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: 6

i) Self-Management ii) TQM iii) IT Policy in Bangladesh iv) Digital Inclusion

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 trail Balance. Why an organization prepared a trail 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: 5

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. 4

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	8
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

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. 5

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

B Distinguish between linear and nonlinear data structure. Analyze the complexity of quick sort algorithm. 4

C Explain recursion with example. Translate, by inspection and hand, each infix expression into its equivalent postfix expression: 5

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

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

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. 5

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: 3

Inorder: EACKFHDBG Preorder: FAEKCDHGB

Draw the tree T.

C i) Build a Huffman tree from the list of elements. 6

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.

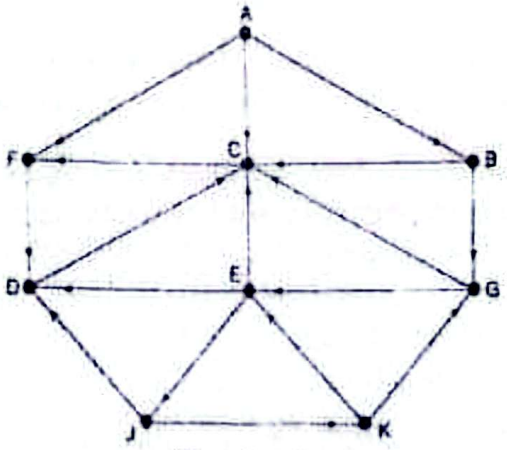


Figure: A2

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 R.E		

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.

	Total	Variable	Fixed
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 5 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 number of employees born in year K. Write a module for each of the following tasks: 07

i. To print each of the years in which no employee was born.
ii. To find the number NNN of years in which no employee was born.
iii. 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.)
iv. 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)

i. Find the number of elements in each array. 07
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.

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) Ω 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) Ω. 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

Answer any 5 of the following

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.

b)

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. 3+2

ii) Explain the features of each layer in TCP/IP protocol.

b) i) Distinguish between LAN and WAN. 2+2

ii) Suppose, a computer A wants to communicate computer B, explain the tasks that are needed to perform this communication.

c) Consider the following equation of composite periodic signal. 5

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

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. 3+2

ii) Distinguish between guided and unguided media.

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

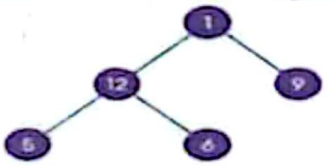
Session 2016-17 Credit Hour: 1.5 Full Marks: 70 Duration: 2 Hours.

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 x 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