Roll No: R110216098

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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Mid Semester Examination, March 2018

Programme: B. Tech CSE all IBM Branches | **Semester – IV**
Course Name: Data Communication and Computer Networks | **Max. Marks : 100**
Course Code: CSEG 226 | **Duration: 2 Hrs**
No. of page/s:2

Notes and Instructions

1. **Section A - 30 marks (Attempt All 4 Questions in this Section. Each question carries 7.5 marks)**
2. **Section B - 45 marks (Attempt All 3 questions. Each question carries 15 marks)**
3. **Section C - 25 marks (Attempt 1 question of 25 marks)**

Section A – 30 marks (Attempt All 4 Questions in this Section)

Q.1) Consider two hosts X and Y, connected by a single direct link of rate 10^6 bits/sec. The distance between the two hosts is 10,000 km and the propagation speed along the link is 2×10^8 m/s. Hosts X send a file of 50,000 bytes as one large message to hosts Y continuously. Let the transmission and propagation delays be p milliseconds and q milliseconds, respectively. Find out the value of p and q. **(7.5 marks)**

Q.2) 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? Draw the sender and receiver windows. **(7.5 marks)**

Q.3)

a) A computer network consists of 30 stations. Suppose Six stations are designated as hubs, each fully interconnected with the others using mesh topology. The remaining 24 stations are equally distributed to the hubs such that any one station is connected to only one hub. Determine the number of links required. **(3.5 marks)**

b) Which of the OSI layers handles each of the following : - **(4 marks)**

1. Allows a user to log on to a remote host.
2. Dividing the transmitted bit stream into frames.
3. Encryption and compression of the information.
4. Flow control between source and destination node.

Q.4) Explain ISDN along with its channels, types and interfaces. **(7.5 marks)**

Section B – 45 Marks (Attempt All 3 questions)

Q.5) What are the different approaches of packet switching? Explain with suitable diagram & Compare on the basis of efficiency and delay. **(15 marks)**

Q.6)

a) Explain the internal structure of optical fiber cable and also list the advantages of optical fiber cable over coaxial cables. **(7 marks)**

b) The digital signal is to be designed to permit 160 kbps for a bandwidth of 20KHz. Determine **(8 marks)**

(1) number of levels

(2) Signal to Noise ratio.

Q.7) If a divisor in form of polynomial is x^4+x+1 and data to send in network is 1101011011. What will be the CRC? Show the generation of dataword at receiver site as well (assuming no errors). **(15 marks)**

Section C-25 Marks (Attempt 1 question)

Q.8)

a) How does a single-bit error differ from burst error? Generate codeword for given dataword 1001101 using hamming code. **(13 marks)**

OR

Four sources, each creating 250 characters per second. If the interleaved unit is a character and 1 synchronization bit is added to each frame, find

1. The data rate of each source
2. The duration of each character in each source
3. The frame rate
4. The duration of each frame
5. The number of bits in each frame
6. The data rate of the link

b) Define relationship among all layers and addresses of TCP/IP model. **(12 marks)**

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Mid Semester Examination, March 2018

Programme: B.Tech CSE – IBM All Branches | **Semester - IV**
Course Name: Software Engineering & Project Management | **Max. Marks : 100**
Course Code: CSEG 265 | **Duration : 2 Hrs**
No. of page/s: 02

SECTION A — 30 MARKS

Question 1 and 2 carry 7 marks each, and Questions 3 and 4 carry 8 marks each

1. Explain seven reasons as to how software is different from other engineering products?
2. Explain any seven guidelines to be followed for constructing DFDs
3. Discuss the significance and use of requirement engineering. What are the problems in the formulation of requirements? [4+4]
4. When is V Model applied? Briefly explain the Validation phases of the V Model. [3+5]

SECTION B — 45 MARKS

There is internal choice in Question no. 7. Each question carries 15 marks.

5. A software system to be developed for the Library Management System of a University, which involves both students and faculty as members of the Library, We have processes such as Issue of Books, Return of books and Querying books/ journals for availability in the University Library. For this problem of Library management System , design the following :

   a) Problem Statement [4 marks]
   b) Use Case diagram [5 marks]
   c) Use Cases and their explanation [6 marks]

6. a) Once actors have been identified, use-cases can be developed. Jacobson in his work has suggested a number of questions that should be answered by a use-case. What are they? [4]

   b) What is the purpose of feasibility study w.r.t. Software Requirements? What points does a feasibility study focus on? Mention these points. [2+3]

   c) Explain the Task regions in the Spiral Model with the aid of a diagram. [6]
   Note : You do not have to explain the Spiral Model, EXPLAIN only the Task regions

7. A University wishes to develop a software system for the student result management system of its M.Tech. Programme, which is a four Semester Programme. Students study both Core and Elective subjects, and each subject is evaluated out of 100 marks. Every subject has certain credits attached to it. All students data and Courses data, their subjects offered as well as their Result is available on the University Website. Answer these questions now :

   i) Draw a level 1 DFD of Result management System [6]
   ii) **Draw a Level 2 DFD for all these modules separately :**
      a) Students' subject choice management . [3]
      b) Marks information Management [3]
      c) Student information management [3]

OR

7. a) What is "requirements elicitation"? Discuss any two techniques of elicitation. [2+4]

b) State the pros and cons of using Function Points [2+2]

c) Compare the RAD Model & the Spiral Model on these characteristics in following table form: [5]

S.N	Characteristic	Spiral	RAD
1	Can we define requirements early in the cycle?		
2	Requirements are indicating a complex system to be built		
3	User have no previous experience of participating in similar projects		
4	Users are experts of problem domain		
5	Funding is stable for the project		

Note : Students you have to fill in the blank information in the table by making table of your own as per the above format, and fill in the information as either YES or NO

SECTION C

25 MARKS

There is internal choice in Question no. 8. Each question carries 15 marks.

8. a) A system being developed has the 15 user inputs (Average), 10 user outputs (High), 5 user inquiries (High), 8 internal logical files (Low) and 4 external interface (High). In addition to above, system requires: i) Significant backup and recovery ii) Internal Processing complexity is essential iii) Performance is Moderate iv) Designed code may be significantly reusable v) System is incidentally designed for distributed processing function. Other complexity adjustment factors are treated as average. Compute unadjusted and adjusted FPs. [10]

Compulsory

b) A new project with estimated 200 KLOC Semidetached system has to be developed. Project manager has a choice of hiring from three pools of developers

Pool 1: Very high analyst capability capable with little application experience and high Programmer Capability

Pool 2 : Developers of low Analyst Capability but a lot of experience with the programming language and high product complexity

Pool 3 : Developers of low application experience, high use of software tools and low programmer capability.

Which pool of developers should be hired and why? (Use intermediate COCOMO). For this Pool of developers hired, compute the Effort, Schedule, Productivity & Average Manpower [9+3+3]

OR

a) Explain Software Architecture and its Objectives. Suppose we have to design and build a simple system for taking an on-line survey of students on a campus. **Draw the C&C architecture for the same and explain it.** [2+4]

b) A project of size 12 KLOC is there. Use intermediate COCOMO Model to determine the overall cost & schedule assuming that it has Developers of low Analyst Capability but a lot of experience with the programming language and high product complexity. [5]

c) Also compute the Cost estimate for different phases [4]