for software systems? [5]
- ✓ c) When describing a system, explain why you may have to start the design of the system architecture before the requirements specification is complete? [5]
- ✓ d) Imagine that a government wants a software program that helps to keep track of the utilization of the country's vast mineral resources. Although the requirements put forward by the government were not very clear, a software company was tasked with the development of a prototype. The government found the prototype impressive, and asked it be extended to be the actual system that would be used. Discuss the pros and cons of taking this approach. [4]
- ✓ e) Suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems. Explain your answer according to the type of system being developed:
• A system to control antilock braking in a car
• A virtual reality system to support software maintenance
• A university accounting system that replaces an existing system
• An interactive travel planning system that helps users plan journeys with the lowest environmental impact [5]
- ✓ f) Write down each of the clauses in the ACM/IEEE Code of ethics for software engineers. [5]
- ✓ g) Which method involve customer representatives directly in the development process? Describe about the iterative development methods that focus on reducing process overheads and documentation and on incremental software delivery. [4]
- ✓ h) At the end of their study program, students in a software engineering course are typically expected to complete a major project. Explain how the agile methodology may be very useful for the students to use in this case. [5]
- ✓ i) To reduce costs and the environmental impact of commuting, your company decides to close a number of offices and to provide support for staff to work from home. However, the senior management who introduce the policy are unaware that software is developed using Scrum. Explain how you could use technology to support Scrum in a distributed environment to make this possible. What problems are you likely to encounter using this approach? [5]
- ✓ j) Identify and briefly describe four types of requirements that may be defined for a computer-based system. [4]
- ✓ k) When emergency changes have to be made to systems, the system software may have to be modified before changes to the requirements have been approved. Suggest a model of a process for making these modifications that will ensure that the requirements document and the system implementation do not become inconsistent. [5]
- ✓ l) You have taken a job with a software user who has contracted your previous employer to develop a system for them. You discover that your company's interpretation of the requirements is different from the interpretation taken by your previous employer. Discuss what you should do in such a situation? You know that the costs to your previous employer will increase if the ambiguities are not resolved. However, you also have a duty of confidentiality to your previous employer. [5]

client
req.

- a) You have been asked to develop a system that will help with planning large-scale events and parties such as weddings, graduation celebrations, and birthday parties. Using an activity diagram, model the process context for such a system that shows the activities involved in planning a party (booking a venue, organizing invitations, etc.) and the system elements that might be used at each stage. [4]
- b) Develop a sequence diagram showing the interactions involved when a student registers for a course in a university. Courses may have limited enrollment, so the registration process must include checks that places are available. Assume that the student accesses an electronic course catalog to find out about available courses. [5]
- c) Should there be a separate profession of 'software architect' whose role is to work independently with a customer to design the software system architecture? A separate software company would then implement the system. What might be the difficulties of establishing such a profession? [5]
- 6 a) When code is integrated into a larger system, problems may surface. Explain how configuration management can be useful when handling such problems. [3]
- b) Explain how the number of known defects remaining in a program at the time of delivery affects product support. [4]
- c) Testing is meant to show that a program does what it is intended to do. Why may testers not always know what a program is intended for? [3]
- d) Explain how advances in technology can force a software subsystem to undergo change or run the risk of becoming useless. [4]

Patuakhali Science and Technology University

B.Sc.Engg.(CSE) 3rd Semester (Level-2, Semester-I) Final Examination-2020 (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) a. Define *Electric Generator*. Derive the E.M.F. equation of *D.C. generator*. 05
 b. What are the losses of *D.C. generator*? For a D.C. generator, justify the expression 06
 $\eta_c = \eta_m + \eta_e$, where, all symbols represents proper meanings.
 c. The armature of a 6-pole, 600 r.p.m. lap-wound generator has 70 slots. If each coil has 4 turns, calculate the flux per pole required to generate an e.m.f. of 260 volts. 03
- [2] a. Write down the properties of an *Ideal Transformer*. Draw the equivalent circuit of an *ideal transformer*. 06
 b. Derive the efficiency equation of transformer. 08
- (3) a. "The efficiency of a D.C. generator will be maximum when the load current is such that variable loss is equal to the constant loss". Justify the statement with appropriate symbols. 05
 b. Define *back E.M.F.* Write down the significance of back E.M.F. 06
 c. What are the troubles that may arise in the operation of a D.C. motor? 03
- (4) a. Define D.C. motor. Explain the expression $T_a = I_a^2$, where symbols denotes appropriate meanings. 07
 b. An 8-pole, lap-wound armature rotated at 500 r.p.m. is required to generate 250 V. The useful flux per pole is 0.06 wb. If the armature has 100 slots, calculate the number of conductors per slot. 04
 c. "The mechanical power developed by the motor is maximum when back E.M.F. is equal to half of the applied voltage". Explain the statement with appropriate symbols. 03
- (5) a. What are the interconnections of three phase circuits? 02
 b. Derive the power equation of 3-phase 3-wire system. 08
 c. A 300v, 3-phase voltage is applied to a balanced delta connected 3-phase load of phase impedance $(8+j4) \Omega$. Find the phasor current in each line, power consumed in each phase, and phasor sum of three line currents. 04
- (6) a. Describe Star connection of three phase circuit to find line and phase current. 06
 b. "The impedance in star connected circuit is equivalent to one-third of the impedance in delta connected circuit". Justify the statement. 04
 c. A balanced star connected load of $(10+j5) \Omega$ per phase is connected to a balanced 3-phase 400v supply. Find the line current, power factor, power and total volt-ampere. 04

$$\Phi_2 = \frac{V_{pn}}{Z_{pn}}$$

$$\Rightarrow I_{pn} = \frac{V_{pn}}{Z_p}$$

0.046

Dept. of Computer and Communication Engineering

Faculty of Computer Science and Engineering

Patuakhali Science and Technology University

Dumki, Patuakhali-8602, Bangladesh

Final Examination of B. Sc. Engineering in CSE Level: 2 Semester: I Session: 2018-2019

Course Code
CCE-211

Course Title

Data Communication and Engineering

January-June 2020

Credit: 03

Time: 03 Hr

Marks: 70

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

- (1) [A.] Illustrate each layer of OSI model with a suitable example. ✓ 7
- [B.] Compare the characteristics of LAN, MAN and WAN.
ii. What are the key features of a protocol? ✓ 7
- (2) [A.] Write the objectives and learning outcomes of the data communication and engineering as a student of CSE. ✓ 3 10
- [B.] Explain a simplified communications model with example. ✓ 5 10
- [C.] Has any implementation of OSI model? Make comparison between the OSI model with the TCP/IP model. ✓ 6 10
- (3) [A.] Briefly describe synchronous time-division multiplexing with figure. Why is it that the start and stop bits can be eliminated when character interleaving is used in synchronous TDM? ✓ 6 3
- [B.] i. What is parity bit and CRC?
ii. Calculate the cyclic redundancy check for given 8-bit block of data, or message $M = 11100011$, frame check sequence consists of 5 bits and the predetermined divisor $P = 110011$. ✓ 8 7
- 4 [A.] Define encoding. Discuss the modulation techniques with figure. 4
- [B.] Why Pulse Code Modulation (PCM) is preferable to Differential Manchester (DM) for encoding analog signals that represent digital data? 5
- [C.] What is frequency-hopping spread spectrum? Explain general model of spread spectrum digital communication system with figure. ✓ 5 6
- (5) [A.] Write down difference between Frequency-Division Duplex (FDD) and Time-Division Duplex (TDD). ✓ 4 4
- [B.] How are binary values represented in amplitude shift keying and in binary frequency shift keying? What are the limitations of these approaches? ✓ 6 4
- [C.] For the bit stream 0100110, sketch the waveforms for each of the codes of digital signal encoding formats (Digital Data, Digital Signal). Assume that the signal level for the preceding bit for NRZI is high; the most recent preceding 1 bit (AMI) has a negative voltage; and the most recent preceding 0 bit (pseudo ternary) has a negative voltage. ✓ 4 4
- 6 [A.] How does frequency division multiplexing work? Explain FDM system with example and figure. ✓ 6 4
- [B.] Assume direct sequence spread spectrum (DSSS) used on a data input 01001011. Note that an information bit of 1 inverts the spreading code bits in the combination, while information bit of 0 causes the spreading code bits to be transmitted without inversion. How does the technique work in transmitter and in receiver end? ✓ 5 4
- [C.] Two communicating devices are using a single-bit even parity check for error detection. The transmitter sends the byte 10101010 and, because of channel noise, the receiver gets the byte 10011010. Will the receiver detect the error? Why or why not? ✓ 3 2

Patuakhali Science and Technology University

Faculty of Computer Science and Engineering

3rd semester (L-2, S-I) Final Examination of B.Sc. in Engg. (CSE), Jan-June 2020

Session: 2018-19, 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 statistics? Write down some characteristics of statistics.

6

- b) Define ogive and Histogram. Draw the histogram and frequency curves for following data?

5

Monthly income (in thousand Tk)	No of workers	Monthly income (in thousand TK)	No of workers
20-22	9	30-32	85
22-24	34	32-34	60
24-26	45	34-36	41
26-28	90	36-38	30
28-30	110	38-41	12

c)

There are two branches of a company employing 100 and 80 employees respectively. If

3

arithmetic's means of the monthly salaries paid by two branches are Rs. 4570 and Rs. 5890

respectively. Find the Arithmetic's means of the salaries of the employees of the company as

a whole?

2. a) Define variance. Find the standard deviation from the monthly wages of 5 workers working in a company.

5

No of workers	Monthly wages (Rs.)	No of workers	Monthly wages (Rs.)
L	1430	O	1460
M	1440	P	1480
N	1445		

- b) Find the working formula for Variance or Prove $\sigma^2 = \frac{1}{n} \left\{ \sum x^2 - \frac{(\Sigma x)^2}{n} \right\}$?

6

- c) What is Skewness and Kurtosis?

3

3. a) Define probability. State and prove Bay's law of probability.

(5)

- b) Find Mean and variance of Poisson Distribution?

6

$$(H e^{-\lambda}) -$$

c) The mean of a binomial distribution is 40 and standard deviation 6 calculate n, p and q.

4. a) Define differential equation and Ordinary differential equation.

i) Solve the differential equation

i) $\frac{dy}{dx} = (4x + y + 1)^2$

ii) $\frac{dy}{dx} + \frac{y^2 + y + 1}{x^2 + x + 1} = 0$

iii) $\sin^{-1}(\frac{dy}{dx}) = x + y$

iv) $\frac{dy}{dx} = e^{x-y} + x^2 e^{-y}$

5 a) Define Integrating factor.

b) State and prove the necessary and sufficient condition for a differential equation $Mdx + Ndy = 0$ to be exact.

c) Solve the differential equation

i) $(x^3 + 3xy^2)dx + (y^3 + 3x^2y)dy = 0$

ii) $(1 + e^y)\frac{dx}{x} + e^y(1 - \frac{x}{y})dy = 0$

6 a) Define linear differential equations and Homogeneous differential equation.

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

c) Solve the following differential equation

i) $\frac{dy}{dx} = \frac{y}{x} + \tan \frac{y}{x}$

ii) $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = 0$

Patuakhali Science and Technology University

3rd Semester (Level-2, Semester-1) B.Sc.Engg.(CSE) Final Examination-2020 (January-June)

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

Credit Hour : 3.00 Session: 2018-19 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. Answer must be brief, relevant and neat.

- 1 a) Define data structure. Mention the operations of data structures. 3
 b) Suppose a data set S contains n elements
 i) Compare the running time T_1 of the linear search algorithm with the running time T_2 of the binary search algorithm when $n=1000$ and $n = 10000$. 2+2
 ii) Discuss searching for a given item in S when S is stored as a linked list.
 c) Briefly explain the following terms with respect to data structure and algorithm.
 i) Time-space tradeoff ii) Algorithm and procedure iii) Big O notation 3
 d) Define overflow. Sort the following array of elements by using insertion/ radix sort algorithm. 1+3
 804, 143, 361, 423, 538, 128, 321, 543, 366

- 2 a) Translate, by inspection and hand, each infix expression into its equivalent prefix expression: 1+2
 i) $(A-B)*(D/E)$ ii) $(A+B \uparrow D)/(E-F) + G$ C B M O P R S T U
 b) Explain divide-and-conquer procedure. Differentiate between recursion and iteration. 2+2
 c) Suppose S is the following list of 15 alphabetic characters: 3
 COMPUTER SCIENCE

The characters in S are to be sorted alphabetically. Use the quicksort algorithm to find the final position of the first character C.

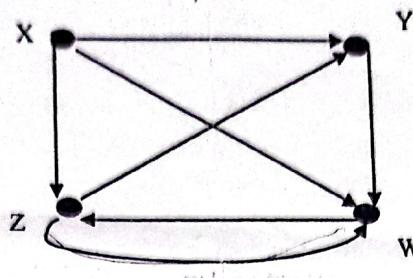
- d) Consider the following queue of characters, where QUEUE is a circular array which is allocated six memory cells: FRONT = 2, REAR = 4 QUEUE: _ _ A, C, D, _ _ (For notational convenience, we use " _ " to denote an empty memory cell.) Describe the queue as the following operations take place: 4

- | | |
|------------------------------------------|------------------------------|
| (a) F is added to the queue. - - A c D F | (e) R is added to the queue. |
| (b) Two letters are deleted. | (f) Two letters are deleted. |
| (c) K, L and M are added to the queue. | (g) S is added to the queue. |
| (d) Two letters are deleted. | (h) Two letters are deleted. |

- 3 a) Write an algorithm to find the shortest path from a weighted graph. 3
 b) Define finite graph and multi graph. Distinguish between BFS and DFS. 2+2
 c) Consider the following figure A2, find a minimum path P from A to K using BFS where each edge has length 1. 3



- d) i) Consider the (directed) graph G from the following figure A1. (a) Find all the simple path from Y to Z. (c) Find $\text{indeg}(Y)$ and $\text{outdeg}(Y)$ (d) Are there any sources or sinks?
ii) Suppose the nodes of the figure A are stored in memory. Find the adjacency matrix A of the graph G.



4. a) What is the difference between linear and non-linear data structure?
b) Suppose a 10-element array A contains the values a_1, a_2, \dots, a_{10} . Find the values in A after each loop.

2
4

- i) Repeat for K=1 to 9
 Set A [K+1]:= A [K].
 [End of loop.]
 - ii) Repeat for K=9 to 1 by -1:
 Set A [K+1]:= A [9].
 [End of loop.]

$$\begin{array}{c} \cancel{(222)} \\ \cancel{UB = a + 1} \\ \cancel{-2 -2 + 1} \\ \cancel{5} \end{array}$$

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

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

4

- d) Modify the binary search algorithm, so that it becomes a search and insertion algorithm.

4

5. a) What are the disadvantages of array? How to recover them using linked list?
b) Let LIST be a linked list in memory. Write a procedure.

$$2+2=4$$

- i) Finds the number NUM of times a given ITEM occurs in LIST
 - ii) Finds the number NUM of nonzero elements in LIST
 - iii) Adds a given value K to each element in the LIST

- c) Suppose LIST is a linked list in memory. Write an algorithm which deletes the last node from the LIST.

3

- d) What is two-way list? Draw a schematic diagram of the two-way list.

1

6. a) Define in your own words the following terms: binary tree, ancestor of a node, descendant of a node, depth of a tree. Write the preorder traversal algorithm. 4+3=7

- b) A binary tree has 9 nodes. The inorder and preorder traversals of T yield the following sequences of nodes: Inorder: E A C K F H D B G and Preorder: F A E K C D H G B. Draw the T.

3

- c) Write the formal insertion procedure of heap, INSHEAP (TREE, N, ITEM). Build a heap H from the numbers: 44, 30, 50, 22, 60, 55, 77, 55.

1

Patuakhali Science and Technology University

3rd Semester (Level-2, S-I) Final Examination of B.Sc.Engg.(CSE), January-June 2020

Course Code: AIS-211; Course Title: Accounting and Management

Full Marks: 70

Time: 3.00 Hours

(Answer any five (05) questions from the following. Split answering of any part of each question is not expected. Figures in the right margin indicate mark)

4. a) Explain four (04) principles of scientific management suggested by F. W. Taylor. 04

b) Discuss the Max Weber's concept of Ideal organization "Bureaucracy" with its characteristic. 04

c) "Though controlling is viewed as last function of management rather it is the starting point of next year of planning". Do you agree or not? Give your argument. 03

d) Explain two factors theory of Herzberg. Which factor is more important and why? 03

2. a) Give five examples of charismatic political leaders in the world. 02

b) "Leaders are born not made". Do you agree or not? Give your judgment. 04

c) "Team manager is concerned with high production and high employee welfare while impoverished leader is concerned lower production and lower employee welfare". Explain this concept as per Blake and Mouton's Managerial Grid. 05

d) Briefly explain the equity theory developed by J. Stacy. Adams. 03

Write short notes: (any ten:10*1.4)

- Write short notes: (any ten. 10 x 1.4)

 - a) Division of work b) Unity of command c) Unity of direction d) Scalar chain
 - e) Subordination of individual interest to group interest f) Equity g) Discipline
 - h) Esprit de corps i) Authority and responsibility j) Initiative and remuneration
 - k) Efficiency & Effectiveness l) Vision, Mission & objective

What are the statements included in a financial statement?

- Rami decided to open a computer programming service which he named Zeus. The transactions of the first month of operation are given below. Analyze the transactions using accounting equation:

i. On September 1, 2020, Rami invested Tk. 55,000 cash in the business.

ii. Zeus purchases for Tk. 10,600 from Harmis Ltd. computer paper and other supplies expected to last several months. The purchase is made on account.

iii. Zeus provides Tk. 13,500 of programming services for customers. The company receives cash of Tk. 11,500 from customers, and it bills the balance of Tk. 2,000 on account.

iv. Zeus receives a bill for Tk. 2,500 from the Daily News for advertising but postpones payment until a later date.

v. Zeus receives Tk. 1,200 cash from customers who had been billed for services [Transaction (iii)]

- vi. Zeus receives Tk. 1,800 cash from customers for programming services it has provided.

- vii. Rami withdraws Tk. 1,300 in cash from the business for his personal use.

"Shareholders of a Public Limited Company are External Users of Accounting Information." Do you agree? Why?

- In August 2021, Topu Bormon opened his studio at Nilkhel. During the first month 10 of operation, below stated transactions took place at the studio. Provide appropriate journal entries for the transactions.

Aug. 1: The owner invested Tk. 57,500 cash and Tk. 32,500 of photography equipment in the business.

~~01: Paid Tk. 2,400 cash for an insurance policy covering the next 24 months~~

Q7. Services are performed and clients are billed for Tk. 10,000

13. Purchased office supplies for Tk. 1,400. Cash paid Tk. 400 and remaining outstanding.

20: Received Tk. 2,000 cash in photography fees earned previously on Aug 07

~~24: The client immediately pays Tk. 15,000 for services to be performed at a later date.~~

Adjustments:

31: Provide adjustment for Prepaid Insurance at the end of the month.

Discuss the limitations of a Trial Balance

- Presented below is a list of accounts. Prepare a classified balance sheet in good form. (No monetary amounts are to be shown.)

✓ Notes Payable	✓ Patents
✓ Salaries and Wages Expense	✓ Bonds Payable
✓ Investment	✓ Buildings
✓ Accounts Receivable	✓ Accounts Payable
✓ Inventory—Ending	Sales Revenue*
✓ Advances to Employees	✓ Equipment
Advertising Expense*	✓ Copyrights
✓ Accumulated Depreciation—Equipment	Purchases*
✓ Retained Earnings	✓ Prepaid Rent
✓ Cash (on hand)	✓ Common Stock
Land	✓ Paid-in Capital in Excess of Par

Dept. of Computer and Communication Engineering

Patuakhali Science and Technology University

Mid Examination of B. Sc. Engineering in CSE Level: 2 Semester: I Session: 2019-2020

Course Code : CCE-211

Course Title: Data Communication and engineering

Credit Hour: 3.00

Full Marks: 15

Duration: 45 minutes

1. What is protocol? Explain different types of protocol. 4
2. Describe Source Port and Destination Port Field in TCP Header. 3.5
3. What is direct sequence spread spectrum? What is the relationship between the bit rate of a signal before and after it has been encoded using DSSS? 3
4. How does FDM System work? Explain with example. 4.5

MHS

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debitum~~

System design

Implementation & Testing

Midterm Examination

Integrate
& TOW

Operation mountain.

January – June: 2021 Course Code: CIT-213 Course Title: Software Engineering

Total Marks: 15, Time: 1 Hour

- 1 What are the attributes of good software? Write the basic principles of software engineering code. Ethics. 8

2 What is a process? Briefly describe about generic process models. 7

Patuakhali Science and Technology University

Dept. of Computer Science and Information Technology

Course Code: CIT- 211

Time: 50 minutes

Course Title: Data Structure and Algorithms

Marks: 15

Distinguish linear and nonlinear data structure. Suppose LA is a linear array with $N = 4$ elements and K is a positive integer such that $K \leq N$. Write an algorithm that inserts an element ITEM into the Kth position in LA.

Illustrate the representation of a two-dimensional array in memory and formulate the related formula. What is the limitation of the binary search algorithm? Write the binary search algorithm. Compare the complexity of linear and binary search algorithms. 5

Write a procedure to PUSH an element to stack. -2. 2

Using algorithmic steps for transforming the following Infix expression into its equivalent postfix expression. -4 A-B*D+(E-F)*G

MAT-21

Patuakhali Science and Technology University

Mid Exam.-Jan-June 2021, Course Title: Mathematics-III, Marks-15, Time: 40 minutes

- | | | |
|---|------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | Solve the following differential equation $(D^2 + 4)y = x^2$ | 7 |
| 2 | Write down the relation between <u>arithmetic mean</u> , <u>geometric mean</u> and <u>harmonic mean</u> . | 2 |
| 3 | The following frequency distribution shows the length of hilsa fish caught on a certain day at a certain point of the Padma: | 6 |

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

Compute: (a) Mean (b) Median (c) Draw a histogram and locate the mode

AIS Mid-term

Faculty of Computer Science and Engineering

Patuakhali Science and Technology University

Midterm Examination of CSIT 3rd Semester January-June 2021

Course Code: AIS 211; Course Title: Accounting and Management

Full Marks: 15

Time: 1 Hour

[Answer the following questions. The right margin indicates marks distribution.]

1. Define management. Discuss the functions of management.
2. "As a manager, you have to play ten roles according to Henri Mintzberg". Explain the statement with proper justification.
3. Discuss skills for managers of different levels suggested by Robert. L. Katz. Differentiate between efficiency and effectiveness.
4. Bob opened the Campus Laundromat on January 1, 2022. During the first month of operations, the following transactions occurred.

- Jan. 1 Bob invested Tk. 20,000 cash in the business.
- 2 The company paid Tk. 1,000 cash for store rent for January.
- 3 Purchased washers and dryers for Tk. 25,000, paying Tk. 10,000 in cash and signing a Tk. 15,000, 6-month, 12% note payable.
- 4 Paid Tk. 1,200 for a one-year accident insurance policy.
- 10 Received a bill from the *Daily News* for advertising the opening of the laundromat Tk. 200.
- 20 Bob withdrew Tk. 700 cash for personal use.
- 30 The company determined that cash receipts for laundry services for the month were Tk. 6,200.

You are required to Journalize the January transactions.

5. What is accounting? Why does accounting matter?

3

3

Patuakhali Science and Technology University

Faculty of Computer Science and Engineering

3rd Semester (L-2, S-I) Final Examination of B.Sc. in Engg. (CSE), Jan-June-2021, Session: 2019-20

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 order, degree of differential equation and ordinary differential equation.

b) Solve the differential equations

$$(i) (e^y + 1) \cos x dx + e^y \sin x dy = 0$$

$$(ii) (x - y)^2 \frac{dy}{dx} = a^2$$

$$(iii) \frac{dy}{dx} = (x + y)^2$$

Mehedi Hasan
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2. a) State the necessary and sufficient condition for a differential equation $Mdx + Ndy = 0$ to be exact. 02

b) Solve the differential equations

$$(i) (1 + e^y)dx + e^y \left(1 - \frac{x}{y}\right) dy = 0$$

$$(ii) (xdx + ydy) = \frac{a^2(xdy - ydx)}{x^2 + y^2}$$

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 following 08

$$(i) D^3 - 2D^2 - 4D + 8 = 0$$

$$(ii) D^2 - 4D + 4 = x^2 + x + 1$$

Define Clairaut's Equation and solve the differential equation $(y - px)(p - 1) = p$ 04

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.

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) Illustrate the importance of measuring dispersion. 02

b) Calculate the standard deviation and co-efficient of variation from the following frequency distribution: 06

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

Frequency: 05 09 13 20 19 09 05

Ans *in 15*

06

04

04

06

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

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.

- b) Establish the relation between correlation coefficient and regression coefficient.

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

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 is 3.5 weeks.

y_{dn}

$\sqrt{12 - 0^2} y_{dn}$

Patuakhali Science and Technology University

B.Sc.Engg.(CSE) 3rd Semester (Level-2, Semester-I) Final Examination-2021 (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

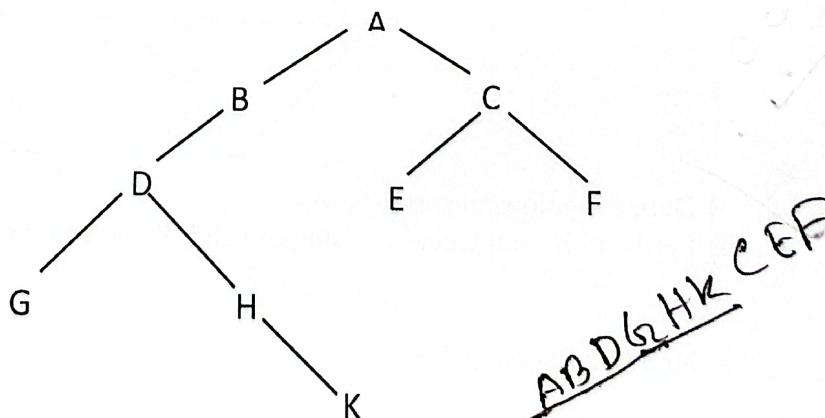
- [1]**
- a. Define polyphase circuits. Why do we use polyphase circuits instead of single phase? 03
 - b. Derive the equation of line and phase voltage of 4-wire 3-phase system. 05
 - c. A balanced star connected load of $(8+j4) \Omega$ per phase is connected to a balanced 3-phase 300v supply. Find the line current, power factor, power and total volt-ampere. 04
 - d. Differentiate between alternator and generator. 02
- [2]**
- a. What are the interconnections of three phase circuits? Describe 3-phase 3-wire system of three phase circuit to find line and phase current. 06
 - b. A 300v, 3-phase voltage is applied to a balanced delta connected 3-phase load of phase impedance $(10+j5) \Omega$. Find the phasor current in each line, power consumed in each phase, and phasor sum of three line currents. 04
 - c. "The impedance in star connected circuit is equivalent to one-third of the impedance in delta connected circuit". Justify the statement. 04
- [3]**
- a. Define electric generator. Derive the E.M.F. equation of D.C. generator. 05
 - b. What are the losses of D.C. generator? For a D.C. generator, justify the expression $\eta_c = \eta_m + \eta_e$, where, all symbols represents proper meanings. 06
 - c. An 8-pole, lap-wound armature rotated at 400 r.p.m. is required to generate 200 V. The useful flux per pole is 0.06 wb. If the armature has 120 slots, calculate the number of conductors per slot. 03
- [4]**
- a. "The efficiency of a D.C. generator will be maximum when the load current is such that variable loss is equal to the constant loss". Justify the statement with appropriate symbols. 06
 - b. Define back E.M.F. Write down the significance of back E.M.F. 04
 - c. What are the troubles that may arise in the operation of a D.C. motor? 04
- [5]**
- a. What is D.C. motor? Explain the expression $T_a = I_a^2$, where symbols denotes appropriate meanings. 06
 - b. "The mechanical power developed by the motor is maximum when back E.M.F. is equal to half of the applied voltage". Explain the statement with appropriate symbols. 03
 - c. Write down the key characteristics and applications of D.C. motor. 05
- [6]**
- a. What is logic analyzer? Classify and describe different types of logic analyzer. 04
 - b. Differentiate between logic analyzer and oscilloscope. Write down the key characteristics of logic analyzer. 06
 - c. The armature of a 6-pole, 600 r.p.m. lap-wound generator has 100 slots. If each coil has 4 turns, calculate the flux per pole required to generate an e.m.f. of 250 volts. 04

[Figure in the right margin indicates full marks. Split answering of any question is not recommended.]
 Answer any 5 of the following questions. Answer must be brief, relevant and neat.

- ✓ 1 a) Define the following terms in your own words. Data, Entity, Attributes, Records, and Data structure. 3
- b) What is linear array? Demonstrate the representation of linear array in memory. Suppose a 10-element array A contains the values a_1, a_2, \dots, a_{10} . Find the values in A after each loop. 2+4
- i) Repeat for K=1 to 9
Set A [K+1]:= A [K].
[End of loop.]
 - ii) Repeat for K=9 to 1 by -1:
Set A [K+1]:= A [9].
[End of loop.]
- c) Mention the sorting principle of bubble sort 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 the array A and discuss each pass separately. 1+4
- ✓ 2 a) What are the disadvantages of array? How to recover them using linked list. Show the representation of linked list in memory including free-storage list. 2+3
- b) Distinguish between overflow and underflow in a linked list. Let LIST be a linked list in memory with successive nodes A and B and node N is to be inserted 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. 2+4
- c) What is header linked list? Draw a schematic diagram of the two-way list. 3

- ✓ 3 a) Define and demonstrate the following terms in your own words. Binary tree, Complete binary tree, Extended binary tree, and Depth of a tree. Show the sequential representation of binary tree in memory. 4+2
- b) 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



- c) What is the property of binary search tree? Write the formal insertion procedure of heap, INSHEAP (TREE, N, ITEM). Build a heap H from the numbers: 44, 30, 50, 22, 60, 55, 77, 55. 1+3

- ✓ 4 a) Explain divide and conquer algorithms with example. 3
- b) i. Translate by inspection and hand, following infix expression into its equivalent prefix expression: $(A-B)*(D/E)$ 2+2
- ii. Write the algorithm to insert an element into a queue.
- Evaluate the following postfix expression using algorithmic steps. 3

- a) A graph G is stored in memory as follows:

NODE	A	B		E		D	C	
NEXT	7	4	0	6	8	0	2	3
ADJ	1	2	3	4	5	6	7	8
	1	2	3	4	5	6	7	8
START=1, AVAILN=5								

DEST	2	6	4		6	7	4		4	6
LINK	10	3	6	0	0	0	0	4	0	0
	1	2	3	4	5	6	7	8	9	10
AVAILE=8										

1+3

- ✓ b) Draw the graph G.
Define complete graph and multigraph. Suppose the nodes of the figure A are stored in memory.

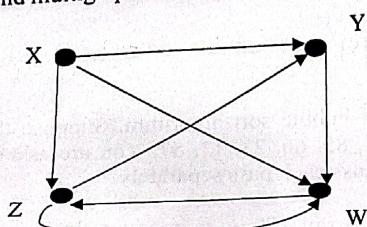
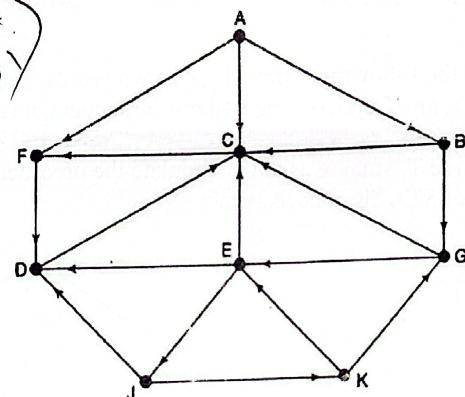


Figure A1

Give the adjacency matrix A of the graph G. Calculate the path matrix P of G.

- c) Consider the following figure. Find and print all the nodes reachable from the node A using DFS.



3

1.5+2.5

- d) i) Define topological sort.
ii) Let J and K be integers and suppose Q(J, K) is recursively defined by

$$Q(J, K) = \begin{cases} 5 & ; \text{if } J < K \\ Q(J - K, K + 2) + j & ; \text{if } J \geq K \end{cases}$$

Find Q(2,7) and Q(5,3)

- 6 a) Briefly explain the following terms with respect to data structure and algorithm.

3

- i) Pseudocode
ii) Algorithm and procedure

- b) i) Give the short notes on Constant time and Logarithmic time complexity with example.
ii) Calculate the complexity of the following segment of code.

2+2

```
sum = 0;
for (i=0; i<n*n; i++)
    sum++;
```

- c) Sort the following array of elements by using insertion sort algorithm.
348, 143, 361, 423, 538, 128, 321, 543, 366

3

- d) Write the algorithm for merging two sorted arrays.

Faculty of Computer Science and Engineering
 Patuakhali Science and Technology University
 3rd Semester (Level-2, Semester-I) Final Examination of B.Sc. Engg. (CSE), January-June 2021
 Course Code-AIS 211; Course Title- Accounting and Management

Full Marks-70;

Credit Hour-3

Time- 3 Hours.

[Answer any five of the following questions. The right margin indicates marks distribution. Different parts of the same question (if any) must be answered in order of given sequence.]

1. a) Define accounting. Briefly explain the importance of accounting.
 b) Bob opened the Campus Laundromat on January 1, 2022. During the first month of operations, the following transactions occurred.

- Jan. 1 Bob invested Tk. 20,000 cash in the business.
 2 The company paid Tk. 1,000 cash for store rent for January.
 3 Purchased washers and dryers for Tk. 25,000, paying Tk. 10,000 in cash and signing a Tk. 15,000, 6-month, 12% note payable.
 4 Paid Tk. 1,200 for a one-year accident insurance policy.
 10 Received a bill from the *Daily News* for advertising the opening of the laundromat Tk. 200.
 20 Bob withdrew Tk. 700 cash for personal use.
 30 The company determined that cash receipts for laundry services for the month were Tk. 6,200.

You are required to:

- i. Journalize the transactions.
- ii. Post to the ledger accounts.
- iii. Prepare a trial balance on January 31, 2022.

4
4
3

2. a) Briefly explain Marginal Cost and Opportunity cost with two suitable examples each.
 b) Mabo Company makes calculators that sell for Tk. 20 each. For the coming year, management expects fixed costs to total Tk. 220,000 and variable costs to be Tk. 9 per unit.

You are required to Compute:

- i. Break-even point in units using the mathematical equation
- ii. Margin of safety percentage assuming actual sales are Tk. 500,000.
- iii. Sales required in dollars to earn net income of Tk. 165,000.

6

- c) Krisanne Company reports the following operating results for the month of June 2017.

Particulars	Total	Per unit
Sales (5000 units)	Tk. 300,000	60
Variable costs	180,000	36
Contribution Margin	120,000	24
Fixed Cost	100,000	
Net Income	20,000	

To increase net income, management is considering reducing the selling price by 10%, with no changes to unit variable costs or fixed costs. Management is confident that this change will increase unit sales by 25%.

You are required to

- Compute the break-even point in units and dollars and the margin of safety in dollars using the contribution margin technique (a) assuming no changes to sales price or costs, and (b) assuming changes to the sales price and volume as described above.

- Comment on your findings.

3. a) What is trial Balance? Why an organization prepared a trial balance.

b) Lori Figgs is confused about the lack of agreement between the cash balance per book and the balance per bank. Explain the causes for the lack of agreement with Lori, and give an example of each cause.

c) The following information was obtained from the books of accounts of Smart manufacturing Company Ltd. for the year ended 31.12.2021.

Particulars	Tk.	Particulars	Tk.
Direct Materials	100000	Consumable stores	2500
Direct Wages	3000	Manager's Salary	5000
Wages of Foreman	2500	Directors' fees	1250
Lighting: Factory	1500	Office Stationery	500
Office	500	Telephone Charges	125
Storekeeper's wages	1000	Postage and Telegrams	250
Oil and water	500	Salesmen's salary	1250
Rent: Factory	5000	Traveling expenses	500
Office	2500	Advertising	1250
Repairs and Renewals:		Warehouse charges	500
Factory plant	3500	Sales	189500
Transfer to Reserves	1000	Carriage outward	375
Discount on shares written off	500	Dividend	2000
Depreciation: Factory Plant	500	Electric power	500
Office Premises	1250		

You are required to Calculate

- Prime Cost
- Factory Cost
- Cost of Production
- Cost of Sales
- Profit/loss

a) i) "Management is both science and art". Do you agree or not? Give your argument.
ii) "Though controlling is viewed as last function of management rather it is the starting point of next year of planning". Do you agree or not? Give your argument.

b) "As a manager you have to play ten roles according to Henri Mintzberg". Explain the statement with proper judgment.

c) What are the skills that are needed for the various levels of management according to Robert L. Katz? Explain.

5. a) Define scientific Management. Explain four (04) principles of scientific management suggested by F. W. Taylor.

b) Discuss the Max Weber's concept of Ideal Organization "Bureaucracy" with its characteristic.

Write short notes: (any six)

- i) Division of work ii) Unity of command iii) Unity of direction iv) Scalar chain
- v) Subordination of individual interest to group interest vi) Equity vii) Discipline

a) Give five examples of charismatic political leaders in the world.

1

b) Discuss the bases of power a leader may need.

4

c) "Leaders are born not made". Do you agree or not. Give your judgment.

3

d) "Team manager is concerned with high production and high employee welfare while impoverished leader is concerned lower production and lower employee welfare". Explain this concept as per Blake and Mouton's Managerial Grid.

6

Dept. of Computer and Communication Engineering

Faculty of Computer Science and Engineering

Patuakhali Science and Technology University

Dumki, Patuakhali-8602, Bangladesh

*Mehedi Hasan
Sarker*

Final Examination of B. Sc. Engineering in CSE Level: 2 Semester: I Session: 2019-2020

Course Code
CCE-211

Course Title
Data Communication and Engineering

January-June 2021

Credit: 03
Time: 03 Hr
Marks: 70

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

1 [A.] Explain a simplified communications model with example. 7

[B.] i. Describe Source Port and Destination Port Field in TCP Header. 7

ii. How Sequence Number Field and Acknowledgement Number Field in TCP Header work?

2 [A.] Illustrate each layer of OSI model with a suitable example. 7

[B.] What is protocol? Explain different types of protocol. 7

3 [A.] Explain the following terms in detail. 7

- i. IPV4 Header
- ii. Header Length Field in TCP Header
- iii. URG Flag Field in TCP Header

[B.] Has any implementation of OSI model? Make comparison between the OSI Model with the TCP/IP Model. 7

4 [A.] Two communicating devices are using a single-bit even parity check for error detection. The transmitter sends the byte 10101010 and, because of channel noise, the receiver gets the byte 10011010. Will the receiver detect the error? Why or why not? 3

[B.] Station A needs to send a message consisting of 9 packets to station B using a sliding window (window size 3) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no ACKs from B ever get lost), then what is the number of packets that A will transmit for sending the message to B? Illustrate the transmitting scenario and explain with justification. 4

[C.] Only the sender of a data transmission needs to be concerned about the rules or protocols that govern how it communicates with the receiver. State with explanation, whether the given statement is true or false. 2

[D.] The following table illustrates the operation of an FHSS system for one complete period of the PN sequence. 5

Time	0	1	2	3	4	5	6	7	8	9	10	11
Input data	0	1	1	1	1	1	1	0	0	0	1	0
Frequency	f_1		f_3		f_{23}		f_{22}		f_8		f_{10}	
PN sequence	001			110				011				

Time	12	13	14	15	16	17	18	19
Input data	0	1	1	1	1	0	1	0
Frequency	f_1		f_3		f_2		f_2	
PN sequence	001			001				

- i. What is the period of the PN sequence, in terms of bits in the sequence?
- ii. The system makes use of a form of FSK. What form of FSK is it?
- iii. What is the number of bits per signal element?
- iv. What is the number of FSK frequencies?
- v. What is the length of a PN sequence per hop?
- vi. Is this a slow or fast FH system?
- vii. What is the total number of possible carrier frequencies?
- viii. Show the variation of the base, or demodulated, frequency with time.

- 5** [A.] In which means signals transmit without guided medium? **2**
- [B.] How are binary values represented in amplitude shift keying and in binary frequency shift keying? What are the limitations of these approaches? **6**
- [C.] Coaxial cable is a two-wire transmission system. What is the advantage of connecting the outer conductor to ground? **3.5**
- [D.] What is frequency-hopping spread spectrum? **2.5**
- 6** [A.] Why is a statistical time division multiplexer more efficient than a synchronous time division multiplexer? Briefly explain with figure. **6**
- [B.] For the bit stream 01001110, sketch the waveforms for each of the codes of digital signal encoding formats (Digital data, digital signal). Assume that the signal level for the preceding bit for NRZI was high; the most recent preceding 1 bit (AMI) has a negative voltage; and the most recent preceding 0 bit (pseudoternary) has a negative voltage. **4**
- [C.] Demonstrate by example that a receiver that suffers a framing error on asynchronous transmission will eventually become realigned. Write down a few dozen arbitrary bit patterns; assume one start bit and a stop element of length one bit. **4**

Answer any seven question

- 1.** a) What is the importance of software Engineering? Briefly describe what should be steps taken under the process of developing a software system.
 b) Explain the principles which play a major role in development of software.
 c) Describe the components and quality which is necessary for the documents of software specification.
 d) What are the benefits of metrics in software engineering?
- 2.** a) Define the blue print methodology.
 b) Give the benefits of verification and validation in software development and tell about the techniques of verification and validation in the process of software development.
 c) Define the meaning of quality assurance. Explain the role of testing in quality assurance.
 d) Write short note on software failure, black box testing, white box testing and stress Testing.
- 3.** a) Explain the various types of models which used in software Engineering.
 b) Write down the concept of data flow diagram.
 c) Describe the objectives of a) coding b) structured programming in terms of software engineering.
 d) You have been asked to develop a system that will help with planning large-scale events and parties such as weddings, graduation celebrations, and birthday parties. Using an activity diagram, model the process context for such a system that shows the activities involved in planning a party (booking a venue, organizing invitations, etc.) and the system elements that might be used at each stage
- 4.** a) At the end of their study program, students in a software engineering course are typically expected to complete a major project. Explain how the agile methodology may be very useful for the students to use in this case.
 b) To reduce costs and the environmental impact of commuting, your company decides to close a number of offices and to provide support for staff to work from home. However, the senior management who introduce the policy is unaware that software is developed using Scrum. Explain how you could use technology to support Scrum in a distributed environment to make this possible. What problems are you likely to encounter using this approach?
 c) You have taken a job with a software user who has contracted your previous employer to develop a system for them. You discover that your company's interpretation of the requirements is different from the interpretation taken by your previous employer. Discuss what you should do in such a situation? You know that the costs to your current employer will increase if the ambiguities are not resolved. However, you also have a responsibility of confidentiality to your previous employer.
- 5.** a) Why a software project manager require for a software industry? Show the responsibilities of project manager.
 b) Briefly describe the project planning, scope management and project estimation in terms of software management activities.
 c) Write short note about project scheduling, resource management, project communication management, configuration management.
 d) Suppose you are a project manager of XYZ software development team. Company authority asks you to present a project schedule for a client. Draw a Gantt chart and PERT chart for that software scheduling.
- 6.** a) What is Entity-Relationship model? Define data dictionary and show the requirement of data dictionary.
 b) Differentiate among software design strategies like structured design, function oriented design and object oriented design.
 c) Compare between Top-down design and Bottom-up design.
 d) Show the user interface design activities.
- 7.** a) List out the characteristics of good software.
 b) Discuss about the Big Bang model with its advantage and disadvantage. Show the V-Model structure.
 c) Describe about the data flow diagram components with their three levels of architecture.
 Or
 Write down each of the clauses in the ACM/IEEE Code of ethics for software engineers.
- 8.** a) Imagine that a government wants a software program that helps to keep track of the utilization of the country's vast mineral resources. Although the requirements put forward by the government were not very clear, a software company was tasked with the development of a prototype. The government found the prototype impressive, and asked it be extended to be the actual system that would be used. Discuss the pros and cons of taking this approach.
 b) Suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems. Explain your answer according to the type of system being developed:
 - A system to control antilock braking in a car
 - A virtual reality system to support software maintenance
 - A university accounting system that replaces an existing system
 - An interactive travel planning system that helps users plan journeys with the lowest environmental impact
 c) Should there be a separate profession of 'software architect' whose role is to work independently with a customer to design the software system architecture? A separate software company would then implement the system. What might be the difficulties of establishing such a profession?

2018

Patuakhali Science and Technology University

Final Examination of B. Sc. Engineering in CSE Level: 2 Semester: I Session: 2015-2016

Course Code Course Title

January-June 2017

Credit: 03

CCE-211 Data Communication and Networking

Time: 03 Hr

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

Marks: 70

1. (a) Define Data Communication. Write the effectiveness of a data communications system according to fundamental characteristics P-4(f) slide 4 3
- (b) For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology? P-9(f) 3
- (c) What are the responsibilities of physical and data link layer for a computer network? 3
- (d) Match the following to one or more layers of the OSI model: 3
 - i. Reliable process-to-process message delivery slide
 - ii. Route selection
 - iii. Defines frames
 - iv. Provides user services such as e-mail and file transfer
 - v. Transmission of bit stream across physical medium
 - vi. Error correction and retransmission slide p-6(f)sttance
- (e) Classify data flow with example. Suppose a computer sends a packet at the network layer to a computer somewhere in the Internet. The logical destination address of the packet is corrupted. What happens to the packet? How can the source computer be informed of the situation? 3

2. (a) Define the term bandwidth in two context: analog and digital. 2
- (b) A nonperiodic composite signal has a bandwidth of 200 kHz, with a middle frequency of 140 kHz and peak amplitude of 20 V. The two extreme frequencies have an amplitude of 0. Draw the frequency domain of the signal. 2 P-88(f)
- (c) Define Transmission time and Propagation time. What are the propagation time and the transmission time for a 5-MB of an image if the bandwidth of the network is 1 Mbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s. 4 Ex. 3.47
- (d) Illustrate Stop-and-Wait ARQ with Normal operation, lost frame and lost ACK 4
- (e) A file contains 2 million bytes. How long does it take to download this file using a 56-Kbps channel? 1-Mbps channel? 2 1 MB

3. (a) Explain Polar biphasic scheme with different coding criteria. 3 Polar biphasic
- (b) Discuss the different situations in HDB3 scrambling technique. 3 P(1)
- (c) Compare and contrast PCM and DM. What are the steps in quantization of PCM? 3 1533
- (d) What is the maximum data rate of a channel with a bandwidth of 200 KHz if we use four levels of digital signaling? 2 Performance better zero-1-0-1
- (e) A network using CSMA/CD has a bandwidth of 10 Mbps. If the maximum propagation time (including the delays in the devices and ignoring the time needed to send a jamming signal, as we see later) is 25.6 μ s, what is the minimum size of the frame? 2

Signal is a digital and composite analog Signal circuit

access QPSK and its implementation.

Q-14b

We have an available bandwidth of 100 kHz which spans from 200 to 300 kHz. What should be the carrier frequency and the bit rate if we modulated our data by using FSK with $d = 1^{\circ}$?

(c) A corporation has a medium with a 1-MHz bandwidth (lowpass). The corporation needs to create 10 separate independent channels each capable of sending at least 10 Mbps. The company has decided to use QAM technology. What is the minimum number of bits per baud for each channel? What is the number of points in the constellation diagram for each channel? Let $d = 0$.

(d) Illustrate the CSMA/CA technique and its uses. 4

(e) Fill in the blanks with appropriate answer. 3

(i) In a _____ communication, the media is dedicated.

(ii) In fiber optics, the signal is _____ waves.

(iii) UTP and STP are different implementations of _____ cable.

(iv) Circuit switching is normally used in _____ layer.

(v) In the _____ random-access method, stations do not sense the medium.

(vi) In FDMA, we use different _____ to achieve channelization.

SF $\frac{B}{T}$
S = $\frac{B}{T}$

5. (a) The code 11110101101 was received. Show the original code using the Hamming encoding algorithm. 6

(b) Discuss the steps involved in CRC technique. ~~— 17~~ 6

(c) Why two dimensional parity checks are used in data transmission? ~~— 17~~ 2

6. (a) What kind of error is undetectable by the checksum? Show the steps of checksum for the given bit sequences 10111001 and 00110110. 7

(b) Explain about bit padding and synchronizing in multiplexing systems. 4

(c) Four 2-kbps connections are multiplexed together. Find (1) the duration of 1 bit before multiplexing (2) the transmission rate of the link (3) the duration of a time slot (4) the duration of a frame.

Patuakhali Science and Technology University

3rd Semester (L-2, S-1), Final Exam. of B. Sc. Engg. (CSE), January-June, 2015

Course Code: CCE-211 Course Title: Data Communication and Engineering

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]

Give the answers of any 5 questions from the given questions:

- Q. 1. (a). How can a composite signal be decomposed into its individual frequencies? What are the differences between low pass and band-pass channel? 6
 (b). What is Nyquist bit rate? Why it is used in digital transmission? 6
 (c). Consider a noiseless channel with a bandwidth of 3000 hz transmitting a signal with eight signal level. Calculate the maximum bit rate. 2
2. (a). For the bit stream of 00101101110011, show the Manchester, bipolar and MLT-3 encoding. 6
 (b). Write down the short notes on (i) 8B/6T block codes (ii) PCM (iii) PAM (iv) 2B1Q 8
- Q. 3. (a). What are the limitations of NRZ encoding? How these limitations can be solved? 4
 (b). Why 4-PSK method is more efficient than 2-PSK method? Compute the bit rate for a 1000 baud 32-QAM signal. 4
 (c). Draw the constellation diagram of 8 PSK, 8-QAM, 16-QAM. 6
- Q. 4. (a). How is CDMA superior to TDMA and FDMA? 3
 (b). Show the multiplexing and de-multiplexing steps in CDMA technique. 8
 (c). What are the properties of orthogonal sequences? 3
- Q. 5. (a). How the receiver confirms the error on the word "world"? 3
 (b). Why two-dimensional parity check bit is used? What are the limitations of parity check bit? 4
 (c). How CRC generator works for error detections? 7
- Q. 6. (a). What are the purposes of using of hamming code in data transmission? 4
 (b). Show the error detection and correction technique using hamming code when the data 1001101 has been corrupted to 1000101. 10

Patuakhali Science and Technology University (PSTU)

Department of Computer Science and Information Technology(CIT)

MId Term Examination (LAB), July-December - 2018

Program: B. Sc. Engg. In CSE

Session: 2017-18

Course Code : CCE 221

Course Title : Object Oriented Programming Language Sessional

Full Time: 2.00 hours

Answer the marked questions

Full Marks: 15

1.

Write a Java program to add two binary numbers.

Input Data:

Input first binary number: 10

Input second binary number: 11

Expected Output

Sum of two binary numbers: 101

2.

Write a Java program to compute the distance between two points on the surface of earth. Distance between the two points [(x₁,y₁) & (x₂,y₂)]

$$d = \text{radius} * \arccos(\sin(x_1) * \sin(x_2) + \cos(x_1) * \cos(x_2) * \cos(y_1 - y_2))$$

Radius of the earth r = 6371.01 Kilometers

Input Data:

Input the latitude of coordinate 1: 25

Input the longitude of coordinate 1: 35

Input the latitude of coordinate 2: 35.5

Input the longitude of coordinate 2: 25.5

Expected Output

The distance between those points is: 1480.0848451069087 km

3.

Write a Java program that takes the user to provide a single character from the alphabet. Print Vowel or Consonant, depending on the user input. If the user input is not a letter (between a and z or A and Z), or is a string of length > 1, print an error message. *Test Data*

Input an alphabet: p

Expected Output :

Input letter is :Consonant

4.

Write a Java program to calculate the average value of array elements.

5. Write a Java method to display the first 50 pentagonal numbers

Note: A pentagonal number is a figurate number that extends the concept of triangular and square numbers to the pentagon, but, unlike the first two, the patterns involved in the construction of pentagonal numbers are not rotationally symmetrical.

Expected Output:

1	5	12	22	35	51	70	92	117	145
176	210	247	287	330	376	425	477	532	590
651	715	782	852	925	1001	1080	1162	1247	1335
1426	1520	1617	1717	1820	1926	2035	2147	2262	2380
2501	2625	2752	2882	3015	3151	3290	3432	3577	3725

6. Write a Java method to check whether a string is a valid password.

Password rules:

A password must have at least ten characters.

A password consists of only letters and digits.

A password must contain at least two digits.

Expected Output:

1. A password must have at least eight characters.
2. A password consists of only letters and digits.
3. A password must contain at least two digits

Input a password (You are agreeing to the above Terms and Conditions.):

abcd1234

Password is valid: abcd1234

- 7.

4.35,4.36,4.37(a, b, c, d), 5.12,5.13,5.14,5.15(a, b, c, d),5.20,5.24,
6.23,6.24,6.25,6.26,6.27,7.29, 7.14,7.17

```
int n, i,
```

```
Scanner input = new Scanner(system
s.out.println (" Enter the nth term
n = input.nextInt();
```

```
s.out.println ("Required series of Int
team or "));
```

```
for (i=0; i<n; i++)
    s.out.print (fib(i)) + "
```

```
static int fibo (int val)
```

```
{ if (val == 0)
```

```
    return 0;
```

```
else if (val == 1)
    return 1;
```

```
else
    return (fibo(val-1) +
            val-2);
```

Patuakhali Science and Technology University (PSTU)
Department of Computer Science and Information Technology (CSIT)
Department of Computer and Communication Engineering (CCE)

Midterm Examination: July-December-2019

Program: B. Sc. Engg.(CSE)

Session: 2018-19

Course Code : CCE-122

Full Time: 1 Hour 30 Minutes

Course Title : Object Oriented Programming Sessional

Full Marks: 15

Part A

1. (*Employee Class*) Create a class called Employee that includes three instance variables—a first name (type String), a last name (type String) and a monthly salary (double). Provide a constructor that initializes the three instance variables. Provide a *set* and a *get* method for each instance variable. If the monthly salary is not positive, do not set its value. Write a test app named EmployeeTest that demonstrates class Employee's capabilities. Create two Employee objects and display each object's *yearly* salary. Then give each Employee a 10% raise and display each Employee's yearly salary again. 7.5
2. (*Computer-Assisted Instruction*) The use of computers in education is referred to as *computer-assisted instruction (CAI)*. Write a program that will help an elementary school student learn multiplication. Use a SecureRandom object to produce two positive one-digit integers. The program should then prompt the user with a question, such as How much is 6 times 7? The student then inputs the answer. Next, the program checks the student's answer. If it's correct, display the message "Very good!" and ask another multiplication question. If the answer is wrong, display the message "No. Please try again." and let the student try the same question repeatedly until the student finally gets it right. A separate method should be used to generate each new question. This method should be called once when the application begins execution and each time the user answers the question correctly. 7.5
3. (*Date Class*) Create class Date with the following capabilities: 7.5
 - a) Output the date in multiple formats, such as
MM/DD/YYYY
June 14, 1992
DDD YYYY
 - b) Use overloaded constructors to create Date objects initialized with dates of the formats in part (a). In the first case the constructor should receive three integer values. In the second case it should receive a String and two integer values. In the third case it should receive two integer values, the first of which represents the day number in the year.
[Hint: To convert the String representation of the month to a numeric value, compare Strings using the equals method. For example, if s1 and s2 are Strings, the method call s1.equals(s2) returns true if the Strings are identical and otherwise returns false.]
4. (*Rectangle Class*) Create a class Rectangle with attributes length and width, each of which defaults to 1. Provide methods that calculate the rectangle's perimeter and area. It has *set* and *get* methods for both length and width. The *set* methods should verify that length and width are each floating-point numbers larger than 0.0 and less than 20.0. Write a program to test class Rectangle. 7.5



Patuakhali Science and Technology University (PSTU)
Department of Computer Science and Information Technology(CSE)

Mid-Term Examination, July-December -2018-19

Program: B. Sc. in CSE

Session : 2017-18

Course Title : Object Oriented Programming Language

Full Marks: 15

Course Code : CSE-121

Full Time: 1 hour

Answer the questions

1. Why java is called machine independent language? 01
2. Develop a Java application that determines whether any of several department-store customers has exceeded the credit limit on a charge account. For each customer, the following facts are available:
 - a) account number
 - b) balance at the beginning of the month
 - c) total of all items charged by the customer this month
 - d) total of all credits applied to the customer's account this month
 - e) allowed credit limit.

The program should input all these facts as integers, calculate the new balance (= beginning balance + charges - credits), display the new balance and determine whether the new balance exceeds the customer's credit limit. For those customers whose credit limit is exceeded, the program should display the message "Credit limit exceeded".

3. What is the difference between a local variable and an instance variable? 01
4. Where does array stored in memory? 01
5. What is `ArrayIndexOutOfBoundsException`? 01
6. Factorials are used frequently in probability problems. The factorial of a positive integer n (written $n!$ and pronounced " n factorial") is equal to the product of the positive integers from 1 to n . Write an application that calculates the factorials of 1 through 20. Use type `long`. Display the results in tabular format. What difficulty might prevent you from calculating the factorial of 100? 02
7. Explain the purpose of a method parameter. What is the difference between a parameter and an argument? 01

8. (**Temperature Conversions**) Implement the following integer methods: 03

a) Method **celsius** returns the Celsius equivalent of a Fahrenheit temperature, using the calculation
 $celsius = 5.0 / 9.0 * (fahrenheit - 32);$

b) Method **fahrenheit** returns the Fahrenheit equivalent of a Celsius temperature, using the calculation
 $fahrenheit = 9.0 / 5.0 * celsius + 32;$

Use the methods from parts (a) and (b) to write an application that enables the user either to enter a Fahrenheit temperature and display the Celsius equivalent or to enter a Celsius temperature and display the Fahrenheit equivalent.

9. What does the following program segment do? 01

```
- for (i = 1; i <= 5; i++)
{
    for (j = 1; j <= 3; j++)
    {
        for (k = 1; k <= 4; k++)
            System.out.print('*');
        System.out.println();
    } // end inner for
    System.out.println();
} // end outer for
```

10. Identify and correct the errors in each of the following sets of code: 01

a) while (c <= 5)

```
{
    product *= c;
    +c;
```

b) if (gender == 1)

```
    System.out.println("Woman");
else;
    System.out.println("Man");
```

[Figures in the right margin indicate full marks. Split answering of any question is not recommended. Write the full question number e.g. 4(B) before the answer paragraph]

Answer any 5 of the following questions

- A** What are the principles of Object Oriented Programming (OOP)? Discuss with example. 3
- B** Write a full java program that will read a person's weight (kg) and height (meter) and will calculate the Body Mass Index (BMI).
 $BMI = \frac{\text{weight}}{\text{height}^2}$
 If BMI is < 18, display "You are underweight", if BMI>25 display "You are overweight" else show "Good. You are fit". 5
- C** Write an application that calculates the product of the odd integers from 1 to 15. 6

2 A class recursion

```

    {
        int func(int n)
        {
            int result;
            result = func(n-1);
            return result;
        }
    }

    Class Output
    {
        public static void main(String args[])
        {
            recursion obj = new recursion();
            system.out.print(obj.func(12));
        }
    }
  
```

Write the output of the above code with explanation.

- 2 B** class Teacher {
 String designation = " Teacher";
 String collegeName= " PSTU";
 void does(){
 System.out.println(" Teaching");
 }
}

public class PhysicsTeacher extends Teacher{
 String mainSubject = "Physics";
 public static void main(String args[]){
 PhysicsTeacher obj = new PhysicsTeacher();
 System.out.println(obj.collegeName);
 System.out.println(obj.designation);
 System.out.println(obj.mainSubject);
 }

97 (1.1.2) = 0

Teach

Teacher

PSTU

Phys Teach

```
    obj.does();
}
}
```

Write the output of the above code with explanation.

2 C Write the difference between method overloading and method overriding with example. 6

3 A Describe the meaning of polymorphism in java with example. Differentiate between compile time polymorphism and run time polymorphism in java. 4

3 B Compare and contrast abstract classes and interfaces. Why would you use an abstract class? Why would you use an interface? 5

3 C How multithreading help to increase parallelism in java? Explain with an example. 5

4 A Explain the purpose of a method parameter. What is the difference between a parameter and an argument? 3

B One of the world's most common objects is a wrist watch. Discuss how each of the following terms and concepts applies to the notion of a watch: object, attributes, behaviors, class, inheritance (consider, for example, an alarm clock), modeling, messages, encapsulation, interface and information hiding. 4

C Write method distance to calculate the distance between two points (x_1, y_1) and (x_2, y_2) . All numbers and return values should be of type double. Incorporate this method into an application that enables the user to enter the coordinates of the points. 3

D An integer number is said to be a perfect number if its factors, including 1 (but not the number itself), sum to the number. For example, 6 is a perfect number, because $6 = 1 + 2 + 3$. Write a method isPerfect that determines whether parameter number is a perfect number. Use this method in an application that displays all the perfect numbers between 1 and 1000. Display the factors of each perfect number to confirm that the number is indeed perfect. Challenge the computing power of your computer by testing numbers much larger than 1000. 4

5 A Define Constructor. What happens when a return type, even void, is specified for a constructor? How garbage collector works in JAVA?

B What are overloaded constructors? Describe with an example.

C Create class `SavingsAccount`. Use a static variable `annualInterestRate` to store the annual interest rate for all account holders. Each object of the class contains a private instance variable `savingsBalance` indicating the amount the saver currently has on deposit. Provide method `calculateMonthlyInterest` to calculate the monthly interest by multiplying the `savingsBalance` by `annualInterestRate` divided by 12—this interest should be added to `savingsBalance`. Provide a static method `modifyInterestRate` that sets the `annualInterestRate` to a new value. Write a program to test class `SavingsAccount`. Instantiate two `savingsAccount` objects, `saver1` and `saver2`, with balances of \$2000.00 and \$3000.00, respectively. Set `annualInterestRate` to 4%, then calculate the monthly interest for each of 12 months and print the new balances for both savers. Next, set the `annualInterestRate` to 5%, calculate the next month's interest and print the new balances for both savers.

6 A Why are exceptions particularly appropriate for dealing with errors produced by methods of classes in the Java API? If no exceptions are thrown in a try block, where does control proceed to when the try block completes execution? 3

B What is the key reason for using finally blocks? Write java code to create a java file and perform read-write to that file? 4

C Write short note about a) Iterator b) autoboxing c) ArrayList d) auto-unboxing e) set f) collection. 3

D Define a data-manipulation application for the books database. The user should be able to edit existing data and add new data to the database (obeying referential and entity integrity constraints). Allow the user to edit the database in the following ways:

a) Add a new author.

b) Edit the existing information for an author.

c) Add a new title for an author. (Remember that the book must have an entry in the `AuthorISBN` table.).

d) Add a new entry in the `AuthorISBN` table to link authors with titles.

Credit hour: 3.00

Course Title: Object Oriented Programming

Full marks: 70

Duration: 3 hours

[Figures in the right margin indicate full marks.]

Answer any 4 from questions 1 to 5. Answering question no. 6 is must. Split answering is not recommended.

1. **(a)** Define procedural programming language. What are the benefits of Object Oriented Programming? 4
(b) When do we use private, protected and public keywords? Discuss in short with example. 4
c. Define: *constructor, encapsulation, inheritance and polymorphism.* 6
2. a. Declare a class named Student with 3 private member variables for name, ID and marks obtained. The ~~class~~ class should have a default constructor which sets name to empty string, id to 0(zero) and marks obtained to 0.0. The class should also contain a 3 parameter constructor to set the member variables. 5
 b. Write 3 get methods for the class Student you have just written in question 2.a. 4
 c. Write another class Grade which has a member variable for grade and an object of Student class. Write the default constructor which sets grade to "F" and creates the student object with Student's default constructor. Finally write a member function to calculate the grade using PSTU grading rule. 5
3. **(a)** What is method overloading? How can the constructor be overloaded? Explain with example. 6
b. What is an *interface*? How does polymorphism work in interfaces? 5
(c) What are *this* and *super* keywords? Give examples. 3
4. **(a)** Write a program in Java which should take an integer number (*n*) as input first. Then the program should ask to input *n* integer numbers. Then your program will ask for another number (*x*). Now your program should be able to find *x* from those *n* numbers and count how many times *x* was present in the array. The array of integers should be dynamically bound. The program should be in object-oriented way and the functions should be small in size. 14
5. **(a)** Write a class named Employee with 3 member variables for first name, last name and basic salary. These variables should be accessible by its subclasses. Now, write a 3 parameter constructor for the class which initialises the names and the basic salary. 5
 b. Write a class named Teacher which should inherit the Employee class of question 3.a. The Teacher class should have 3 private member variables for his number of increment, amount of each increment and salary. This class should have a 5 parameter constructor which calls the constructor of the super class using *super* keyword. Write a method to calculate the salary which is the sum of basic salary and the increment multiplied by the number of increments. 5
 c. Write another class named TestDriver which should have only the main function. In the main function, instantiate an object of the Teacher class of question 3.b. which should be initialized with 5 parameters. (You may choose any name, basic salary and increment for this). Call the method to calculate the salary of the Teacher object. 4

6. Find and point out the errors in the following program. 14

```

Public class ErrorChecker {
    private Int x;
    private String str;
    ErrorCheck()
    {
        x = 0;
        str = "";
    }
    public ErrorChecker(int X, Str)
    {
        x = X;
        str = Str;
    }
}

system.out.println("This is a print statement");
System.Out.print("x = "+x + " Str = " + Str);
}

public static void main(String[] args) {
    ErrorChecker myClass = new ErrorChecker();
    myClass.x = 50;
    myClass.str = "Hello!";
    ErrorChecker myAnotherClass = new ErrorChecker(5,"HelloWorld!");
    myClass.print();
    myAnotherClass pritn(x,str);
}

```

Patuakhali Science and Technology University

Final Examination of B.Sc. Engineering in CSE Level: 1 Semester: II Session: 2016-17

Course Code

CCE 121

Course Title

July-December
2017

Credit: 03

Time: 03 Hr

Marks: 70

Marks: 70
Answer any 05 out of 06 Questions (Split answers are highly discouraged and write the full question number e.g. 1(a) before the answer paragraph)

- 1 (d) What is Java Virtual Machine and how it is considered in the context of Java's platform-independent feature? 2

(b) Classify and explain Java programming error with example. 3

(c) What are the naming conventions for class names, method names, constants, and variables? Which of the following items can be a constant, a method, a variable, or a class according to the Java naming conventions? 4
MAX_VALUE, Test, read, readDouble

(d) Write a program that prompts the user to enter the minutes (e.g., 1 billion), and displays the number of years and days for the minutes. For simplicity, assume a year has 365 days. Here is a sample run: 3
Enter the number of minutes: 1000000000
1000000000 minutes is approximately 1902 years and 214 days

(e) Suppose $x = 2$ and $y = 3$. Show the output, if any, of the following code. What is the output if $x = 3$ and $y = 2$? What is the output if $x = 3$ and $y = 3$? 2

```
if(x > 2)
if(y > 2){
int z = x + y;
System.out.println("z is " + z);
}
else
System.out.println("x is " + x);
```

 3

2 (a) Suppose you want to develop a program for a first-grader to practice subtraction. The program randomly generates two single-digit integers, number1 and number2, with $\text{number1} \geq \text{number2}$, and it displays to the student a question such as "What is $9 - 2$?" After the student enters the answer, the program displays a message indicating whether it is correct. Here is a sample run: 4
What is $6 - 6$? 0 Enter 5
You are correct! Your answer is wrong
 $9 - 2$ is 7

(b) What is y after the following switch statement is executed? Rewrite the code using an If-else statement. 3

```
x = 3; y = 3;
switch (x + 3) {
case 6: y = 1;
default: y += 1;
}
```

(c) Write a program that prompts the user to enter a three-digit integer and determines whether it is a palindrome number. A number is a palindrome if it reads the same from right to left and from left to right. Here is a sample run of this program: 3
Enter a three-digit integer: 121
121 is a palindrome
Enter a three-digit integer: 123
123 is not a palindrome

(d) What are the three parts of a for loop control? Convert the following for loop statement to a while loop and to a do-while loop: 4

```
long sum = 0;
for (int i = 0; i <= 1000; i++)
    sum += sum + 1;
```

- / 3 (a) Design a client-server program for primality testing using connection-oriented programming language.
- (b) What are the disadvantages of connectionless service? Briefly, describe the server creation steps using stream socket.
- (c) Write the differences between constructor and method.
- 4 (a) What do you mean by synchronization? Suppose you want to read final marks of 50 students stored in an array called "studentResultArray" using five threads. Now design the program using Java programming language and in that case, you must ensure synchronization among threads such that each thread performs the same amount of task without overlapping.
- (b) Why are two different methods used to create a thread in Java? Create and test a thread named "DownloadSong" which inherit properties from "PlaySong" class.
- (c) "Composition is has-a relationship"-Justify this statement with example.
- 5 (a) Differentiate between checked and unchecked exception. Write sample code to create and test a user-defined checked exception called "NameNotFoundException" which return the message "Name not found in database".
- (b) Design a class "Account" containing the public method "GetAccountInfo" and another class "Test" which will use the "GetAccountInfo" method. You must ensure that your "GetAccountInfo" method will force the developer to handle "FileNotFoundException" in "Test" class.
- (c) What is the difference between termination and resumption model of exception handling? Explain stack unwinding with sample code.
- 6 (a) Differentiate among class, interface, and abstract class with example. Why do you think the abstract class is important for software design? Explain with sample code.
- (b) Create a class "Shape" which will be inherited by class "Circle" and "Rectangle". Design another class "ShapeUtility" consists of method "PrintShapeInfo" with an argument of "Shape" object. This method will print information according to object type, for example, in case of "Circle" type object; the method will print "Shape is Circle" and so on. Write sample code using the concept of object upcasting and downcasting in Java.
- (c) Why subclass constructor call superclass constructor explicitly or implicitly?

```
public class A extends B {
    public A() {
        String Name = null;
        super(" name is null");
    }
}
```

Dog d = new Dog()
d = (Animal)

(Figure in the right margin indicates full marks. Split answering of any question is not recommended.)
Answer any 5 of the following questions.

Q1 Shortly explain the following terms (using 1-3 sentences and/or a formula and/or an example). A

- i) OOP
- ii) Java threads
- iii) Member
- iv) Relationship between a class and an object

Q2 b) Why is Java called platform independent?
c) Describe the try-throw-catch mechanism.
d) What is the differences between abstract class and interface? Why would you use an abstract class? (3)

Q3 a) Define the following terms (using 1-3 sentences and/or a formula and/or an example). (6)

- i) Constructor
- ii) Access modifiers
- iii) Encapsulation
- iv) Class library

b) Consider the following piece of code:
Employee E1 = new Employee("PSTU, CSE", "Md. Mamun", 8000);
Employee E2 = new Employee(E1);

What are the values of the expressions E1.equals(E2) and E1 == E2? Why?

c) State the different way to override a method. Why return type of the method is not consider in method overloading?
Explain with java code. (1)

d) Write a program in Java that simply print the following output on the screen: (2)

```

0 0 0 1 1
1 1 1 2 2
2 2 2 3 3
3 3 3 4 4

```

e) Write the output of the following programs. (3)

i)

```
public class A1 {
    public static void show() {
        System.out.println("Static method
called");
    }
    public static void main(String[] args) {
        A obj=null;
        obj.show();
    }
}
```

ii)

```
public class ArrayDemo {
    public static void main(String[] args) {
        int a[]={1,2,3,4,5,6,0};
        for (int i = 0; i < a.length; i++) {
            System.out.println(a[i]);
        }
    }
}
```

iii)

```
public class A {
    static int n=5;
    static
    {
        a=(a-1)/a;
    }
    System.out.println(a);
}
{
    System.out.println(a);
    a=a+1;
}
public static void main(String[] args) {
    System.out.println(a);
}
```

f) Why main method is public and static? (2)

g) Given classes A, B, and C, where B extends A, and C extends B, and where all classes implement the instance method void doIt(). How can the doIt() method in A be called from an instance method in C? Why? (2)

h) Why socket programming is needed? Sketch the basic client server communication model. Write the java code to create client and server. (3)

i) Write a java program to reverse a given String without using String API. (4)

- 4 ✓ Write a while, a do-while and a for loop that will count backwards from 20 to 10.
- ✓ Shortly explain different types of inheritance.
- ✓ Differentiate between method overriding and method overloading?
- d) Describe two ways of creating thread with code in java. Why java support two different ways of thread creation.
- e) Write a class named *TestClass* and add a String data field called *data1*. The *data* field should be private to the class. Now, add a constructor that accepts a starting value for *data1* as its single parameter, and public methods for setting and retrieving the value of *data1*. Call these methods *setData()* and *getData()*.

5 (a) Differentiate among instance variable, class variable and local variable. (5)

(b) What is the difference between a class and a structure?

(c) i) Is it possible for a class to inherit the constructor of its base class?
ii) Can you inherit private members of a class? → public, private

(d) What is exception in java? Distinguish between checked exception and unchecked exception.

(e) Write a java program to calculate sum of following series. Where the value of n is given by user.

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \dots + \frac{1}{n}$$

6 (a) A complete Java program may use the same name for several different methods or variables. Java has a number of features that allow the user to prevent such re-use of names from causing chaos. Describe these under the headings:

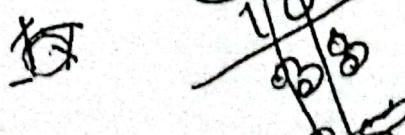
(a) Scope rules within individual functions.

(b) Visibility of method names within classes, and the effects of inheritance.

b) Explain how to set up a 2-dimensional array in Java.

c) What are collections and generics in java?

d) Write a Java program that will write a list of double numbers into a file. Your program will then read the content of the file and find the summation of the numbers.

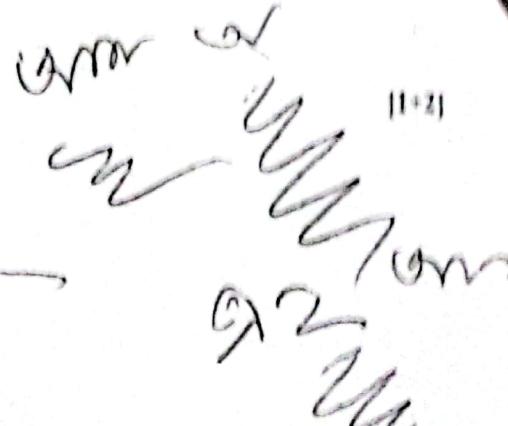


[Figure in the right margin indicates full marks. Split answering of any question is not recommended.]
Answer any 5 of the following questions.

1. (a) What are the differences between process and thread? Depicts the life cycle of a thread. [2+2]
- (b) Write down the sample code of thread creation using Java in two different ways. [5]
- (c) What is deadlock? Explain deadlock situation using synchronized method and synchronized object. [1+4]
2. (a) What is the difference between class and interface? You know that all classes in java are inherited from java.lang.Object class. Are interfaces also inherited from Object class? [2+1]
- b) Can a class extend more than one classes or does java support multiple inheritances? If not, why? How do you implement multiple inheritances in java? Answer with java sample code. [3+4]
- (c) How do you restrict a member of a class from inheriting to its sub classes? Are constructors and initializers also inherited to sub classes? What happens if both, super class and sub class, have a field with the same name? Overriding, Java inheritance confusion [2+1+1]
3. (a) What is an exception? Draw the exception hierarchy. Differentiate between checked and unchecked exception with an example. [1+1+2]
- b) Write down five keywords using in java exception handling with their purpose. How to create custom Exception with Java? [3+3]
- (c) "All catch blocks must be ordered from superclass exception to subclass exception"-Justify this statement with Java code. [4]
4. (a) Create an overload and override version of a method named DISPLAY and overload method must be defined by changing the number of method parameters. Method overloading is not possible by changing the return type of method. Why? [2.5+2.5]
- b) What is the abstract method? Write a practical scenario where the abstract method can help to design the software. [1+4]
- (a) Briefly describe object upcasting and downcasting. Sample code is appreciated. [4]
5. (a) Create a java class using following attribute (instance variable should be public and method should be private.)
Class name: Account
Instance Variable: account_holder_name, amount
Method: WithdrawMoney, Deposit [3]
- (b) What are the differences between method and constructor? [2]

Q) What is UML? Draw the UML of following java class [1+2]

```
class Human
{
    String s1, s2, name;
    public Human()
    {
        s1 = "Super class";
        s2 = "Parent class";
    }
    public Human(String str)
    {
        s1 = str;
        s2 = str;
    }
    private void SetName(String str)
    {
        name = str;
    }
    private String GetName()
    {
        return name;
    }
}
```



a) Write the output of following programs [3]

```
try
{
    int x = 0;
    int y = 5 / x;
}
catch (Exception e)
{
    System.out.println("Exception");
}
catch (ArithmaticException ae)
{
    System.out.println("Arithmatic
Exception");
}
System.out.println("finished");
```

```
public class Foo
{
    public static void main(String[] args)
    {
        try
        {
            return;
        }
        finally
        {
            System.out.println("Finally");
        }
    }
}
```

Ans: Finally

Q) Briefly describe access modifiers of Java? How do you achieve encapsulation property of object oriented programming in your code? [3+1]

b) Why do you need synchronization in multithreaded program? How do you achieve synchronization in your multithreaded program? Explain with code. [2+3]

g) Consider following condition write a sample java code of inheritance [5]

- Super class : Animal
- Super class contain parameterized constructor
- Sub class: Mammal
- Sub class contain default constructor

Answer: Super class code

~~500~~
~~250~~
~~250~~
~~250~~
~~250~~

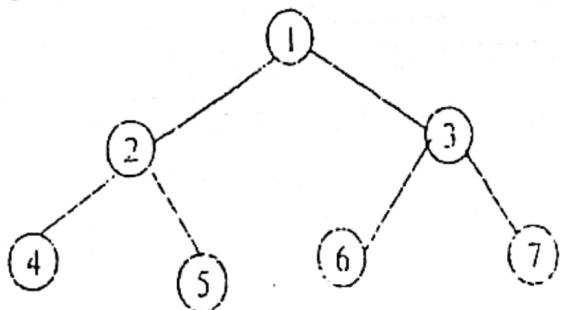
1. a) Is Empty java file name a valid source file name?
public static void main (String [] args) ---- explain this statement.
- b) What is the output of the following Java program?
- ```
11. class Test
12. {
13. public static void main (String args[])
14. {
15. System.out.println(500 * 25 + "Javatpoint");
16. }
17. }
```
- c) Write a program in Java to print such pattern like right angle triangle with number increased by 1. The pattern like:
- 1  
2 3  
4 5 6  
7 8 9 10
2. a) Why multiple inheritance is not supported in java through class?  
How is Inheritance achieved in Java?  
Will the following code be successfully compiled? If yes, what is the output?
- ```
17. public class A {
18.     int x = 20;
19. }
20. public class B extends A {
21.     int x = 30;
22. }
23. public class test {
24.     public static void main (String [] args) {
25.         B b = new B();
26.         System.out.println(b.x);
27.         A a = new A();
28.         System.out.println(a.x);
29.         A a2 = new B();
30.         System.out.println(a2.x);
31.     }
32. }
```

Patuakhali Science and Technology University

B.Sc. Engineering in CSE [Session: Semester-1]
Final Examination-2013 [January - June] Session: 2014-15
Course Code: CH 211 Course Title: Data Structure and Algorithm
Credit Hour: 3.0 Full Marks: 3.00 x 4 + 5 = 70 Duration: 3.0 Hours

[Split answering of any question is not considered. Answer any five of the following questions. Please insert examples and/or figures for each question's answer if required]

- 1 *data structure* 1
- i) Why linked list is better than array to store unlimited number of data?
 - ii) How linked list helps for data insertion and deletion with respect to array?
 - iii) Define Graph and Tree. What is the basic difference between them?
 - iv) How two sorted array can be merged into one sorted array?
- 2 2
- i) Why Stack and Queue are more preferable than array?
 - ii) How the DFS algorithm works for a sample graph?
 - iii) What is the Shortest Path problem? How it is calculated using any algorithm?
 - iv) Write algorithms for a) pre-order b) in-order and c) post-order tree traversal.
- 3 2
- Tree*
- i) How tree is used to represent a mathematical expression?
 - ii) Traverse a tree using BFS algorithm.
 - iii) Define the level, depth, children, predecessor, and ancestor of a sample tree.
 - iv) Make the PSTU organizational hierarchy using tree.
- 4 2
- i) How we can make a connectivity matrix from adjacency list?
 - ii) Write sample code for push and pop function of a Stack.
 - iii) How en-queue and de-queue methods for Queue are implemented using array?
 - iv) Make the postfix expression of the equation: $((A+B)(C+D)) - ((P/Q)+(R-S))$.
- 5 2
- P.S.2*
- i) Define linked list, two-way linked list, and circular linked list.
 - ii) How a node of a linked list is created using programming code?
 - iii) How a node is added at last position of the linked list using programming code?
 - iv) How the pivot element create its position after the first iteration for Quick sort algorithm?
- 6 2
- i) What are the basic differences between Selection sort and Bubble sort?
 - ii) Write the name of the visited node using IN-ORDER and POST-ORDER algorithm from the following tree?



- iii) Build a binary tree from the pre-order and post order traversal value that is given below.
PRE-ORDER: XBYDEGE IN-ORDER : YBFDGAE
- iv) How Divide and Conquer approach is applied to Merge sort, Quick sort algorithm?

Patuakhali Science and Technology University

B.Sc. Engg. (CSE) Level-2, Semester-I, Final Examination Jan-Jun/15, Session: 2013-14

Course code: CIT-211

Credit hours: 3.00

Full marks: 70

Course Title: Data Structures and Algorithm

Duration: 3 hours

[Figures in the right margin indicate full marks.]

Answer any 7 of the following questions. Split answering is not recommended.

1. a. Demonstrate insertion and deletion of an item into an array. 6
 b. If you have an array with length n and you want to insert a value at position p , how many times you have to move the data of the current array? Similarly, how many times you have to move the data of the array with length n if you want to delete the element at position p ? 4

2. a. What are the fundamental characteristics of arrays and linked lists? 5
 b. Discuss with example how you can insert an item in sorted order into a linked list. 5
 c. Provide two examples of each of the applications of queues and stacks. 4
 d. What are the operations on Queues? Discuss with example in short. 6

4. a. When is binary search better than linear search and when is linear search better than binary search? Explain with example. 5
 b. Apply binary search on the following list to search 13. 5

1 2 5 8 9 10 13 15 17

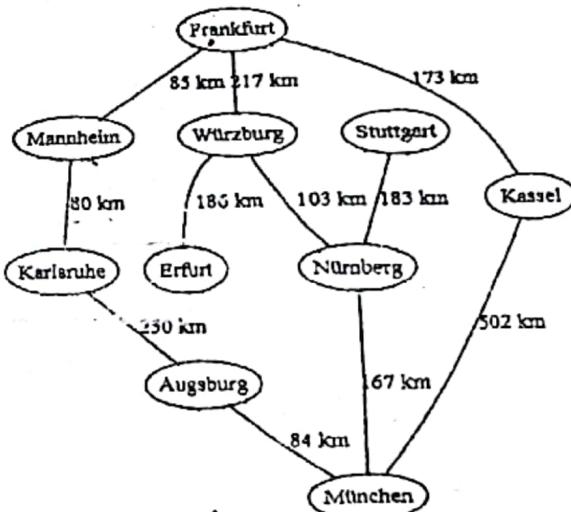
5. a. Draw the graph for the given adjacency matrix. 4
 b. Apply BFS and DFS on the graph you get in the answer to the question no. 5.a. Start from node A and stop when you find node E. Show step-by-step demonstration of BFS and DFS. 6

1	2	3	4	5	6	7
0	5	3	0	0	0	6
5	0	0	6	0	7	0
3	0	0	0	8	5	0
0	6	0	0	0	0	7
0	8	0	0	0	3	0
0	7	6	0	3	0	0
5	0	7	0	0	0	0

6. a. What are the characteristics of a Binary Search Tree (BST)? 2
 b. Construct a BST with the following data. Show each step 5
 10 13 8 5 3 18 20 1 6 16 25

- c. How can you achieve sorted output from a Binary Search Tree? Explain with example. 3

7. a. Construct the adjacency matrix for the graph given. 2
 b. Apply Dijkstra's algorithm on the same graph of question 7.a. with Frankfurt being the start node. Show step-by-step demonstration of the algorithm. 8



Demonstrate how bubble sort works on the following data set. Show each iteration with sub-iterations. 10

5 1 4 2 8

- Show the generation of the Huffman tree using Huffman encoding algorithm on the following text and then encode the text. 10

WAS IT A CAR OR A CAT I SAW?

[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 graph. Differentiate between dijkstra's and Floyd/Warshall algorithm.

3

b)

Consider the following graph G in Fig b.1. Suppose the nodes X,Y,Z,W are stored in memory in an array

6

DATA as follow:

DATA: X,Y,Z,W

- Find the adjacency matrix A of the graph G.
- Find the path matrix P of G using powers of the adjacency matrix A.
- Is G strongly connected?



Fig b.1

c)

Apply BFS on graph 1 and DFS on graph 2 to traverse it and write the vertex sequence with details of calculation.

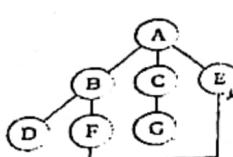


Fig c.1 : graph 1

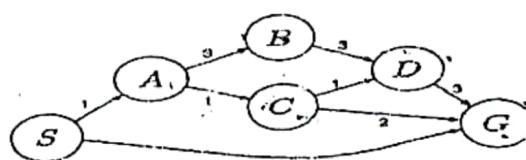


Fig c.2 : graph 2

2 a)

Build a Huffman tree for the following text.

GREEN GLASS GLOBES GLOW GREENLY

7

b)

Define heap. Construct a min heap using following data set (DATA). Using heap data structure write an algorithm to sort a set of numerical data in ascending or descending order.

DATA: 2,7,3,17,19,100,1,25,36

7

c)

Create an algorithm to find and delete all duplicates from a data set using BST data structure.

7.27

d)

Translate each infix expression into its equivalent postfix expression

i) $(A-B)*(D-E)$ ii) $A*(B+D)/E-F*(G+H/K)$ iii) $10*(7-3)-48/(1+5)+4$

10, 7, 3, - * 48 / 1 + 5 + 4

Consider postfix expression of question 3.iii) and evaluate it according to a algorithm using stack data structure.

b)

Define priority queue. Propose at least four methods to build priority queue using array or linked list and analyze the complexity of each methods to find the best one.

8

c)

What is the difference between data structure and abstract data types? How do you find inorder successor of a node? Show with figure.

+ - 7 - 48 / [15 +] + 4

- Linked List
- 4) a) What are difference between array and linked list? Write an algorithm which removes the first element of a list and adds it to the end of the list without changing any value in INFO.
- b) Given an Integer K, write an algorithm which deletes the Kth element from a linked list and also calculate the complexity of your proposed algorithm.

- c) Consider the following stack of characters, where STACK is allocated N=8 memory cells
 STACK: C, A, F, D, K, _, _, _ (_ describe empty memory cell)

Describe the stack as the following operations take place:
 a)POP(STACK,ITEM) b)POP(STACK,ITEM) c)PUSH(STACK,L) d)PUSH(STACK,P) e)POP(STACK,ITEM) f)
 PUSH(STACK,R) g)PUSH(STACK,S) h)POP(STACK,ITEM)

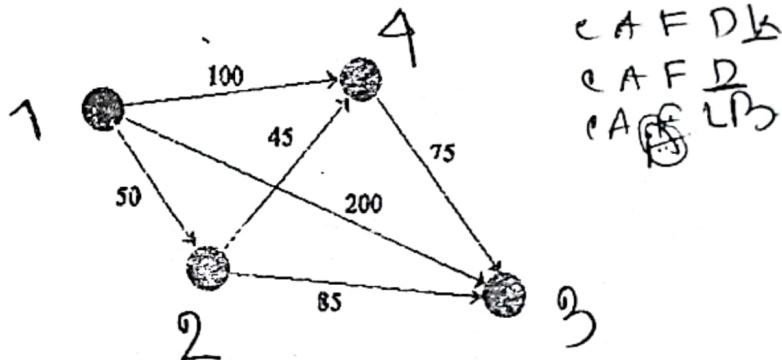
Now Considering Initial state of STACK i) When will underflow and overflow occur? ii) When will C be deleted before A?

- a) Why do you learn sorting algorithm? Sort following data set according to selection sort algorithm and show each steps.

DATA: 87, 43, 54, 21, 98, 32, 76, 65

- b) How do you modify/create a new algorithm based on the logic of insertion sort such that its performs better than actual one? Compare time complexity of your modified insertion sort algorithm with actual insertion sort algorithm.

- c) Apply dijkstra's algorithm to find the shortest path from node 1 to node 3. Show each steps with detailed calculation.



- a) A binary tree T has 9 nodes. The inorder and preorder traversal of T yield the following sequence of nodes:

Inorder: E A C K F H D B G

Preorder: F A E K C D H G B

Draw the tree T.

- b) What are the properties of a BST? Draw a BST using following dataset

DATA : 60,25,15,50,33,44,75,66

Now Delete node 44, 75 and 25 considering intial state of BST and draw new shape of tree after each deletion.

- c) Why do you learn data structure? Write the pseudocode of traversing a two-dimensional array.

- d) Write short note on i) circular linked list ii) complete graph iii) connected Graph

A linked list whose last node points back to the first node instead of containing the null pointer, called

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

Answer any 5 of the following questions.

A huffman tree is a special type of binary tree used for data compression

- 1 a) What are the applications of Huffman Algorithm? Encode following input string using Huffman algorithm and compare the result with ASCII encoding. [2+5]

Input String: "Computer Science and Engineering"

- Consider the following graph G in Figure 1. Suppose the nodes X,Y,Z,W are stored in memory in an array DATA as follow: [1+5+1]

DATA: X,Y,Z,W

- i) Find the adjacency matrix A of the graph G. ii) Find the path matrix P of G using warshall algorithm. iii) Is G strongly connected?

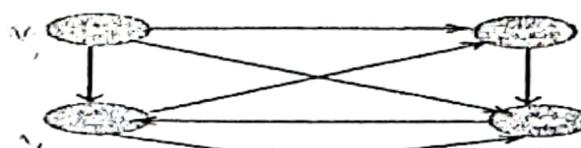


Figure 1

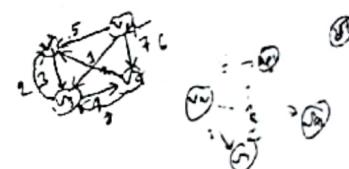
52, 27.51
21, 51, 57, 85, 61, 63

- 2 a) Suppose a weighted directed graph G is maintained in memory by a node array DATA and weight matrix W as follow: [1+6]

P - 8.36

DATA: V1,V2,V3,V4

W	0 0 30
	5 0 17
	2 0 04
	0 6 80



Draw a picture of G and traverse G using Depth First Search algorithm with pseudocode.

Q. 7.18.36

- b) Write the steps of algorithm that will traverse a binary tree in postorder traversal using stack. Discuss the algorithm using example. P - 7.18.36

- c) Translate each infix expression into its equivalent postfix expression and evaluate postfix expression of question iii using stack. P - 6.66

$$i) (A-B)*(D-E) \quad ii) A*(B+D)/E-F*(G+H/K) \quad iii) 10*(7-3)-48/(1+5)+4$$

$$\begin{array}{l} \boxed{AB} \oplus \boxed{DE} \\ = AB - DE - F \\ \boxed{G+H/K} \\ = AB - DE - F - FG + HK \end{array}$$

- d) What are the properties of binary search tree? Build a max heap considering following list of numbers and write the procedure of sorting these numbers in descending order using heap sort. P - 7.60

List of numbers: 44,30,50,22,60,55,77,55

Q. 7.60

- e) Define recursion with example. Write a recursive solution with algorithm steps to the Towers of Hanoi problem for 3 disks. P - 5.27 Ex. 5.9.1

- f) Given an Integer K, write an algorithm which deletes the Kth element from linked list and also calculate the complexity of your proposed algorithm. P - 5.27 Ex. 5.9.1

- g) What are the differences between stack and queue? Write the pseudocode of insert and delete in linear queue. State the limitation of linear queue. P - 5.27 Ex. 5.9.1

- h) Calculate the complexity of bubble sort algorithm. Sort following list of numbers using bubble sort algorithm. P - 4.12 - 4.9

List of numbers: 32,51,27,85,66,23,13,57 - P - 4.12 Ex. 4.7

"Adjacency matrix is better than adjacency list to represent graph in memory"-Justify the statement

[3]

i) Draw a BST using following list of numbers. Ex. 7.18. P. 9.3

[3+4]

List of numbers: 60,25,15,50,33,44,75,66

j) State the rules of deletion of a node from BST and delete node 44, 75 and 25 from tree built using above list of numbers.

k) Write short notes on i) 2-tree, ii) path, iii) space complexity, iv) time complexity

[4]

1 7.65 side


 Patuakhali Science and Technology University

B.Sc.Engg.(CSE) I-2/S-I Final Examination -2013 [Jan-Jun], Session: 2011-12

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]
 [Use figures where necessary]

Answer any 5 of the following questions:

1. (a). What are the advantages of a three phase system over a single phase system?
 (b). Derive the relationship between line and phase voltages and currents in a 3-phase, 3-wire system.
 (c). A balanced 3-phase, 3-wire system with Y-connected load for which the line voltage is 230V and impedance of each phase is $(6+j8)$ ohm. Find the line current and power absorbed by three phases.

2. (a) What is back E.M.F.? Write down the significance of back E.M.F. for D.C. Motor.
 (b). Show that $T_a \propto I_a$, where the symbols having usual meanings.
 (c). "The mechanical power developed by the motor is maximum when back E.M.F. is equal to half the applied voltage". Prove the statement with usual meaningful symbols.

3. (a). Analyze the performance of three types of D.C. motor in terms of characteristic curves.

Or

Briefly classify D.C. generators according to method of field excitation.

- (b). What is a stepper motor? How stepper motor works?

$$I_a = \frac{V - E}{R_a}$$

6

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4. (a). Show that $\eta_c = \eta_m \times \eta_e$ for D.C. generator where the symbols having usual meanings.
 (b). Derive the E.M.F equation of a D.C. generator.

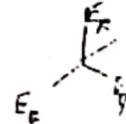
- 914
 (c). Derive the condition for maximum efficiency of a D.C. generator.

5. (a). Define and classify transducers? What are the functions of transducers?
 (b). What is electrical transducer? Write down the parameters of the electrical transducers.
 (c). What are piezoelectric transducers? How it works?

6. (a). What is thyristor? Explain the switching characteristics of a thyristor.
 (b). What is LVDT? Describe the working principle of LVDT. Where it is used?
 (c). Show that $Z_d = 3Z_y$, where the symbols having usual meanings.

$$Y \quad f_{ph} = \frac{f}{3}$$

$$\Delta \quad V_1 = V_{ph}$$



(1)

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

Answer any 5 of the following questions

888

889

- Q1** a. Define electric generator. Describe construction and working of a simple loop generator. 05
 b. Sketch and identify different parts of a practical generator. P-891 03
 In a long shunt compound generator, the terminal voltage is 230V when generator delivers 150A. Determine (i) induced emf (ii) total power generated and (iii) distribution of this power. Given that shunt field, series field, divisor and armature resistance are 92Ω , 0.015Ω , 0.03Ω and 0.3Ω respectively. 03
 A 10kW, 250V, d.c, 6 pole shunt generator runs at 1000 rpm when delivering full load. The armature has 534 lap connected conductors. Full load Cu loss is 0.64 kW. The total brush drop is 1 volt. Determine the flux per pole. Neglect shunt current. 03
 a. Explain the commutation phenomena of a D.C generator. 046
 b. Discuss the advantages of parallel operation of shunt generators. P-952 03
 c. Two shunt generators operating in parallel deliver a load current of 250A. One of the generators is rated 50kW and the other 100kW. The voltage rating of both machines is 500V and have regulations of 6 percent and 4 percent. Assuming linear characteristics, determine (a) the current delivered by each machine (b) terminal voltage. P-959 03
 d. Define electric motor. Show the comparison between generator and motor action. What are the significance of back emf? P-995 04

- Q2** a. Drive the emf equation of a transformer.
 b. Draw the equivalent circuit of a transformer. P-1142 02
 c. The parameters of a 2300/230 V, 50Hz transformer are given below:

$$R_1 = 0.286 \Omega \quad R_2' = 0.319\Omega \quad R_0 = 150 \Omega \\ X_1 = 0.73 \Omega \quad X_2' = 0.73 \Omega \quad X_0 = 1050 \Omega$$

The secondary load impedance $Z_L = 0.387 + j0.29$. Solve the exact equivalent circuit with normal voltage across the primary to find input power factor, power input, power output, primary Cu loss, secondary Cu loss, efficiency and regulation.

- d. Define alternator. What are the advantages of stationary armature? X 03
 [4] a. Find the all-day efficiency of 500-kVA distribution transformer whose copper loss and iron loss at full load are 4.5 kW and 3.5kW respectively. During a day of 24 hours, it is loaded as under:

No. of hours	Loading in KW	Power factor	$\frac{\text{Eff}}{\text{Eff}_{\text{max}}}$	0.98%
6	450	0.9		
5	300	0.8		
5	250	0.85		
4	100	0.75		
4	0	-		

$$\frac{I}{I_p} = \frac{1}{\sqrt{2}}$$

- b. What are the main parameters of a transformer? Describe transformer tests to find out those parameters. P-1148 05

- c. Show the advantages and disadvantages of induction motor. P-1243 P-1245 03
 d. Draw different three-phase transformer connections. P-1244 02

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P - 1538

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[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). Show the significance of back e.m.f. in motor action. - P-998 3
 (b) Justify the condition for maximum power of a motor with electric theories. P-999 4
 (c) Compare the operating principle of generator and motor in applications. P-833+3 3
 (d) A 20 kW, 250 V d.c. shunt generator has armature and field resistance of 0.04Ω and 200 Ω respectively. Determine the total armature power developed when working as a motor taking 25 kW input. P-1000 4
2. (a). Show the comparison between series motor and shunt motor based on the characteristics and applications. P-1022-1015-19 4
 (b) Show the characteristics curves of T/I_a , N/I_a for series motor with proper justifications. P-1015 4
 (c) Prove that the relationship as $N \propto \frac{E_1}{\varphi}$. P-1015 3
 (d) A d.c. motor takes an armature current of 120 A at 460 V. The armature circuit resistance is 0.1Ω . The machine has 4-poles and the armature is lap connected with 846 conductors. The flux per pole is 0.05 Wb. Calculate the speed and armature torque for the motor. P-1000 3
3. (a) How speed can be controlled of a shunt motor? P-1032 3
 (b) Define electric generator. Describe construction and working of a simple loop generator. P-8488 2
 (c) Define simplex lap winding and wave winding. X 2
 (d) Describe the reasons of parallel operation of shunt generators. - P-953 3
 (e) What are the differences between dc generator and alternator? 2
4. (a) Explain different transformer tests for finding parameters. P-1145 5
 (b) Derive the E.M.F. equation of a transformer. P-1122 3
 (c) Draw different three-phase transformer connections. P-1214 3
 (d) A 50 kVA, 2200/110-V, 50 Hz transformer has a high voltage winding resistance of 0.1Ω and a leakage reactance of 0.22Ω . The low voltage winding resistance is 0.035Ω and the leakage reactance is 0.012Ω . Find the equivalent winding resistance, reactance and impedance referred to the (i) high voltage side and (ii) the low voltage side.
 P-1136 P-1217 4
5. (a) A 800-kVA, 3 phase, 50 Hz transformer has a voltage ratio of 33/11 kV and is delta/star connected. The resistances per phase are: high voltage 35Ω , low voltage 0.876Ω and the iron loss is 3000 W. Calculate the value of efficiency at full load and one-half of full load respectively (i) at unity p.f and (ii) 0.7 p.f. 4
 (b) Sketch the detailed construction of alternator. Write down the advantages of stationary armature. P-1401 4
 (c) Explain construction, working, performance, speed control, advantages, disadvantages and applications of permanent magnet dc motor. P-1547 6
6. (a) Describe construction and modes of operation of variable reluctance stepper motor. P-1532 4
 (b) What is servomotor? What are the features of application of servomotor? Explain AC servomotor. P-1562 4
 (c) A shunt generator delivers 195 A at terminal voltage of 250 V. The armature resistance and shunt field resistance are 0.02Ω and 50Ω respectively. The iron and friction losses equal 950 W. Find: (a) EMF generated (b) Cu losses (c) Output of the prime mover (d) commercial, mechanical and electrical efficiencies. P-928 4
 (d) Draw the equivalent circuit of a transformer. P-1142 2

$$P_{eq} = I^2 R + \frac{E_a T_a}{n} - \frac{I^2 R_a}{n} - \frac{P_{loss}}{n}$$

Mid Examination
Course Title: Electrical Technology Sessional
Time: 30 minutes

Course Code: EEE 212
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.
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.
 $1+1+2+1 = 5$

Patuakhali Science and Technology University

3rd semester (L-2, S-I) Final Examination of B.Sc. in Engg. (CSE), Jan-June-2015

Session: 2013-14, 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.

P-2 (A)

P-3 (A)

5

4

✓ 1(a) Define Ordinary differential equation, Partial differential equation and Homogeneous differential equation. *P-33 (A)*

9

2

4

✓ 1(b) Solve the following differential equation

(i)

$$(x^2 + y^2)dx - 2xydy = 0 \quad P - (A)$$

(ii)

$$(x+2y-3)dx - (2x+y-3)dy = 0 \quad E.R.H \quad P - 80 (A)$$

(iii)

$$(x^2 + y^2)dx + 2xydy = 0 \quad P - 40 (A)$$

~~80 (A)~~

~~2 (2)~~ *P (B)*

2

5

✓ 2(a) State the necessary and sufficient condition for a differential equation $Mdx + Ndy = 0$ to be exact. *P - 54 (A)*

8

✓ 2(b) Solve the differential equation

(i)

$$(x^2 - 2xy + 3y^2)dx + (4y^3 + 6xy - x^2)dy = 0 \quad A.P - (68)$$

(ii)

$$(x - 2e^y)dy + (y + x \sin x)dx = 0$$

✓ 3(a) Define Integrating factor. *P - 56 (A)*

2

4

✓ 3(b) Solve the linear differential equation: $\frac{dy}{dx} + Py = Q$, where P and Q are the function of x or constant

P - 71

8

✓ 4(a) Solve the following

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

P - 82



$$(ii) (D^2 - 4D + 4) = x^2 + x + 1$$

$$m=4 \\ m+4 \\ m=2, 2m+2$$

$$(m-2)^m = 2, 2$$

✓ 4(b) What do you understand by statistics? Discuss with example its importance.

4

✓ 4(c) What do you mean by frequency distribution? Distinguish between variable and attribute.

6

Marks obtained by 50 students of CSE 3rd semester in Mathematics are given below:

46, 38, 26, 51, 32, 41, 56, 33, 49, 10, 68, 34, 24, 35, 39, 50, 15, 40, 37, 21, 38, 43, 31, 29, 19, 44, 32, 55, 11, 34, 40, 36, 36, 39, 27, 44, 48, 19, 15, 36, 45, 48, 38, 19, 52, 22, 33, 39, 49, 45

✓ Present the data in the form of a frequency table using the class interval of 10 marks.

✓ What are the different methods of data collection?

10

4

a) What is central tendency? What are the usual measures of central tendency?

b) Find out the mean, median and mode from the following data:

80-89	1
70-79	1
60-69	3
50-59	10
40-49	28
30-39	20
20-29	21
10-19	16

c) What are the various measures of dispersion? Find the standard deviation of the following distribution

5-10

5

10-15

12

15-20

19

20-25

21

25-30

18

30-35

15

35-40

7

40-45

5

$$\text{Standard Deviation} = \sqrt{\frac{\sum f_i x_i^2 - (\bar{x})^2}{N}}$$

$$\sqrt{\frac{\sum f_i x_i^2}{N}}$$

$$\sqrt{\frac{\sum f_i (x_i - \bar{x})^2}{n}}$$

6. a) Explain the idea of correlation and regression. Fit the regression line of Y on X to the following data:

X: 10	12	15	22	24	28	32
Y: 207	222	218	228	230	24	235

b) Discuss the different techniques of sampling. What is pilot survey?

c) What do you understand by the term "test of significance"? What are the different uses of "t" test?

$$Y = a + bx$$

Patuakhali Science and Technology University

3rd semester (L-2, S-I) Final Examination of B.Sc. in Engg. (CSE), Jan-June-2017

Session: 2015-16, 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) State the order of each differential equation and determine whether the differential equation under consideration is linear or nonlinear

(i) $\frac{d^4y}{dx^4} + 3\left(\frac{d^2y}{dx^2}\right)^3 + 5y = 0$ (ii) $\frac{d^2y}{dx^2} + x \sin y = 0$ (iii) $\frac{d^3y}{dx^3} + \frac{dy}{dx} + y \sin x = 0$

Form the differential equation of the following function:

$Ax^2 + By^2 = 1$

Solve the differential equation $\sin^{-1}\left(\frac{dy}{dx}\right) = x + y$ P-28 (A)

2. a) Define homogeneous differential equation with example P-33 (A)

Solve the differential equation $\left(x \sin \frac{y}{x} - y \cos \frac{y}{x}\right)dx + x \cos \frac{y}{x} dy = 0$ P-39 (A)

Explain the integrating factor of a differential equation. P-56 (A)

Solve the differential equation $y \log y dx + (x - \log y) dy = 0$ P-65 (A)

3. a) Write down the form of linear differential equation and Bernoulli's equation P-72 (A)

b) Solve the differential equation $\frac{dy}{dx} + \frac{1}{x} \sin 2y = x^3 \cos^2 y$ P-78 (A)

c) Give the definition of auxiliary equation of a differential equation P-16 (A)

d) Solve the differential equation $(D^2 - 2D + 1)y = x \sin x$ P-228

4. a) Discuss about statistics. Write down the functions of statistics. P-12

b) Marks obtained by 3rd semester CSE students in Mathematics out of 70 are given below:

Marks	No. of students
20-25	05
25-30	10
30-35	15
35-40	20
40-45	08
45-50	04
50-55	02

Present the data by Histogram and frequency curve.

What are the usual measures of central tendency? P-38

For two non-zero positive observations, prove that (i) $A > G > H$ (ii) $AH = G^2$ where

A=Arithmetic mean, H=Harmonic mean, G=geometric mean

5. a) Write down the various methods of absolute measures of dispersion P-65

b) Prove that the standard deviation is independent of change of origin but not of scale

c) Find out the coefficient of variation from the following frequency distribution

Weights	No. of tomato	f_i	$f_i x_i$	$f_i x_i^2$
50-60	5			
60-70	9			
70-80	13			
80-90	20			
90-100	19			
100-110	9			
110-120	5			

6. a) Explain the terms skewness and kurtosis. P-90, 97

A card is randomly drawn from a well shuffled pack. What is the probability that the card will be either an Ace or the Queen of diamond? P-110

c) Write down some properties of correlation coefficient P-A (202)

d) Per week weight(in pounds) of a calf from its birth is given below:

Age in week (x)	1	2	3	4	5	6	7	8	9	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 is 9.5 weeks.

$y = a + bx$

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.

- Q1**) Determine whether the differential equation under consideration is linear or nonlinear 4

$$(i) \frac{d^4y}{dx^4} + 3\left(\frac{d^2y}{dx^2}\right)^2 + 5y = 0 \quad (ii) \frac{dy}{dx} + y \sin x = 0 \quad (iii) \frac{d^2y}{dx^2} + x \sin y = 0 \quad (iv) \frac{d^3y}{dx^3} + 4 \frac{d^2y}{dx^2} - 5 \frac{dy}{dx} + 3y = \sin^2 x$$

- b)** Form a differential equation of the function $y = Ae^{2x} + Be^{-x} + C$ where A, B, C are arbitrary constants 4

- c)** Write down the methods for solving first order and first degree differential equation 2

- d)** Solve the differential equation $\sin^{-1}\left(\frac{dy}{dx}\right) = x + y$ 4

- Q2**) Define homogeneous differential equation with examples 2

b) Solve the differential equation $\frac{y}{x} \cos \frac{y}{x} dx = \left(\frac{x}{y} \sin \frac{y}{x} + \cos \frac{y}{x} \right) dy$ 5

- c)** State the necessary and sufficient condition for a differential equation to be exact 2

d) Solve the differential equation $\frac{dy}{dx} + \frac{1}{x} \sin 2y = x^3 \cos^2 y$ 5

- Q3.** a) Explain the auxiliary equation of a differential equation with examples 2

b) Solve the differential equation $\frac{d^2y}{dx^2} - 4 \frac{dy}{dx} + 4y = x^2 e^{2x}$ 5

c) Find the solution of the differential equation $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + 4y = x + x^2 \log x$ 7

- Q4.** Discuss about statistics with its application. 4

- b)** The frequency distribution below gives the cost of production of computers in different models: 8 AC

Cost (Tk. Lac)	No. of Computers
10-15	11
15-20	27
20-25	42
25-30	45
30-35	35
35-40	30
40-45	20
45-50	15

- Compute: (a) Mean (b) Median (c) Draw a histogram and locate the mode

- a)** Define skewness and kurtosis 2

- b)** A distribution of short term computer credit disbursement from 10 branches of a bank is given below- 5

Amount of credit:	0-5,	5-10,	10-15,	15-20,	20-25
(Lac Tk.)					

No. of branches :	01	02	04	02	01
-------------------	----	----	----	----	----

Calculate first four central moments, coefficients of skewness and kurtosis and thus comment on the shape and nature of the distribution.

- c)** State and prove the additive law of probability for two events 3

- d)** A card is randomly drawn from a well shuffled pack. What is the probability that the card will be either an Ace or the queen of diamond 4

- Q5.** Prove that the value of correlation coefficient lies between -1 and 1 4

- b)** Give the geometrical interpretation of regression coefficient 3

- c)** Distinguish between correlation and regression 3

- d)** Following marks were obtained out of 100 by 7 students of CSE in Physics and mathematics: 4

Marks in Physics (x):	70	66	68	71	69	65	67
Marks in Mathematics (x):	72	68	69	69	72	67	66

Compute the correlation coefficient

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: 2022

Course Code: CCE 211 Course Title: Data communication Engineering

Credit Hour: 3.0 Full Marks: 15 Duration: 60 Minutes

- 1 a) Define Data communication. "The three criteria necessary for an effective and efficient data communication network" justify the statement.

b) For n devices in a network, write the number of cable links required for a mesh, ring, bus, and star topology with each topology?

c) Write TCP/IP layers with duties, address and types of data delivery of each layer.

2 a) What is the relationship between the bandwidth of a signal before and after it has been encoded using spread spectrum?

b) Define the digital hierarchy used by telephone companies and list different levels of the hierarchy.

c) Four data channels (digital), each transmitting at 1 Mbps, use a satellite channel of 1 MHz. Design an appropriate configuration, using FDM.

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: 60 Minutes

- 1 a) "The effectiveness of a data communications system depends on four fundamental characteristics" justify 3
your answer.
- b) Assume a system uses five protocol layers. If the application program creates a message of 100 bytes and each layer (including the fifth and the first) adds a header of 10 bytes to the data unit, what is the efficiency (the ratio of application layer bytes to the number of bytes transmitted) of the system?
- c) A host communicates with another host using the TCP/IP protocol suite. What is the unit of data sent or received and responsibilities at each of the following layers? a. application layer b. network layer c. data-link layer d. Transport layer and e. Physical Link layer
- 2 a) What is direct sequence spread spectrum? What is the relationship between the bit rate of a signal before and after it has been encoded using DSSS? 2
- b) How does FDM System work? Explain with example. 3
- c) A multiplexer combines four 100-kbps channels using a time slot of 2 bits. Show the output with four arbitrary inputs. What is the frame rate? What is the frame duration? What is the bit rate? What is the bit duration? 2

12. C

L2S1 Semester Final Questions

AIS-211 Accounting and Management

CCE-211 Data Communication

CIT-211 Data Structures and Algorithms

EEE-211 Electrical Technology

MAT-211 Mathematics 3

CIT-213 Software Engineering

Department of Accounting and Information Systems

Patuakhali Science and Technology University

B.Sc. Engg. in CSE Third Semester Final Examination 2015 (January-June)

Course code: AIS 211; Course Title: Accounting and Management

Time: 3 Hours

Credit Hour: 3.0

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) The following are users of financial statements.

- | | |
|--------------------------------|----------------------------------------|
| i. Customers' | ii. Securities and Exchange Commission |
| iii. National Board of Revenue | iv. Investors |
| v. Factory manager | vi. Suppliers |
| vii. Labor unions | viii. Human resource worker |
| ix. Vice-president of Finance | |

You are required to identify and explain the users as being either external users or internal users.

5

(b) Selected transactions for T. Carter, an interior decorator, in her first month of business, are as follows.

Jan. 2: Invested Tk20,000 cash in business.

$$A = L + E$$

3: Paid Tk500 cash for advertising.

9: Purchased equipment for Tk7,000 cash.

11: Billed customers Tk2,300 for services performed.

16: Purchased supplies on account for Tk700.

20: Received Tk1,100 cash from customers billed on January 11.

23: Paid creditor Tk400 cash on balance owed.

28: Withdrew Tk1,200 cash for personal use by owner.

You are required to show the effects of the above transactions on the accounting equation.

9

2. Refer to data in question number 1(b), you are required to prepare;

(a) Journal entries for the month. *Date, Explanation, Debit, credit*

6

(b) Necessary ledger accounts and

6

(c) A trial balance on January 31. *S/L, Account titles, debit, credit*

2

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

TAJ COMPANY

Worksheet

For the Year Ended December 31, 2012

<u>Account Titles</u>	<u>Adjusted Normal Balances</u>	
	Debit (Tk)	Credit (Tk)
Cash	5,300	
Accounts Receivable	10,800	
Supplies	1,500	

Prepaid Insurance	2,000
Equipment	27,000
Accumulated Depreciation—Equipment	5,600
Notes Payable	15,000
Accounts Payable	6,100
Salaries and Wages Payable	2,400
Interest Payable	600
Owner's Capital	13,000
Owner's Drawings	7,000
Service Revenue	61,000
Advertising Expense	8,400
Supplies Expense	4,000
Depreciation Expense	5,600
Insurance Expense	3,500
Salaries and Wages Expense	28,000
Interest Expense	600

You are required to prepare;

- (a) An income statement for year ended December 31, 2012 5
- (b) An owner's equity statement for year ended December 31, 2012 and 2
- (c) A balance sheet on December 31, 2012. 7

- ✓ 4. (a) Define management. 2
- (b) What do you understand by the term "Levels of Management"? Explain with various managerial skills that are required at each level. I, P, M, O, W, E, G, R, Growth 7
- (c) "There is no important area of human activity than management since its task is that of getting things done by people". Discuss. 5

- ✓ 5. (a) What do you mean by Contract? 3
- (b) "All agreements are not contracts, but all contracts are agreement". Discuss the statement explaining essential elements of a valid contract. 9
- (c) "A" offers to sell "B" his horse for Tk. 1000 and tells "B", "This offer will remain open one week." The following day "B" rejects the offer. Within the week "B" changes his mind and notifies "A" that he accepts the offer. Is there a contract? Give arguments. 2

- ✓ 6. (a) Define the term of acceptance. What are the essential of a valid acceptance? 3
- (b) "A" proposes by a letter sent by a post, to sell his house to "B". "B" accepts the proposal by a letter sent by a post. When "A" revokes his proposal or "B" his acceptance. 2
- (c) Define consideration. Critically discuss the essentials elements of consideration. Present, past 9

Aspect

Patuakhali Science and Technology University

3rd Semester (L-2, S-1) Final Examination of B.Sc. Engg. in CSE January-June 2017

Course Code: AIS 211; Course Title: Accounting and Management

Time: 3 hours

Credit Hour: 3.0

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 manner in which the answers are presented. Different parts, if any, of the same question must be answered in one place in order of given sequence.]

1. a) What is an accounting information system? "An accounting information system applies only to a manual system." Do you agree? Explain with suitable example. 8.0
- b) What are common features of computerized accounting packages beyond recording transactions and preparing financial statements? 6.0
2. a) Threet's Repair Shop was started on May 1 by Erica Threet. A summary of May transactions is presented below.
 1. Invested Tk 10,000 cash to start the repair shop.
 2. Purchased equipment for Tk 5,000 cash.
 3. Paid Tk 400 cash for May office rent.
 4. Paid Tk 500 cash for supplies.
 5. Incurred Tk 250 of advertising costs in the Beacon News on account.
 6. Received Tk 6,100 in cash from customers for repair service.
 7. Withdrew Tk 1,000 cash for personal use.
 8. Paid part-time employee salaries Tk 2,000.
 9. Paid utility bills Tk 170.
 10. Provided repair service on account to customers Tk 750.
 11. Collected cash of Tk 120 for services billed in transaction (10).You are required to prepare a tabular analysis of the transactions in good form, using the following column headings: Cash, Accounts Receivable, Supplies, Equipment, Accounts Payable, Owner's Capital, Owner's Drawings, Revenues, and Expenses. 7.0
b) Refer to data in question no. (a) above, prepare journal entries. 7.0
3. a) Refer to data in question no. 2(b) above, prepare necessary ledger accounts. 5.0
b) Refer to data in question no. (a) above, prepare a trial balance. 2.0
c) Refer to data in question no. (b) above, prepare financial statements. 7.0
4. a) What do you mean by management and manager? Discuss different kinds of managers 3.0 considering both level and area.
b) Diagrammatically show the management in organization and management process. State the 3.0 skills of a good manager.
c) Explain Henry Fayol's 14 principles of management and distinguish between: 8.0
i) Unity of command and unity of direction ii) Centralization and decentralization.
5. a) Define leadership and leader. Classify leader according to power and authority. 3.0
b) Write down different theories of leadership. 3.0
c) Discuss any one theory from behavioral approach and another from situational approach. 8.0
6. a) What is planning? Write down the importance of planning. 3.0
b) Write down the strategies that you can formulate at both business and corporate levels. 3.0
c) Explain the Porter's generic strategy and BCG matrix with appropriate conclusion. 8.0

3rd

2013

Patuakhali Science and Technology University

B.Sc. Engg. (CSE) Level: 2 Semester: I Final Examination of Session 2011-12	
Course Code: CCE 211	Course Title: Data Communication and Engineering
Credit Hour: 03	Full Marks: 70 Duration: 03 Hours

[Figures in the right margin indicate full marks. Split answering of any question is not recommended. Write the full question number e.g. i(A) before the answer paragraph]

Answer any 5 of the following questions

Back

Question No.

- 1 A ✓ Describe the key elements of a simplified communications model with example. 7
S-1, G-9
- 1 B What are the key features of a protocol? Compare the characteristics of LAN, MAN and WAN. 7
S-2, b
- 2 A How computers or processes can communicate over a network with respect to OSI model. Describe each layer with a suitable example. 7
S-2, 3x
- 2 B Has any implementation of OSI model? Make comparison between the OSI Model with the TCP/IP Model. Mid 7
S-2, 38
- 3 A What are guided and unguided media? Define simplex, half-duplex and full-duplex transmission with example. 7
CH-2, 12
- 3 B What are the most significant transmission impairments? Illustrate each of them with proper example. Mid 7
Page xx
- 4 A Explain attenuation of typical guided media with necessary graph. 7
S-4, 26
- 4 B Describe digital signal encoding format with figure. 7
Page 98
- 5 A Describe the structure of each guided media commonly used for data transmission with figure. 7
- 5 B Illustrate ASK, FSK, PSK, QPSK showing transmitted signal for one bit. 7
- 6 A Define asynchronous and synchronous transmission. "For $a > 1$, the line is always underutilized and even for $a < 1$ the line is inefficiently utilized in case of Stop-and-Wait Flow Control"—Justify the statement. 7
- 6 B How Sliding-Window Flow Control works? Explain with an example. 7

Patuakhali Science and Technology University

3rd Semester (L-2, S-1), Final Exam. of B. Sc. Engg. (CSE), January-June, 2015

Course Code: CCE-211 Course Title: Data Communication and Engineering

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]

Give the answers of any 5 questions from the given questions:

- (f) (a). How can a composite signal be decomposed into its individual frequencies? What are the differences between low pass and band-pass channel? 6

(b). What is Nyquist bit rate? Why it is used in digital transmission? 6

(c). Consider a noiseless channel with a bandwidth of 3000 hz transmitting a signal with eight signal level. Calculate the maximum bit rate. 2

2. (a). For the bit stream of 00101101110011, show the Manchester, bipolar and MLT-3 encoding. 6

(b). Write down the short notes on (i) 8B/6T block codes (ii) PCM (iii) PAM (iv) 2B1Q 8

(3) (a). What are the limitations of NRZ encoding? How these limitations can be solved? 4

(b). Why 4-PSK method is more efficient than 2-PSK method? Compute the bit rate for a 1000 baud 32-QAM signal. 4

(c). Draw the constellation diagram of 8 PSK, 8-QAM, 16-QAM. 6

(4) (a). How is CDMA superior to TDMA and FDMA? 3

(b). Show the multiplexing and de-multiplexing steps in CDMA technique. 8

(c). What are the properties of orthogonal sequences? 3

5. (a). How the receiver confirms the error on the word "world"? 3

(b). Why two-dimensional parity check bit is used? What are the limitations of parity check bit? 4

(c). How CRC generator works for error detections? 7

(6) (a). What are the purposes of using of hamming code in data transmission? 4

(b). Show the error detection and correction technique using hamming code when the data 1001101 has been corrupted to 1000101. 10

$$\begin{array}{cccc} \textcircled{A} & +1 & -1 & +1 \\ \textcircled{B} & +1 & -1 & +1 \\ \textcircled{C} & & & \end{array} \quad \begin{array}{cccc} -3 & -1 & -3 & -1 \\ -1 & -1 & -3 & 1 \\ 3 & 1 & 3 & 1 \end{array}$$

Patuakhali Science and Technology University

B.Sc. Engg. (CSE) Level-2, Semester-I, Final Examination Jan-Jun/15, Session: 2013-14

Course code: CIT-211

Course Title: Data Structures and Algorithm

Credit hours: 3.00

Full marks: 70

Duration: 3 hours

[Figures in the right margin indicate full marks.]

Answer any 7 of the following questions. Split answering is not recommended.

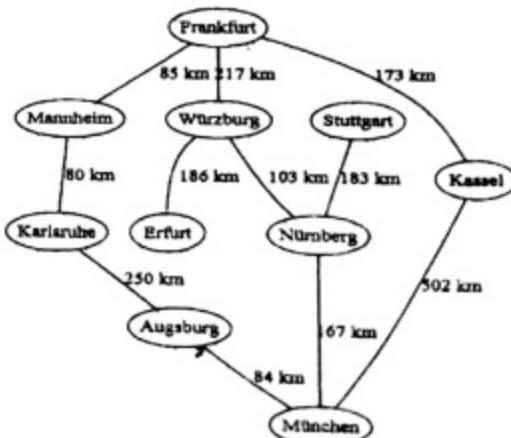
1. a. Demonstrate insertion and deletion of an item into an array. (Algorithm) 6
b. If you have an array with length n and you want to insert a value at position p , how many times you have to move the data of the current array? Similarly, how many times you have to move the data of the array with length n if you want to delete the element at position p ? (Code) 4
2. a. What are the fundamental characteristics of arrays and linked lists? 5
b. Discuss with example how you can insert an item in sorted order into a linked list. 5
3. a. Provide two examples of each of the applications of queues and stacks. 4
b. What are the operations on Queues? Discuss with example in short. 6
4. a. When is binary search better than linear search and when is linear search better than binary search? Explain with example. 5
b. Apply binary search on the following list to search 13. 5

1 2 5 8 9 10 13 15 17 ✓

5. a. Draw the graph for the given adjacency matrix. 4
b. Apply BFS and DFS on the graph you get in the answer to the question no. 5.a. Start from node A and stop when you find node E. Show step-by-step demonstration of BFS and DFS. 6

0	5	3	0	0	0	6
5	0	0	6	0	7	0
3	0	0	0	8	6	0
0	6	0	0	0	0	7
0	8	0	0	0	3	0
0	7	6	0	3	0	0
6	0	7	0	0	0	0

6. a. What are the characteristics of a Binary Search Tree (BST)? 2
b. Construct a BST with the following data. Show each step 5
10 13 8 5 3 18 20 1 6 16 25
c. How can you achieve sorted output from a Binary Search Tree? Explain with example. 3
7. a. Construct the adjacency matrix for the graph given. 2
b. Apply Dijkstra's algorithm on the same graph of question 7.a. with Frankfurt being the start node. Show step-by-step demonstration of the algorithm. 8



8. Demonstrate how bubble sort works on the following data set. Show each iteration with sub-iterations. 10
5 1 4 2 8

9. Show the generation of the Huffman tree using Huffman encoding algorithm on the following text and then encode the text. 10
WAS IT A CAR OR A CAT I SAW? ?

Patuakhali Science and Technology University

B.Sc. Engg. (CSE) Level-2 Semester-I Final Examination-2017 (January-June)

Credit Hour : 3.00 Full Marks:70 Duration: 3 Hours

Course Code: CIT-211 Course Title : Data Structure and Algorithm

[Figure in the right margin indicates full marks. Split answering of any question is not recommended.]
Answer any 5 of the following questions.

- a) What are the applications of Huffman Algorithm? Encode following input string using Huffman algorithm and compare the result with ASCII encoding. [2+5]

InputString: "ComputerScienceandEngineering"

- b) Consider the following graph G in Figure 1. Suppose the nodes X,Y,Z,W are stored in memory in an array DATA as follow: [1+5+1]

DATA: X,Y,Z,W

- i) Find the adjacency matrix A of the graph G. ii) Find the path matrix P of G using warshall algorithm. iii) Is G strongly connected?

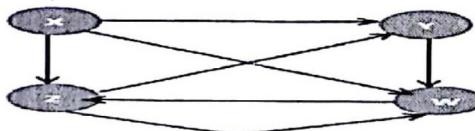


Figure 1

- 3 a) Suppose a weighted directed graph G is maintained in memory by a node array DATA and weight matrix W as follow: [1+6]

DATA: V1,V2,V3,V4

$$W = \begin{pmatrix} 0 & 0 & 3 & 0 \\ 5 & 0 & 1 & 7 \\ 2 & 0 & 0 & 4 \\ 0 & 6 & 8 & 0 \end{pmatrix}$$

Draw a picture of G and traverse G using Depth First Search algorithm with pseudocode.

Write the steps of algorithm that will traverse a binary tree in postorder traversal using stack. Discuss the algorithm using example. ✓ [3.5+3.5]

- 3 a) Translate each infix expression into its equivalent postfix expression and evaluate postfix expression of question iii using stack. [4+3]

~~(A-B)*(D-E) ✓ A*(B-D) ✓ E-F*(G+H/K) iii) 10*(7-3)-48/(1+5)+4 X 10, ✓~~

What are the properties of binary search tree? Build a max heap considering following list of numbers and write the procedure of sorting these numbers in descending order using heap sort. ✓ [1+2+4]

List of numbers: 44,30,50,22,60,55,77,55

- 4 a) Define recursion with example. Write a recursive solution with algorithm steps to the Towers of Hanoi problem for 3 disks. ✓ [2+5]

- b) Given an Integer K, write an algorithm which deletes the Kth element from linked list and also calculate the complexity of your proposed algorithm. ✓ [5+2]

- 5 a) What are the differences between stack and queue? Write the pseudocode of insert and delete in linear queue. State the limitation of linear queue. [2+4+1]

- b) Calculate the complexity of bubble sort algorithm. Sort following list of numbers using bubble sort algorithm. ✓ [2+5]

List of numbers: 32,51,27,85,66,23,13,57 ✓

- 6 a) "Adjacency matrix is better than adjacency list to represent graph in memory"-Justify the statement [3]

- b) Draw a BST using following list of numbers [3+4]

List of numbers: 60,25,15,50,33,44,75,66

State the rules of deletion of a node from BST and delete node 44, 75 and 25 from tree built using above list of numbers. X ✓

Write short note on i) 2-tree ii) path iii) space complexity iv) time complexity

[4]

Faculty of Computer Science and Engineering Patuakhali Science and Technology University

Final Examination of B.Sc. Engineering in CSE Level: 2 Semester: 1 Session: 2015-16

Course Code	Course Title	January-June	Credit: 1.5
CIT 212	Data Structure and Algorithm Sessional	2017	Time: 03 Hr Marks: 70

You can solve question number 2 using any programming language.

 A Fill in the blanks of following questions. Answer may be more than one word.

1*20=20

1. Linear array is a list of finite number of Data elements.
2. The elements of array are referenced by an number.
3. The elements of array are stored respectively in memory location.
4. refers to the operation of adding another element in a collection.
5. The time complexity of bubble sort is
6. The time complexity of binary search is
7. List must be in case of binary search.
8. The syntax to declare a two dimensional array is
9. Linked list is a linear collection of data elements, called
10. The pointer of the last node contains a special value, called the
11. The reference of first node will hold by another node, called
12. The operation to visit each node of linked list is, called
13. An element is inserted or deleted only at end of a stack.
14. Stack can be represented in memory using
15. queue is better than linear queue.
16. Elements is deleted from end of queue.
17. Two trees are said to be if they have same structure.
18. If search item is greater than root in case of a binary search tree then proceed to ... of root.
19. If node has two children then you have to find successor.
20. A graph G consists of things.

 B Write shortnotes on the following topics

2*5= 10

- 1. Heap
- 2. Time complexity
- 3. Linkedlist
- 4. Warshall's algorithm
- 5. 2-Tree

 A Implement stack with function push, pop, empty, size and top.

10

2 B Delete Kth node from linked list.

15

Input: Value of K
Output: Show Linked list elements after deletion

3 Vivavoce.

15

Patuakhali Science and Technology University

rd Semester (L-2, S-1) Final Examination of B.Sc. Engg. (CSE)-2014 (Jan-June), Session: 2012-13
 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]
 [Use figures where necessary]

Answer any 5 of the following questions:

1. (a). What is the basic difference between generator and alternator? 1
 (b). Derive the relationship between line and phase voltages and currents in a 3-phase, 4-wire system. 6
 (c). Show that $Z_{\Delta} = 3Z_Y$, where the symbols having usual meanings. 3
 (d). A 240-v, 3-phase voltage is applied to a balanced delta connected 3-phase load of phase impedance $(8+j6)\Omega$.
 a). Find the phasor current in each line. 4
 b). What is the power consumed in three phase. 5
 c). What is the phasor sum of three line currents? Why does it have this value?

2. (a) What are the functions of Brushes in D.C. generator? Write down the significance of brush pressure in D.C. generator. 3
 (b). Show that $T_a \propto I_a^2$. where the symbols having usual meanings. 5
 (c). "The mechanical power developed by the motor is maximum when back E.M.F. is equal to half the applied voltage". Prove the statement with usual meaningful symbols.
 Is it possible to achieve maximum power in D.C. motor? Explain your answer. 4
 (d). Show that $\eta_c = \eta_m \times \eta_e$ for D.C. generator where the symbols having usual meanings. 2

3. (a). What is back E.M.F.? Write down the significance of back E.M.F. for D.C. Motor. 4
 (b). "The efficiency of a D.C. generator will be maximum when the load current is such that Variable loss is equal to the Constant loss". Explain this statement with usual meaningful symbols. 4
 (c). Define thyristor. Explain the switching characteristics of a thyristor. 4
 (d). What do you mean by transducers? What are the functions of transducers? 2

4. (a). Define electrical transducer. Write down the parameters of the electrical transducers. 4
 (b). What are Stray losses? Describe stray losses in brief. 4
 (c). Describe the factors for selecting a transducer. 4
 (d). What are the applications of oscilloscope? 2

5. (a). Define and categories logic analyzer. Write down the key characteristics of logic analyzer. 5
 (b). What is photovoltaic cell? Describe the working principle of photovoltaic cell. 5
 (c). Differentiate between photoemissive, photoconductive and photovoltaic transducers. 4

6. (a). Analyze the electrical characteristics of three types of D.C. motor in terms of characteristic curves. 3
 Or
 Compare three types of D.C. motor in terms of characteristic curves.
 (b). Define and classify scan technique. Write down the advantages and disadvantages of different types of scan techniques. 5
 (c). What is LVDT? Describe the working principle of LVDT. Where it is used? 4
 (d). Write down the applications of synchronous motor. 2

[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. Define electric generator. Describe construction and working of a simple loop generator. 05
 b. Sketch and identify different parts of a practical generator. 03
 c. In a long shunt compound generator, the terminal voltage is 230V when generator delivers 150A. Determine (i) induced emf (ii) total power generated and (iii) distribution of this power. Given that shunt field, series field, divisor and armature resistance are 92Ω , 0.015Ω , 0.03Ω and 0.3Ω respectively. 03
 d. A 10kW, 250V, d.c, 6 pole shunt generator runs at 1000 rpm when delivering full load. The armature has 534 lap connected conductors. Full load Cu loss is 0.64 kW. The total brush drop is 1 volt. Determine the flux per pole. Neglect shunt current. 03
- [2] a. Explain the commutation phenomena of a D.C generator. 04
 b. Discuss the advantages of parallel operation of shunt generators. 03
 c. Two shunt generators operating in parallel deliver a load current of 250A. One of the generators is rated 50kW and the other 100kW. The voltage rating of both machines is 500V and have regulations of 6 percent and 4 percent. Assuming linear characteristics, determine (a) the current delivered by each machine (b) terminal voltage. 03
 d. Define electric motor. Show the comparison between generator and motor action. What are the significance of back emf? 04
- [3] a. Drive the emf equation of a transformer. 04
 b. Draw the equivalent circuit of a transformer. 02
 c. The parameters of a 2300/230 V, 50Hz transformer are given below: 05
 $R_1=0.286 \Omega$ $R_2'=0.319\Omega$ $R_0=150 \Omega$
 $X_1=0.73 \Omega$ $X_2'=0.73 \Omega$ $X_0=1050 \Omega$
- The secondary load impedance $Z_L=0.387+j0.29$. Solve the exact equivalent circuit with normal voltage across the primary to find input power factor, power input, power output, primary Cu loss, secondary Cu loss, efficiency and regulation.
- d. Define alternator. What are the advantages of stationary armature? 03
- (4) a. Find the all-day efficiency of 500-kVA distribution transformer whose copper loss and iron loss at full load are 4.5 kW and 3.5kW respectively. During a day of 24 hours, it is loaded as under: 04

No. of hours	Loading in KW	Power factor
6	450	0.9
5	300	0.8
5	250	0.85
4	100	0.75
4	0	

- b. What are the main parameters of a transformer? Describe transformer tests to find out those parameters. 05
 c. Show the advantages and disadvantages of induction motor. 03
 d. Draw different three-phase transformer connections. 02

- Ques. No. 1. Answer any four questions. Each question carries 10 marks.
- [5] a. Define stepper motor. Classify stepper motor. 02
b. Describe construction and modes of operation of variable reluctance stepper motor. 06
c. What is servomotor? What are the features of application of servomotor? Explain DC servomotor. 04
d. Define speed regulation of a motor. 02
- [6] a. Describe construction and working of permanent magnet stepping motor. 06
b. Explain construction, working, performance, speed control, advantages, disadvantages and applications of permanent magnet dc motor. 02
c. Define synchros. Write down the types of synchros. 02
d. Make a comparison between VR stepper motor and SR motor. 02

Patuakhali Science and Technology University

B.Sc. Engg. (CSE) Level-2 Semester-1 Final Examination-2017 (January- 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. (a). Show the significance of back e.m.f. in motor action. 3
 (b). Justify the condition for maximum power of a motor with electric theories. 4
 (c). Compare the operating principle of generator and motor in applications. 3
 (d). A 20 kW, 250 V d.c. shunt generator has armature and field resistance of 0.04Ω and 200Ω respectively. Determine the total armature power developed when working as a motor taking 25 kW input. 4

2. (a). Show the comparison between series motor and shunt motor based on the characteristics and applications. 4
 (b). Show the characteristics curves of T_o/I_a , N/I_a for series motor with proper justifications. 4
 (c). Prove that the relationship as $N \propto \frac{E_b}{\phi}$. 3
 (d). A d.c. motor takes an armature current of 120 A at 460 V. The armature circuit resistance is 0.1Ω . The machine has 4-poles and the armature is lap connected with 846 conductors. The flux per pole is 0.05 Wb. Calculate the speed and armature torque for the motor. 3

3. (a). How speed can be controlled of a shunt motor? 3
 (b). Define electric generator. Describe construction and working of a simple loop generator. 4
 (c). Define simplex lap winding and wave winding. 2
 (d). Describe the reasons of parallel operation of shunt generators. 3
 (e). What are the differences between dc generator and alternator? 2

4. (a). Explain different transformer tests for finding parameters. 5
 (b). Derive the E.M.F. equation of a transformer. 3
 (c). Draw different three-phase transformer connections. 3
 (d). A 50 kVA, 2200/110-V, 50 Hz transformer has a high voltage winding resistance of 0.1Ω and a leakage reactance of 0.22Ω . The low voltage winding resistance is 0.035Ω and the leakage reactance is 0.012Ω . Find the equivalent winding resistance, reactance and impedance referred to the (i) high voltage side and (ii) the low voltage side. 3

5. (a). A 800-kVA, 3 phase, 50 Hz transformer has a voltage ratio of 33/11 kV and is delta/star connected. The resistances per phase are: high voltage 35Ω , low voltage 0.876Ω and the iron loss is 3000 W. Calculate the value of efficiency at full load and one-half of full load respectively (i) at unity p.f and (ii) 0.7 p.f. 4
 (b). Sketch the detailed construction of alternator. Write down the advantages of stationary armature. 4
 (c). Explain construction, working, performance, speed control, advantages, disadvantages and applications of permanent magnet dc motor. 6

6. (a). Describe construction and modes of operation of variable reluctance stepper motor. 4
 (b). What is servomotor? What are the features of application of servomotor? Explain AC servomotor. 4
 (c). A shunt generator delivers 195 A at terminal voltage of 250 V. The armature resistance and shunt field resistance are 0.02Ω and 50Ω respectively. The iron and friction losses equal 950 W. Find: (a) EMF generated (b) Cu losses (c) Output of the prime mover (d) commercial, mechanical and electrical efficiencies. 4
 (d). Draw the equivalent circuit of a transformer. 2

Patuakhali Science and Technology University

3rd semester (L-2, S-I) Final Examination of B.Sc. in Engg. (CSE), Jan-June-2015

Session: 2013-14, 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 Ordinary differential equation, Partial differential equation and Homogeneous differential equation. 5
- b) Solve the following differential equation 9
- (i) $(x^2 + y^2)dx - 2xydy = 0$
- (ii) $(x + 2y - 3)dx - (2x + y - 3)dy = 0$
- (iii) $(x^2 + y^2)dx + 2xydy = 0$
2. a) State the necessary and sufficient condition for a differential equation $Mdx + Ndy = 0$ to be exact. 6
- b) Solve the differential equation 8
- (i) $(x^2 - 2xy + 3y^2)dx + (4y^3 + 6xy - x^2)dy = 0$
- (ii) $(x - 2e^y)dy + (y + x\sin x)dx = 0$
3. a) Define Integrating factor. 2
- b) Solve the linear differential equation: $\frac{dy}{dx} + Py = Q$, where P and Q are the function of x or constant 4
- c) Solve the following 8
- (i) $\frac{dy}{dx} + \frac{2}{x}y = \frac{y^3}{x^3}$
- (ii) $(D^2 - 4D + 4)y = x^2 + x + 1$
4. a) What do you understand by statistics? Discuss with example its importance. 4
- b) What do you mean by frequency distribution? Distinguish between variable and attribute. 6
- Marks obtained by 50 students of CSE 3rd semester in Mathematics are given below:
- 46, 38, 26, 51, 32, 41, 56, 33, 49, 10, 68, 34, 24, 35, 39, 50, 15, 40, 37, 21, 38, 43, 31, 29, 19, 44, 32, 55, 11, 34, 40, 36, 36, 39, 27, 44, 48, 19, 15, 36, 45, 48, 38, 19, 52, 22, 33, 39, 49, 45
- Present the data in the form of a frequency table using the class interval of 10 marks.
- c) What are the different methods of data collection? 4

- (5) a) What is central tendency? What are the usual measures of central tendency?
b) Find out the mean, median and mode from the following data:

80-89	1
70-79	1
60-69	3
50-59	10
40-49	28
30-39	20
20-29	21
10-19	16

- c) What are the various measures of dispersion? Find the standard deviation of the following distribution

5-10	5
10-15	12
15-20	19
20-25	21
25-30	18
30-35	15
35-40	7
40-45	5

- (6) a) Explain the idea of correlation and regression. Fit the regression line of Y on X to the following data:

X: 10	12	15	22	24	28	32
Y: 207	222	218	228	230	24	235

- b) Discuss the different techniques of sampling. What is pilot survey?

- c) What do you understand by the term "test of significance"? What are the different uses of "t" test?

6

6

4

4

Patuakhali Science and Technology University

3rd semester (L-2, S-I) Final Examination of B.Sc. in Engg. (CSE), Jan-June-2017

Session: 2015-16, 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) State the order of each differential equation and determine whether the differential equation under consideration is linear or nonlinear 6

(i) $\frac{d^4y}{dx^4} + 3\left(\frac{d^2y}{dx^2}\right)^5 + 5y = 0$ (ii) $\frac{d^2y}{dx^2} + x \sin y = 0$ (iii) $\frac{d^3y}{dx^3} + \frac{dy}{dx} + y \sin x = 0$

- b) Form the differential equation of the following function: 4

$Ax^2 + By^2 = 1$

- c) Solve the differential equation $\sin^{-1}\left(\frac{dy}{dx}\right) = x + y$ 4

2. a) Define homogeneous differential equation with example 2

b) Solve the differential equation $\left(x \sin \frac{y}{x} - y \cos \frac{y}{x}\right)dx + x \cos \frac{y}{x} dy = 0$ 5

- c) Explain the integrating factor of a differential equation. 2

d) Solve the differential equation $y \log y dx + (x - \log y) dy = 0$ 5

3. a) Write down the form of linear differential equation and Bernoulli's equation 2

b) Solve the differential equation $\frac{dy}{dx} + \frac{1}{x} \sin 2y = x^3 \cos^2 y$ 5

- c) Give the definition of auxiliary equation of a differential equation 2

- d) Solve the differential equation $(D^2 - 2D + 1)y = x \sin x$ 5

4. a) Discuss about statistics. Write down the functions of statistics 4

- b) Marks obtained by 3rd semester CSE students in Mathematics out of 70 are given below: 5

Marks	No. of students
20-25	05
25-30	10
30-35	15
35-40	20
40-45	08
45-50	04
50-55	02

Present the data by Histogram and frequency curve.

- c) What are the usual measures of central tendency? 2

- d) For two non-zero positive observations, prove that (i) $A > G > H$ (ii) $AH = G^2$ where
A=Arithmetic mean, H=Harmonic mean, G=geometric mean 4

5. a) Write down the various methods of absolute measures of dispersion 3

- b) Prove that the standard deviation is independent of change of origin but not of scale 5

- c) Find out the coefficient of variation from the following frequency distribution 6

Weights	No. of tomato
50-60	5
60-70	9
70-80	13
80-90	20
90-100	19
100-110	9
110-120	5

6. a) Explain the terms skewness and kurtosis. 2

- b) A card is randomly drawn from a well shuffled pack. What is the probability that the card will be either an Ace or the Queen of diamond? 3

- c) Write down some properties of correlation coefficient 3

- d) Per week weight(in pounds) of a calf from its birth is given below: 6

Age in week (x)	1	2	3	4	5	6	7	8	9	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 9.5 weeks.

Patuakhali Science and Technology University

B. Sc. Engg. (CSE) Level-2, Semester I Final Examination-2013 (January-June), Session -2011-2012

Course Code: CIT 213, Course Title: Software engineering

Credit Hour: 03

Full Marks 70

Duration: 3 Hours

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

Answer any 5 of the following questions.

- 1.** a) Define Software Engineering. Distinguish between Computer Science and System Engineering. 6
 b) In the 21st century, which kind of key challenges are facing in the Software Engineering field? 3
 c) What are the five generic process frame work activities? 5
- 2.** a) What is software process model? 3
 b) Explain how both the waterfall model of the software process and the prototyping model can be accommodated in the spiral process model. 6
 c) What does a system engineering model accomplish? 5
- 3.** a) Briefly describe requirement of engineering process that is accomplished through the execution of six distinct functions. 12
 b) Write short note on object aggregation of software engineering. 2
- 4.** a) Illustrate on Quality Function Development (QFD). 3
 b) What are the difference between generic software product development and customer software development? 3
 c) Draw a sequence diagram (partial) for safe home security function and illustrate it. 8
- 5.** a) What do you mean by design classes? 3
 b) Briefly write down a "well formed" "design class." 8
 c) Describe the difference between verification and validation in respect of Software Engineering. 3
- 6.** a) What is the overall strategy for software testing? 3
 b) Draw a figure of testing strategy. 2
 c) What are the step for top-down integration, bottom-up integration and regression testing? 6
 d) How do you complete the black-box and white-box testing? 3

Patuakhali Science and Technology University

B. Sc. Engg. (CSE) Level-2, Semester-I Final Examination-2014 (January-June), Session 2012-2013

Course Code: CIT 213, Course Title: Software Engineering

Credit Hour: 03

Full Marks: 70

Duration: 3 Hours

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

Answer any 5 of the following questions.

1. a) Define software Engineering. Distinguish between Computer Science and System Engineering. 6
 b) Which kind of key challenges are being faced in the software Engineering field presently? 3
 q c) Explain why system testing costs are particularly high for generic software products which are sold to a very wide market. 5

2. description a) What are the differences between a software process model and a software process? 4
 b) Explain how both the waterfall model of the software process and the prototyping model can be accommodated in the spiral process model. 6
 2 c) Design a process model for running system tests and recording their results. 4

3. 5 a) What do you mean by design Classes? 3
 b) Briefly write down a "well formed" design class. 8
 q c) Describe the difference between verification and validation in respect of software Engineering. 3

4. 15 a) What is the overall strategy for software testing? 2
 q b) Draw a figure of testing strategy. 2
 10 c) What are the steps for top-down integration, bottom-up integration and regression testing? 6
 14 d) Explain why it may be necessary to design the system architecture before the specifications are written. 4

5. a) Briefly describe requirement of engineering process that is accomplished through the execution of six distinct functions. 12
 b) Write short note on object aggregation of software engineering. 2

6. a) Illustrate on Quality Function Development (QFD). 3
 q b) Briefly explain generic software product development and customer software development. 4
 c) Draw a sequence diagram (partial) for safe home security function and illustrate it. 7

Patuakhali Science and Technology University
B.Sc. Engg. (CSE) 3rd Semester (L-2, S- I) Final Examination
January-June- 2015, Session-2013-2014
Course Code: CIT 213 Course Title: Software Engineering
Credit Hour: 03 Full Marks: 70 Duration: 03 Hours

[Figures in the right margin indicate full marks. Split answering of any question is not recommended. Write the full question number e.g. 1(A) before the answer paragraph]

Answer any 5 of the following questions:

- 1 A Write short note on software engineering, computer science and system engineering. 6
- 1 B What are the attributes of good software? Write down the key challenges facing by software engineering in 21 century? 8
- 2 A Describe five generic process framework activities. 5
- 2 B Explain with figure the mentioned process model Incremental Model, RAD Model, Spiral Model. 9
- 3 A What does a system engineering model accomplish? 6
- 3 B Briefly describe the function of Business Process Engineering (BPE) and Product Engineering. 8
- 4 A What is the overall strategy for software testing? Draw a figure of testing strategy. 4
- 4 B Explain why it may be necessary to design the system architecture before the specifications are written. 4
- 4 C What are the steps for top-down integration, bottom -up integration and regression testing? 6
- 5 A What do you mean by design classes? 3
- 5 B Briefly write down a "well formed" design class 8
- 5 C Describe the difference between verification and validation in respect of software engineering. 3
- 6 A What are the seven distinct functions for requirement engineering process in software engineering? Explain briefly. 14

Patuakhali Scienceand Technology University

Final Examination ofB.Sc. Engg (CSE) Level-2, Semester-1, Jan-June-2017

Course Code: CIT-213 Course Title: Software Engineering

Session :2015-2016 Credit Hour: 3.00 Full Marks: 70 Duration: 3.00 Hours

[Figure in the right margin indicates fullmarks. Split answering of any question isnot recommended.]

Answer any 7 of the following questions.

1. a) What is software re-engineering?Findout thereasons for the Failure of Water Fall Model. 2
b) Define Software Evolution Laws. 3
c) Explain the different phasesinvolvedin waterfall life cycle. 3
d) What is feasibility study? Show the contents we should contain in the feasibility report. 2
2. a) What are the varioussteps underrisk analysis? 3
b) Explain the commonrisk tools andtechniques. 3
c) Compare basic objects and aggregate objects used software configuration. 2
d) Draw a diagram forpurewaterfall life cycle. 2
3. a) Briefly describe the characteristics of good software. 2
b) Write the distinction between SCM and Software Support. 2
c) What are the purposes of Data Flow diagrams and Entity-Relationship diagrams?Give an example of each. 3
d) How do we define Software Quality? Define Software Reliability. 3
4. a) How do we compute the "Expected Value" for Software Size? 2
b) What is software reuse? Explain various aspects of software reuse. 3
c) Define the terms: i. Agility ii. Agile Team 2
d) What arethe challenges in software? Write about software change strategies. 3
5. a) Discuss the different types of CASE tools available in Software Engineering. 3
b) Explain all the phases involved in the implementation phase. 3
c) Compare between the"Known Risks" and "Predictable Risks"? 2
d) How many types of software maintenance? Why is it necessary? 2
6. a) List the process activitiesofsoftware configuration management. 3
b) What is user acceptance testing? Explain different testing's in user acceptance testing. Why is it necessary? 3
c) How to compute the cyclomatic complexity? What are the common approaches in debugging? 2
d) Define White Box Testing. Explain in detail about Black box testing. Or
A project PP has 100 nos. Regression test cases, 80 nos. test cases executed during regression testing.Find the percentage ofttest casesexecuted. 2
7. a) Write down the importance of CRC Modeling. 2
b) Listand explain different types of testing done during the testing phase Unit. 3
c) Showthe steps involved in the prototyping. 3
d) For a certain project ABC, total defects attributed to all phases are 55 and total size of the projectis 180FP. Find the defect injection rate? 2
8. a) Define steps in Behavioral Modeling. 2
b) What arethe basic design principles of Class-Based Components? 3
c) Discuss about class and object. Draw the diagrams and representation of class and object. 3
d) What is generalization?Give an example of generalization. Or
Define the task regions in the Spiral model. 2

Full Marks-70;

Credit Hour-3

Time- 3 Hours.

[Answer any five of the following questions. The right margin indicates marks distribution. Different parts of the same question (if any) must be answered in order of given sequence.]

1. a) Define accounting. Briefly explain the importance of accounting. 3
- b) Bob opened the Campus Laundromat on January 1, 2022. During the first month of operations, the following transactions occurred.
- Jan. 1 Bob invested Tk. 20,000 cash in the business.
- 2 The company paid Tk. 1,000 cash for store rent for January.
- 3 Purchased washers and dryers for Tk. 25,000, paying Tk. 10,000 in cash and signing a Tk. 15,000, 6-month, 12% note payable.
- 4 Paid Tk. 1,200 for a one-year accident insurance policy.
- 10 Received a bill from the *Daily News* for advertising the opening of the laundromat Tk. 200.
- 20 Bob withdrew Tk. 700 cash for personal use.
- 30 The company determined that cash receipts for laundry services for the month were Tk. 6,200.

You are required to:

- i. Journalize the transactions. 4
 - ii. Post to the ledger accounts. 4
 - iii. Prepare a trial balance on January 31, 2022. 3
- a) Briefly explain Marginal Cost and Opportunity cost with two suitable examples each. 3
- b) Mabo Company makes calculators that sell for Tk. 20 each. For the coming year, management expects fixed costs to total Tk. 220,000 and variable costs to be Tk. 9 per unit. 3

You are required to Compute:

- i. Break-even point in units using the mathematical equation
 - ii. Margin of safety percentage assuming actual sales are Tk. 500,000.
 - iii. Sales required in dollars to earn net income of Tk. 165,000.
- c) Krisanne Company reports the following operating results for the month of June 2017. 6

<u>Particulars</u>	<u>Total</u>	<u>Per unit</u>
Sales (5000 units)	Tk. 300,000	60
Variable costs	180,000	36
Contribution Margin	120,000	24
Fixed Cost	100,000	
Net Income	20,000	

To increase net income, management is considering reducing the selling price by 10%, with no changes to unit variable costs or fixed costs. Management is confident that this change will increase unit sales by 25%.

You are required to

- i. Compute the break-even point in units and dollars and the margin of safety in using the contribution margin technique (a) assuming no changes to sales price or c and (b) assuming changes to the sales price and volume as described above.
- ii. Comment on your findings.
3. a) What is trial Balance? Why an organization prepared a trial balance.
- b) Lori Figgs is confused about the lack of agreement between the cash balance per book and the balance per bank. Explain the causes for the lack of agreement with Lori, and give an example of each cause.
- c) The following information was obtained from the books of accounts of Smart manufacturing Company Ltd. for the year ended 31.12.2021.

3

Particulars	Tk.	Particulars	Tk.
Direct Materials	100000	Consumable stores	2500
Direct Wages	3000	Manager's Salary	5000
Wages of Foreman	2500	Directors' fees	1250
Lighting: Factory	1500	Office Stationery	500
Office	500	Telephone Charges	125
Storekeeper's wages	1000	Postage and Telegrams	250
Oil and water	500	Salesmen's salary	1250
Rent: Factory	5000	Traveling expenses	500
Office	2500	Advertising	1250
Repairs and Renewals:		Warehouse charges	500
Factory plant	3500	Sales	189500
Transfer to Reserves	1000	Carriage outward	375
Discount on shares written off	500	Dividend	2000
Depreciation: Factory Plant	500	Electric power	500
Office Premises	1250		

You are required to Calculate

- i. Prime Cost ii. Factory Cost iii. Cost of Production
iv. Cost of Sales v. Profit/loss

- 4.a) i) "Management is both science and art". Do you agree or not? Give your argument.
- ii) "Though controlling is viewed as last function of management rather it is the starting point of next year of planning". Do you agree or not? Give your argument.
- b) "As a manager you have to play ten roles according to Henri Mintzberg". Explain the statement with proper judgment.
- c) What are the skills that are needed for the various levels of management according to Robert L. Katz? Explain.
- a) Define scientific Management. Explain four (04) principles of scientific management suggested by F. W. Taylor.
- b) Discuss the Max Weber's concept of Ideal Organization "Bureaucracy" with its characteristic.



: short notes: (any six)

- a) Division of work ii) Unity of command iii) Unity of direction iv) Scalar chain
- b) Subordination of individual interest to group interest vi) Equity vii) Discipline
- c) Give five examples of charismatic political leaders in the word.
- d) Discuss the bases of power a leader may need.
- e) "Leaders are born not made". Do you agree or not. Give your judgment.
- f) "Team manager is concerned with high production and high employee welfare while impoverished leader is concerned lower production and lower employee welfare". Explain this concept as per Blake and Mouton's Managerial Grid.



REDMI NOTE 8
AI QUAD CAMERA

6

3

1

4

6

Time	0	1	2	3	4	5	6	7	8	9	10	11
Input data	0	1	1	1	1	1	1	0	0	0	1	0
Frequency	f ₁	f ₂	f ₃	f ₄	f ₅	f ₆	f ₇	f ₈	f ₉	f ₁₀	f ₁₁	f ₁₂
PN sequence	001	110	111	001	110	111	001	110	111	001	110	111

complete period of the PN sequence.

The following table illustrates the operation of an FHS system for one

[•α]

Only the sender of a data transmission needs to be concerned about the rules of communication how it communicates with the receiver. State with explanation, whether the given statement is true or false.

[C.]

Station A needs to send a message consisting of 9 packets to station B using a sliding window (window size 3) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet in the sequence gets lost (but no ACKs from B ever get lost), then what is the number of packets that A will transmit for sending the message to B? Illustrate the transmitting scenario and explain with justification.

[•]

Two communicating devices are using a single-bit even parity check for error detection. The transmitter sends the byte 101010 and, because of channel noise, the receiver gets the byte 10011010. Will the receiver detect the error?

4 [A.]

Has any implementation of OSI model? Make comparison between the OSI Model with the TCP/IP Model.

[ə]

[a] Explain the following terms in detail.

[B.] What is protocol? Explain different types of protocol.

iii. How Sequence Number Field and Acknowledgment Number Field in TCP Header work?

Answer my 63 out of 66 Questions (Split answers are highly discouraged) Marks: 70

[A.] Explain a simplified communication model with example.

Answer my 65 out of 66 Questions (Syllabus answers are listed).
Time: 03 Hrs Marks: 70

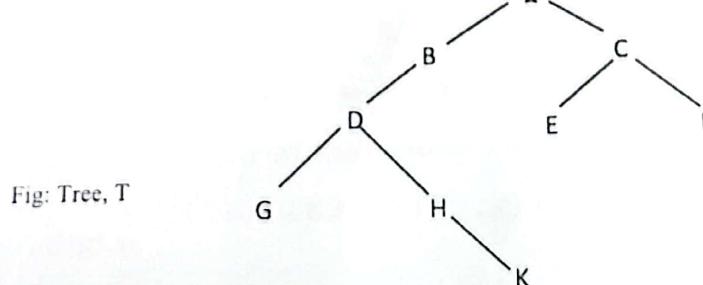


- i. What is the period of the PN sequence, in terms of bits in the sequence? 2
 - ii. The system makes use of a form of PSK. What form of VSK is it? 6
 - iii. What is the number of bits per signal element? 3.5
 - iv. What is the number of FSK frequencies? 2.5
 - v. What is the length of a PN sequence per hop? 6
 - vi. Is this a slow or fast FH system? 4
 - vii. What is the total number of possible carrier frequencies? 4
 - viii. Show the variation of the base, or demodulated, frequency with time.
- In which means signals transmit without guided medium?
- I How are binary values represented in amplitude shift keying and in binary frequency shift keying? What are the limitations of these approaches?
- A Coaxial cable is a two-wire transmission system. What is the advantage of connecting the outer conductor to ground?
- D. What is frequency-hopping spread spectrum?
- A.] Why is a statistical time division multiplexer more efficient than a synchronous time division multiplexer? Briefly explain with figure.
- B.] For the bit stream 01001110, sketch the waveforms for each of the codes of digital signal encoding formats (Digital data, digital signal). Assume that the signal level for the preceding bit for NRZI was high; the most recent preceding 1 bit (AMI) has a negative voltage; and the most recent preceding 0 bit (pseudoternary) has a negative voltage.
- C.] Demonstrate by example that a receiver that suffers a framing error on asynchronous transmission will eventually become realigned. Write down a few dozen arbitrary bit patterns; assume one start bit and a stop element of length one bit.

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

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

1. a) Define the following terms in your own words. Data, Entity, Attributes, Records, and Data structure. 3
- b) What is linear array? Demonstrate the representation of linear array in memory. Suppose a 10-element array A contains the values a_1, a_2, \dots, a_{10} . Find the values in A after each loop. 2+4
- i) Repeat for K=1 to 9
Set $A[K+1] := A[K]$
[End of loop.]
 - ii) Repeat for K=9 to 1 by -1.
Set $A[K+1] := A[9]$
[End of loop.]
- c) Mention the sorting principle of bubble sort 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 the array A and discuss each pass separately. 1+4
2. a) What are the disadvantages of array? How to recover them using linked list. Show the representation of linked list in memory including free-storage list. 2+3
- b) Distinguish between overflow and underflow in a linked list. 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. 2+4
- c) What is header linked list? Draw a schematic diagram of the two-way list. 3
3. a) Define and demonstrate the following terms in your own words. Binary tree, Complete binary tree, Extended binary tree, and Depth of a tree. Show the sequential representation of binary tree in memory. 4+2
- b) 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



- c) What is the property of binary search tree? Write the formal insertion procedure of heap, INSHEAP (TREE, N, ITEM). Build a heap H from the numbers: 44, 30, 50, 22, 60, 55, 77, 55. 1+2

4. a) Explain divide and conquer algorithms with example. 2
- b) i. Translate by inspection and hand, following infix expression into its equivalent prefix expression: $(A-B)*(D/E)$
ii. Write the algorithm to insert an element into a queue.
- c) Evaluate the following postfix expression using algorithmic steps.

$$P: 3, 1, +, 2, \uparrow, 7, 4, -, 2, *, +, 5, -$$

- d) Consider the following weight matrix W.

$$W = \begin{pmatrix} 7 & 5 & 0 & 0 \\ 7 & 0 & 0 & 2 \\ 0 & 3 & 0 & 0 \\ 4 & 0 & 1 & 0 \end{pmatrix}$$

Draw weighted graph G. Apply modified Warshall's algorithm to find the shortest path Q.

Pag



REDMI NOTE 8
AI QUAD CAMERA

in memory as follows:

NODE	A	B		E		D	C
NEXT	7	4	0	6	8	9	2
ADJ	1	2		5		7	3
	1	2	3	4	5	6	7
							8

DEST	2	6	4		6	7	4		4	6
LINK	10	3	6	0	0	0	0	4	0	0
	1	2	3	4	5	6	7	8	9	10

START=1, AVAILN=5

AVAILE=8

- b) Draw the graph G.
- b) Define complete graph and multigraph. Suppose the nodes of the figure A are stored in memory.

1+3

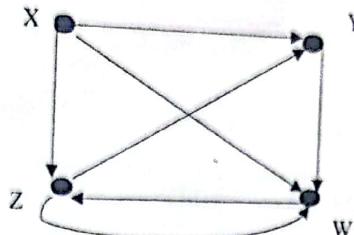
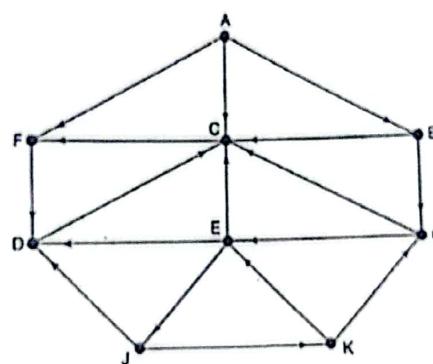


Figure A1

Give the adjacency matrix A of the graph G. Calculate the path matrix P of G.

- c) Consider the following figure. Find and print all the nodes reachable from the node A using DFS.

3



1.5-2.

- d) i) Define topological sort.
ii) Let J and K be integers and suppose Q(J, K) is recursively defined by

$$Q(J, K) = \begin{cases} 5 & ; \text{if } J < K \\ Q(J - K, K + 2) + j & ; \text{if } J \geq K \end{cases}$$

Find Q(2,7) and Q(5,3)

- 6 a) Briefly explain the following terms with respect to data structure and algorithm.

- i) Pseudocode
ii) Algorithm and procedure

- b) i) Give the short notes on Constant time and Logarithmic time complexity with example.
ii) Calculate the complexity of the following segment of code.

```
sum = 0;
for (i=0; i<n*n; i++)
    sum++;
```

- c) Sort the following array of elements by using insertion sort algorithm.
348, 143, 361, 423, 538, 128, 321, 543, 366
d) Write the algorithm for merging two sorted arrays.



REDMI NOTE 8
AI QUAD CAMERA

P

Answer any seven question

- a) What is the importance of software Engineering? Briefly describe what should be steps taken under the process of developing a software system. 3
- b) Explain the principles which play a major role in development of software. 2
- c) Describe the components and quality which is necessary for the documents of software specification. 3
- d) What are the benefits of metrics in software engineering? 2
2. a) Define the blue print methodology. 2
- b) Give the benefits of verification and validation in software development and tell about the techniques of verification and validation in the process of software development. 3
- c) Define the meaning of quality assurance. Explain the role of testing in quality assurance. 3
- d) Write short note on software failure, black box testing, white box testing and stress Testing. 2
3. a) Explain the various types of models which used in software Engineering. 4
- b) Write down the concept of data flow diagram. 2
- c) Describe the objectives of a) coding b) structured programming in terms of software engineering. 2
- d) You have been asked to develop a system that will help with planning large-scale events and parties such as weddings, graduation celebrations, and birthday parties. Using an activity diagram, model the process context for such a system that shows the activities involved in planning a party (booking a venue, organizing invitations, etc.) and the system elements that might be used at each stage 2
4. a) At the end of their study program, students in a software engineering course are typically expected to complete a major project. Explain how the agile methodology may be very useful for the students to use in this case. 3
- b) To reduce costs and the environmental impact of commuting, your company decides to close a number of offices and to provide support for staff to work from home. However, the senior management who introduce the policy is unaware that software is developed using Scrum. Explain how you could use technology to support Scrum in a distributed environment to make this possible. What problems are you likely to encounter using this approach? 3
- c) You have taken a job with a software user who has contracted your previous employer to develop a system for them. You discover that your company's interpretation of the requirements is different from the interpretation taken by your previous employer. Discuss what you should do in such a situation? You know that the costs to your current employer will increase if the ambiguities are not resolved. However, you also have a responsibility of confidentiality to your previous employer. 4

5. a) Why a software project manager require for a software industry? Show the responsibilities of project manager. 2
- b) Briefly describe the project planning, scope management and project estimation in terms of software management activities. 3
- c) Write short note about project scheduling, resource management, project communication management, configuration management. 3
- d) Suppose you are a project manager of XYZ software development team. Company authority asks you to present a project schedule for a client. Draw a Gantt chart and PERT chart for that software scheduling. 2
6. a) What is Entity-Relationship model? Define data dictionary and show the requirement of data dictionary. 3
- b) Differentiate among software design strategies like structured design, function oriented design and object oriented design. 3
- c) Compare between Top-down design and Bottom-up design. 2
- d) Show the user interface design activities. 2
7. a) List out the characteristics of good software. 2
- b) Discuss about the Big Bang model with its advantage and disadvantage. Show the V-Model structure. 4
- c) Describe about the data flow diagram components with their three levels of architecture. 4
- Or**
Write down each of the clauses in the ACM/IEEE Code of ethics for software engineers.
8. a) Imagine that a government wants a software program that helps to keep track of the utilization of the country's vast mineral resources. Although the requirements put forward by the government were not very clear, a software company was tasked with the development of a prototype. The government found the prototype impressive, and asked it be extended to be the actual system that would be used. Discuss the pros and cons of taking this approach 3
- b) Suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems. Explain your answer according to the type of system being developed: 4
- A system to control antilock braking in a car
 - A virtual reality system to support software maintenance
 - A university accounting system that replaces an existing system
 - An interactive travel planning system that helps users plan journeys with the lowest environmental impact
- c) Should there be a separate profession of 'software architect' whose role is to work independently with a 3
- separate software system architecture? A separate software company would then

Patuakhali Science and Technology University

B.Sc. Engg(CSE) 3rd Semester (Level-2, Semester-I) F-Removal Examination-2020 (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] a. Define polyphase circuits. Why do we use polyphase circuits instead of single phase? 03
b. What are the interconnections of three phase circuits? Describe Star connection of three phase circuit to find line and phase current. 05
c. A 320v, 3-phase voltage is applied to a balanced delta connected 3-phase load of phase impedance $(6+j3)\Omega$. Find the phasor current in each line, power consumed in each phase, and phasor sum of three-line currents. 08
- [2] a. Derive the power equation of 3-wire 3-phase system. 06
b. "The impedance in star connected circuit is equivalent to one-third of the impedance in delta connected circuit". Justify the statement. 05
- [3] a. Define electric generator. Derive the E.M.F. equation of D.C. generator. 05
b. What are the losses of D.C. generator? For a D.C. generator, justify the expression $\eta_c = \eta_m + \eta_e$, where, all symbols represent proper meanings. 06
c. An 8-pole, lap-wound armature rotated at 250 r.p.m. is required to generate 320 V. The useful flux per pole is 0.06 wb. If the armature has 200 slots, calculate the number of conductors per slot. 03
- [4] a. What is D.C. motor? Explain the expression $T_a = I_a^2$, where symbols denote appropriate meanings. 05
b. The armature of a 6-pole, 600 r.p.m. lap-wound generator has 150 slots. If each coil has 4 turns, calculate the flux per pole required to generate an e.m.f. of 250 volts. 02
c. Write down the key characteristics of a D.C. motor. 02
- [5] a. "The efficiency of a D.C. generator will be maximum when the load current is such that variable loss is equal to the constant loss". Justify the statement with appropriate symbols. 06
b. Define back E.M.F. Write down the significance of back E.M.F. 05
c. "The mechanical power developed by the motor is maximum when back E.M.F. is equal to half of the applied voltage". Explain the statement with appropriate symbols. 03
- [6] a. Define logic analyzer. Classify and describe different types of logic analyzer. 07
b. Differentiate between logic analyzer and oscilloscope. Write down the key characteristics of logic analyzer. 07

Patuakhali Science and Technology University

Department of Computer Science and Information Technology

Special Repeat Examination of July-December 2020

8th Semester (Level-4, Semester-II) in B.Sc. Engg. (CSE)

Course Title: Data Structure and Algorithms

Enlist:

Course Code: CIT-211

Credit Hour: 3.00

Session: 2016-17

Full Marks: 70

Duration: 3 Hours

Answer any

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) What is recursion? Distinguish between linear and nonlinear data structure. 2+2

b) i) Translate, by inspection and hand, each infix expression into its equivalent postfix expression:

$$A * (B + D) / E - F * (G + H / K)$$

ii) Sort the following array of elements by using radix sort algorithm.
348, 12, 143, 361, 423, 538, 128, 321, 543, 99

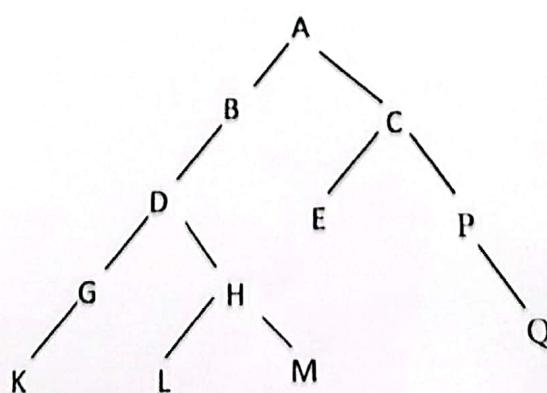
c) Differentiate between stack and queue. Write a procedure to insert an element to the stack. 2+

2 a) Draw the weighted graph for the given adjacency matrix. The values in the matrix represent weight of the edge and zero value represent no edge. You have to label the vertices like A, B, C, G.

0	5	3	0	0	0	5
5	0	0	6	0	7	0
3	0	0	0	8	6	0
0	6	0	0	0	0	7
0	8	0	0	0	3	0
0	7	6	0	3	0	0
6	0	7	0	0	0	0

b) Apply BFS and DFS on the graph you get in the answer to the (a). Start from node A and stop when you find node E. Show a step-by-step demonstration of BFS and DFS.

c) Define 2-tree. Simulate (step-by-step processing) the inorder traversing mechanism of the following tree.



a) Make a maxheap from the following list of elements.

11, 50, 80, 5, 22, 53, 3, 15, 23

b) i) Give the complexity of quick sort, selection sort, and insertion sort.

ii) Explain the quick sort process for sorting the following list of elements.

348, 12, 143, 361, 423, 538, 128, 321, 543, 99

c) Build a Huffman tree from the list of elements.

Item	Weight	A	B	C	D	E	F	G
REDML	21		5	25	15	8	12	11

- 7) What is a linear array? Write the operation of linear data structure. Illustrate the representation of linear memory.
- b) Mention the key concept of the Bubble sort algorithm. Suppose, the following numbers need to be sorted 32, 51, 27, 85, 66, 23, 13, 57, you apply the Bubble sort algorithm to make the ascending order of the numbers. Write the complexity of this algorithm.
- c) What are the advantages of using a pointer in an array? Show the representation of records in memory using a parallel array. State the steps of the matrix multiplication algorithm. How to compute the complexity of matrix multiplication.

5

- 5 a) Define the linked list with an example. List the disadvantages of the array. How to address the limitation using a linked list. Demonstrate the linked list in memory. How to determine the overflow and underflow for performing the operation of data structure.
- b) Write an algorithm that inserts an ITEM after a given node. Show a schematic diagram of middle node deletion.
- c) What is the header linked list? Illustrate a header linked list in memory. Draw a schematic structure of a two-way circular header list.

5

5

4

- 6 a) Define in your own words the following terms: binary tree, ancestor of a node, descendant of a node, depth of a tree.
- b) Write the formal insertion procedure of heap, INSHEAP (TREE, N, ITEM). Build tree, T, using binary search tree algorithm from the numbers: 44, 30, 50, 22, 60, 55, 77, 55.
- c) Fully describe the insertion sort algorithm with complexity.

4

5

5



Patuakhali Science and Technology University

B. Sc. Engg. (CSE) Level-2, Semester-I Final Examination-2013 (January-June), Session -2011-2012

Course Code: CIT 213, Course Title: Software engineering

Credit Hour: 03 Full Marks 70 Duration: 3 Hours

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

Answer any 5 of the following questions.

1. a) Define Software Engineering. Distinguish between Computer Science and System Engineering. 6
b) In the 21st century, which kind of key challenges are facing in the Software Engineering field? 3
c) What are the five generic process frame work activities? 5
2. a) What is software process model? 3
b) Explain how both the waterfall model of the software process and the prototyping model can be accommodated in the spiral process model. 6
c) What does a system engineering model accomplish? 5
3. a) Briefly describe requirement of engineering process that is accomplished through the execution of six distinct functions. 12
b) Write short note on object aggregation of software engineering. 2
4. a) Illustrate on Quality Function Development (QFD). 3
b) What are the difference between generic software product development and customer software development? 3
c) Draw a sequence diagram (partial) for safe home security function and illustrate it. 8
5. a) What do you mean by design classes? 3
b) Briefly write down a "well formed" "design class. 8
c) Describe the difference between verification and validation in respect of Software Engineering. 3
6. a) What is the overall strategy for software testing? 3
b) Draw a figure of testing strategy. 2
c) What are the step for top-down integration, bottom-up integration and regression testing? 6
d) How do you complete the black-box and white-box testing? 3

Patuakhali Science and Technology University
B. Sc. Engg. (CSE) Level-2, Semester-I Final Examination-2014 (January-June), Session 2012-2013
Course Code: CIT 213, Course Title: Software Engineering
Credit Hour: 03 Full Marks: 70 Duration: 3 Hours

[Figure in the right margin indicates full marks. Split answering of any questions is not recommended.]
Answer any 5 of the following questions.

1. a) Define software Engineering. Distinguish between Computer Science and System Engineering. 6
b) Which kind of key challenges are being faced in the software Engineering field presently? 3
c) Explain why system testing costs are particularly high for generic software products which are sold to a very wide market. 5

2. a) What are the differences between a software process model and a software process? 4
b) Explain how both the waterfall model of the software process and the prototyping model can be accommodated in the spiral process model. * 6
c) Design a process model for running system tests and recording their results. 4

3. a) What do you mean by design Classes? 3
b) Briefly write down a "well formed" design class. 8
c) Describe the difference between verification and validation in respect of software Engineering. 3

4. a) What is the overall strategy for software testing? 2
b) Draw a figure of testing strategy. 2
c) What are the steps for top-down integration, bottom-up integration and regression testing? 6
d) Explain why it may be necessary to design the system architecture before the specifications are written. 4

5. a) Briefly describe requirement of engineering process that is accomplished through the execution of six distinct functions. * 12
b) Write short note on object aggregation of software engineering. 2

6. a) Illustrate on Quality Function Development (QFD). 3
b) Briefly explain generic software product development and customer software development. 4
c) Draw a sequence diagram (partial) for safe home security function and illustrate it. 7

Patuakhali Science and Technology University
B.Sc. Engg. (CSE) 3rd Semester (L-2, S-I) Final Examination
January-June- 2015, Session-2013-2014
Course Code: CIT 213 Course Title: Software Engineering
Credit Hour: 03 Full Marks: 70 Duration: 03 Hours

[Figures in the right margin indicate full marks. Split answering of any question is not recommended. Write the full question number e.g. 1(A) before the answer paragraph]

Answer any 5 of the following questions:

- 1 A Write short note on software engineering, computer science and system engineering. *Slide 7 ①*
- 1 B What are the attributes of good software? Write down the key challenges facing by software engineering in 21 century? *Slide 8 ①*
- 2 A Describe five generic process framework activities. *Slide 7 ①* 5
- 2 B Explain with figure the mentioned process model Incremental Model, RAD Model, Spiral Model. *Slide 7 ②* 9
- 3 A What does a system engineering model accomplish? 6
- 3 B Briefly describe the function of Business Process Engineering (BPE) and Product Engineering. 8
- 4 A What is the overall strategy for software testing? Draw a figure of testing strategy. 4
- 4 B Explain why it may be necessary to design the system architecture before the specifications are written. 4
- 4 C What are the steps for top-down integration, bottom -up integration and regression testing? 6
- 5 A What do you mean by design classes? 3
- 5 B Briefly write down a "well formed" design class 8
- 5 C Describe the difference between verification and validation in respect of software engineering. 3
- 6 A What are the seven distinct functions for requirement engineering process in software engineering? Explain briefly. 14

Answer any 7 of the following questions.

1. a) What is software re-engineering? Find out the reasons for the failure of Water Fall Model. 3
b) Define Software Evolution Laws. slide 2 - 3 2
c) Explain the different phases involved in waterfall life cycle. slide 9 - 2 3
d) What is feasibility study? Show the contents we should contain in the feasibility report. 2
2. a) What are the various steps under risk analysis? slide 1 3
b) Explain the common risk tools and techniques. P-130 3
c) Compare basic objects and aggregate objects used software configuration. 2
d) Draw a diagram for pure waterfall life cycle. slide 2 8 2
3. a) Briefly describe the characteristics of good software. slide 11 1 2
b) Write the distinction between SCM and Software Support. 2
c) What are the purposes of Data Flow diagrams and Entity-Relationship diagrams? Give an example of each. 3
d) How do we define Software Quality? Define Software Reliability. 3
4. a) How do we compute the "Expected Value" for Software Size? 2
b) What is software reuse? Explain various aspects of software reuse. slide 2 3
c) Define the terms: i. Agility ii. Agile Team 2
d) What are the challenges in software? Write about software change strategies. 3
5. a) Discuss the different types of CASE tools available in Software Engineering. slide - 36 3
b) Explain all the phases involved in the implementation phase. 3
c) Compare between the "Known Risks" and "Predictable Risks"? 2
d) How many types of software maintenance? Why is it necessary? 2
6. a) List the process activities of software configuration management. 3
b) What is user acceptance testing? Explain different testing's in user acceptance testing. Why is it necessary? 3
c) How to compute the cyclomatic complexity? What are the common approaches in debugging? 2
d) Define White Box Testing. Explain in detail about Black box testing. Or. 2
A project PP has 100 nos. Regression test cases, 80 nos. test cases executed during regression testing. Find the percentage of test cases executed.
7. a) Write down the importance of CRC Modeling. 2
b) List and explain different types of testing done during the testing phase Unit. 3
c) Show the steps involved in the prototyping. 3
d) For a certain project ABC, total defects attributed to all phases are 55 and total size of the project is 180FP. Find the defect injection rate? 2
8. a) Define steps in Behavioral Modeling. slide 19 2
b) What are the basic design principles of Class-Based Components? 3
c) Discuss about class and object. Draw the diagrams and representation of class and object. 3
d) What is generalization? Give an example of generalization. Or Define the task regions in the Spiral model. 2