

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. 2+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.

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

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

Analyze the bandwidth and data rate for the following cases.

 - i) $k=(1, 2, 3, 4)$ and $f=1\text{MHz}$
 - ii) $k=(1, 3, 5)$ and $f= 4\text{MHz}$

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

Handwritten notes and calculations:

1, 3, 5, 7, 9, 11
 2, 3, 4, 6, 10, 11
 5, 6, 7, 8, 9, 10, 11

Handwritten notes and calculations:

$2^n = m+n+1$
 $2^2 = 4$
 $2^3 = 8$
 $2^4 = 16$
 $2^5 = 32$
 $2^6 = 64$
 $2^7 = 128$
 $2^8 = 256$
 $2^9 = 512$
 $2^{10} = 1024$
 $2^{11} = 2048$
 $2^{12} = 4096$
 $2^{13} = 8192$
 $2^{14} = 16384$
 $2^{15} = 32768$
 $2^{16} = 65536$
 $2^{17} = 131072$
 $2^{18} = 262144$
 $2^{19} = 524288$
 $2^{20} = 1048576$
 $2^{21} = 2097152$
 $2^{22} = 4194304$
 $2^{23} = 8388608$
 $2^{24} = 16777216$
 $2^{25} = 33554432$
 $2^{26} = 67108864$
 $2^{27} = 134217728$
 $2^{28} = 268435456$
 $2^{29} = 536870912$
 $2^{30} = 1073741824$
 $2^{31} = 2147483648$
 $2^{32} = 4294967296$
 $2^{33} = 8589934592$
 $2^{34} = 17179869184$
 $2^{35} = 34359738368$
 $2^{36} = 68719476736$
 $2^{37} = 137438953472$
 $2^{38} = 274877906944$
 $2^{39} = 549755813888$
 $2^{40} = 1099511627776$
 $2^{41} = 2199023255552$
 $2^{42} = 4398046511104$
 $2^{43} = 8796093022208$
 $2^{44} = 17592186044416$
 $2^{45} = 35184372088832$
 $2^{46} = 70368744177664$
 $2^{47} = 140737488355328$
 $2^{48} = 281474976710656$
 $2^{49} = 562949953421312$
 $2^{50} = 1125899906842624$
 $2^{51} = 2251799813685248$
 $2^{52} = 4503599627370496$
 $2^{53} = 9007199254740992$
 $2^{54} = 18014398509481984$
 $2^{55} = 36028797018963968$
 $2^{56} = 72057594037927936$
 $2^{57} = 144115188075855872$
 $2^{58} = 288230376151711744$
 $2^{59} = 576460752303423488$
 $2^{60} = 1152921504606846976$
 $2^{61} = 2305843009213693952$
 $2^{62} = 4611686018427387904$
 $2^{63} = 9223372036854775808$
 $2^{64} = 18446744073709551616$
 $2^{65} = 36893488147419103232$
 $2^{66} = 73786976294838206464$
 $2^{67} = 147573952589676412928$
 $2^{68} = 295147905179352825856$
 $2^{69} = 590295810358705651712$
 $2^{70} = 1180591620717411303424$
 $2^{71} = 2361183241434822606848$
 $2^{72} = 4722366482869645213696$
 $2^{73} = 9444732965739290427392$
 $2^{74} = 18889465931478580854784$
 $2^{75} = 37778931862957161709568$
 $2^{76} = 75557863725914323419136$
 $2^{77} = 151115727451828646838272$
 $2^{78} = 302231454903657293676544$
 $2^{79} = 604462909807314587353088$
 $2^{80} = 1208925819614629174706176$
 $2^{81} = 2417851639229258349412352$
 $2^{82} = 4835703278458516698824704$
 $2^{83} = 9671406556917033397649408$
 $2^{84} = 19342813113834066795298816$
 $2^{85} = 38685626227668133590597632$
 $2^{86} = 77371252455336267181195264$
 $2^{87} = 154742504910672534362390528$
 $2^{88} = 309485009821345068724781056$
 $2^{89} = 618970019642690137449562112$
 $2^{90} = 1237940039285380274899124224$
 $2^{91} = 2475880078570760549798248448$
 $2^{92} = 4951760157141521099596496896$
 $2^{93} = 9903520314283042199192993792$
 $2^{94} = 19807040628566084398385987584$
 $2^{95} = 39614081257132168796771975168$
 $2^{96} = 79228162514264337593543950336$
 $2^{97} = 158456325028528675187087900672$
 $2^{98} = 316912650057057350374175801344$
 $2^{99} = 633825300114114700748351602688$
 $2^{100} = 1267650600228229401496703205376$

Transmission Commission Protocol
Internet Protocol

✓ 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.

Asynchronous Transfer Module

Patuakhali Science and Technology University

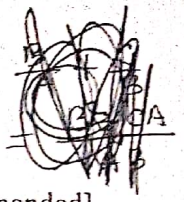
B.Sc.Engg.(CSE) 3rd Semester (Level-2, Semester-I) Final Examination-2020 (Jan-June)

Course Code: EEE 211 Course Title: Electrical Technology

Credit Hour: 3.0

Full Marks: 70

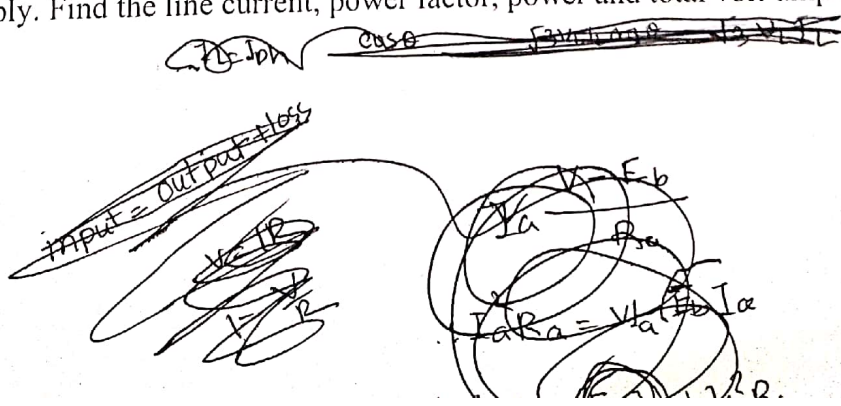
Duration: 3 Hours.



[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 $\eta_c = \eta_m + \eta_e$, where, all symbols represents proper meanings. 06
 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



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: CIT-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

1. ☒ 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]
2. ☒ 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. [4]
- ☒ 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: [5]
 - ☒ 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) Write down each of the clauses in the ACM/IEEE Code of ethics for software engineers. [5]
3. ☒ a) 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]
- ☒ b) 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]
- ☒ c) 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]
4. ☒ a) Identify and briefly describe four types of requirements that may be defined for a computer-based system. [4]
- ☒ b) 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]
- ☒ 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]

Completeness
computability
comp. model

- 5 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 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

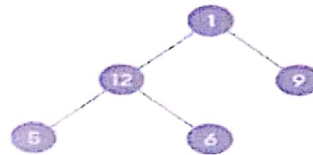
Duration: 2 Hours.

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

- 02 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, 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



- 03 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)

- 04 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

- 05 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.

06 Viva-voce.

10

20