

POSSESSION OF MOBILES IN EXAMS IS UFM PRACTICE.

NAME Himanchu

Enrollment No. 21103262

Jaypee Institute of Information Technology, Noida

T2 Examination, Even 2023

B. Tech. IV Semester

Course Name: Algorithms and Problem Solving

Maximum Time: 1 Hr.

Course Code: 15B11CI411

Maximum Marks: 20 Marks

CO1	Analyse the complexity of different algorithms using asymptotic analysis.
CO2	Select appropriate sorting and searching technique for problem solving
CO3	Apply various algorithm design principles for solving a given problem
CO4	Identify, formulate and design an efficient solution to a given problem using appropriate data structure and algorithm design technique.

Q1. [CO3] [5 Marks] It is desired to perform the multiplication of matrices as per the following sequence:

$$A_1 \times A_2 \times A_3 \times A_4 \times A_5$$

Considering the order/dimensions of the matrices, $A_1 \times A_2 \times A_3 \times A_4 \times A_5$ as (7×5) , (5×3) , (3×1) , (1×4) , (4×2) , find out the minimum number of multiplication operations needed to multiply these matrices in given sequence.

Q2. [CO3] It is desired to compress a message, M using Huffman Encoding. Following table presents the frequency of the characters present in the message, M (having 83 characters)

Character	Frequency
A	10
B	25
C	17
D	8
E	11
F	9
G	3

Answer following:

- [3 Marks]** Apply Huffman Encoding to encode the unique characters A to G of the message M (having 83 characters). Further, compute the count of bits in the compressed message when the message M (having 83 characters) was encoded using Huffman Encoding.
- [3 Marks]** Let us consider a small segment (say S) of the message M as: AABACEDG. Encode this segment using the encoding scheme of each unique character obtained using Huffman Encoding in Part A. Further, decode this encoded/compressed message segment, S?

Q3. [CO4] Finding the edge disjoint paths between any two vertices (say V_1 and V_2) in a directed graph (say GR) is the problem where we need to find out all the paths from V_1 to V_2 so that edge in GR appears in at most once in all the identified paths between V_1 and V_2 . As an example, in following graph (GR), the two paths BDEG and BDCG between two vertices, B and G cannot be called as edge disjoint because both paths contain a common edge BD.

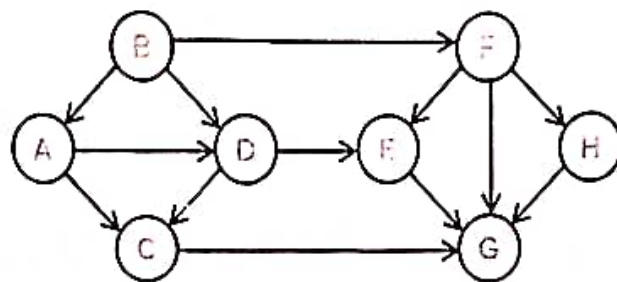


Fig. 1: Given graph, GR

- [3 Marks] Propose an efficient scheme (mentioning the algorithmic steps) to find out the count of all the edge-disjoint paths between any two vertices in a directed graph.
- [2 Marks] Apply your scheme (elaborating all the intermediate steps) to find out the count of all the edge-disjoint paths between vertex B and G in the graph, GR given in Fig. 1.

Q4. [CO3] [4 Marks] It is desired to find out the minimum spanning tree (MST) for the weighted graph, GR given in Fig. 2. Out of the two approaches to find MST, i.e. Prim's and Kruskal's, which one you will use to find out the MST for the given graph, GR? Justify your selection.

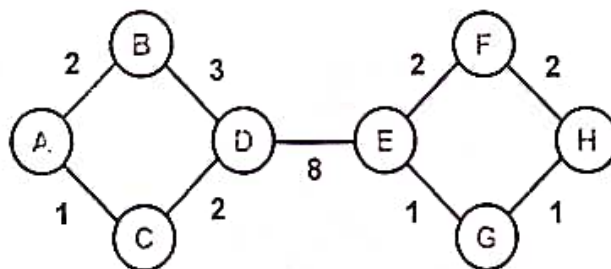


Fig. 2: Given weighted graph, GR

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Name _____ Enrolment No. _____
Jaypee Institute of Information Technology, Noida
_____ MID TERM Examination, 2023 _____
B.Tech IV Semester

Course Title : Environmental Studies
Course Code : 19B13BT211

Maximum Time : 1 hr
Maximum Marks : 30

Upon course completion, students will be able to		Cognitive level
Co number	Course outcomes	
CO1	Explain diversity of environment, ecosystem resources and conservation	C2
CO2	Identify hazards related to environmental pollution and safe management systems	C3
CO3	Apply modern techniques for sustainable urban planning and disaster management	C3
CO4	Recall government regulations, environmental policies, laws and ethics	C2
CO5	Survey ground situation on specific environmental aspects, examine risks involved, make a field report and present the findings	C4

Answer the following

Section A

1. Define trophic levels. What type of organisms are at the top of any food chain and why? Explain unidirectional flow of energy in ecosystem. (1+1+2=4) [CO1]
2. Identify the potential impacts of oil and mineral exploration on land and water ecosystems. Present your views citing a relevant case study. (2+2=4) [CO2]
3. Differentiate between direct and indirect use of biodiversity. Explain its ecological and economical importance. (2+2=4) [CO1]
4. How GDP, CO₂ emission and global climate change are related. Explain with graphical infographic and brief explanation. (4) [CO1]
5. Water can be the reason for National and International conflicts. Support your answer with 2 related case studies. (2+2=4) [CO1]
6. Compare between biomagnification and bioaccumulation. Elaborate with appropriate case study. (2+2=4) [CO2]

Section B

7. Differentiate between a) Autecology, Synecology b) Alpha, Beta diversity (3) [CO1]
8. How can Organic and eco-friendly practices help in achieving sustainable food security? (3) [CO3]

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Name Himanshu

Enrollment No. 21103262

Jaypee Institute of Information Technology, Noida
T-2 Examination, Even Sem 2023
B. Tech. IV Semester

Course Title: Probability and Random Processes

Maximum Time: 1 Hour

Course Code: 15B11MA301

Maximum Marks: 20

After pursuing the course, students will be able to

CO1: explain the basic concepts of probability, conditional probability and Bayes' theorem.

CO2: identify and explain one and two dimensional random variables along with their distributions and statistical averages.

CO3: apply some probability distributions to various discrete and continuous problems.

CO4: solve the problems related to the component and system reliabilities.

CO5: identify the random processes and compute their averages.

CO6: solve the problems on Ergodic process, Poisson process and Markov chain.

All questions are compulsory.

- The number of flaws on a magnetic cassette tape produced continuously at a factory follows Poisson distribution with parameter $\lambda = 2.5$. What is the probability that there are
 - at least two flaws in a single cassette tape?
 - exactly six flaws in a single cassette tape?[CO3, 3 Marks]
- Identify the distribution and its parameter if the M.G.F. of the random variable X is given by $M_X(t) = e^t(5 - 4e^t)^{-1}$ [CO3, 2 Marks]
 - The digits after the decimal point of a random number between 0 and 1 are numbers selected at random, with replacement, independently, and successively from the set $\{0, 1, 2, 3, \dots, 9\}$. In a random number from $(0, 1)$, on the average, how many digits are there before the fifth 3? [CO3, 1 Mark]
- Suppose that the time (in hours) taken by a mechanic to repair a machine is a random variable X following Erlang distribution with parameters $k = 2, \lambda = 2$. Find the probability that repair takes
 - at most 4 hours,
 - at least 3 hours,
 - between 1 and 3.5 hours.[CO3, 3 Marks]
- The marks scored by the students of B. Tech. II year in the course 'Probability and random processes' of a reputed institute follows normal distribution with a mean of 527 and standard deviation 112.
 - What is the probability of a particular student scoring above 500?
 - At least how many marks must a student score to be in top 5%?[CO3, 3 Marks]
- The density function of time to failure (in years) of an appliance is given by
$$f(t) = 2at e^{-at^2}, \quad a > 0, \quad t > 0$$

Find (i) the reliability function $R(t)$

(ii) MTTF

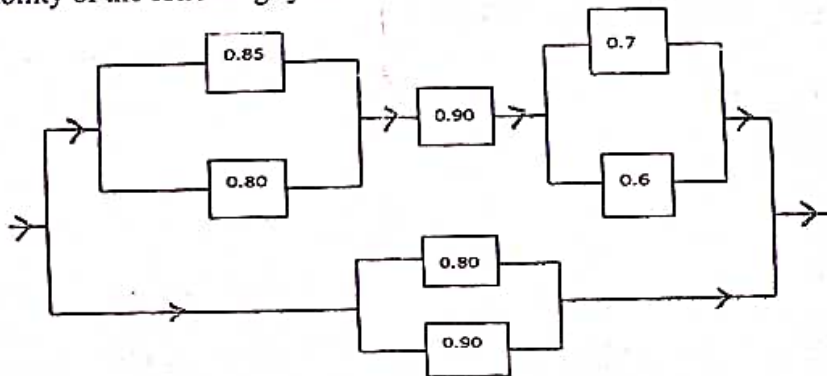
(iii) Hazard rate function $\lambda(t)$

(iv) the design life for a reliability of e^{-7a} , given 3 years of wear-in period.

[CO4, 4 Marks]

6. Calculate the reliability of the following system-

[CO4, 4 Marks]



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Name Himanshu

Enrollment No. 21103262

Jaypee Institute of Information Technology, Noida
T2 Examination, Even Semester 2023
B. Tech. IV Semester

Course Title: Financial Accounting

Course Code: 15B1NHS435

Maximum Time: 1 Hour

Maximum Marks: 20

After pursuing this course, the students will be able to:

- CO1 Understand the basic concepts of Accounting.
- CO2 Apply accounting concepts of recording of business transactions.
- CO3 Compare and reconcile the accounting records with other sources of information.
- CO4 Evaluate the accounting records to identify and rectify the errors made during accounting process.
- CO5 Construct the final accounts and cash flow statement of a business.

Note: Answer all questions

- Q.1. On 1 January 2022, the following were the ledger balances of Ranjan & Co: (CO2, 8 marks)
Cash Rs 70,000, Bank balance Rs 15,000 and Debtor Mr. Soni Rs 30,000
Transactions during the month are given below:
5 Jan Purchased goods of list price Rs 50,000 at 10% trade discount. Paid in cash to avail 1% cash discount
7 Jan Withdrew Rs 5000 from bank for office use
8 Jan Mr. Soni paid through cheque Rs 28000
Ascertain the capital and journalize the opening balance and other transactions. Post them into ledger and prepare a Trial Balance 31 December 2022.
- Q.2 From the following particulars of Krishna & Co, prepare a Bank Reconciliation Statement, showing the balance as per Bank Statement on 31 March 2023. (CO3, 4 marks)
I. On 31 March 2023, the bank balance as per cash book was Rs 9800.
II. A cheque of Rs 5000 was deposited in the bank account but was not collected until 31 March.
III. A cheque of Rs 4200 issued by Krishna and Co. was encashed in April 2023.
IV. A customer paid Rs 7300 directly into the bank account of Krishna & Co. without intimating them.
V. Bank allowed an interest of Rs 500
- Q.3 There was a difference in Trial Balance of M/s Keshav & Brothers, a trader on 31.12.22 & the difference was carried to a suspense account. Subsequently the following errors were found: (CO4, 5 marks)
a. Rs 2296 paid for repairs to motor car were debited to motor car A/c as Rs 696.
b. Salary of Rs 1650 paid to a clerk has been debited to his personal account.
c. An amount of Rs 1840 received from Naman, a debtor in settlement of his account had been treated as a cash sale.
d. Cash discount allowed for Rs 600 has been posted to the wrong side of Discount A/c in the ledger.
Pass the rectification entries for these errors and prepare a Suspense Account
- Q.4 State with reasons whether the following are capital, revenue or deferred revenue expenditures. (CO4, 3 marks)
a. New furniture of Rs 6000 was acquired and cartage of Rs 150 paid.
b. A person was injured by the motor car of the company and Rs 10,000 was paid to him by the way of compensation.
c. Rs 2, 40,000 were spent on advertising the introduction of a new product in the market, benefit of which will be effective for 3 years.

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Name Himanshu Dixit

Enrollment No. 21103262

Jaypee Institute of Information Technology, Noida

T-2 Examination, EVEN 2023

B. Tech IV Semester

Course Title: Digital Systems

Course Code: ISB11EC213

Maximum Time: 1 Hr

Maximum Marks: 20

CO1: Familiarize with the fundamentals of number system, Boolean algebra and Boolean function minimization techniques.

CO2: Analyze and design combinational circuit using logic gates.

CO3: Analyze state diagram and design sequential logic circuits using flip flops.

CO4: Understand the classification of signals and systems and learn basic signal operations and Fourier analysis.

CO5: Understand various steps involved in digitization and transmission of signal.

Note: Attempt all questions. All questions are compulsory.

Q. 1 Convert D flip flop in to JK flip flop.

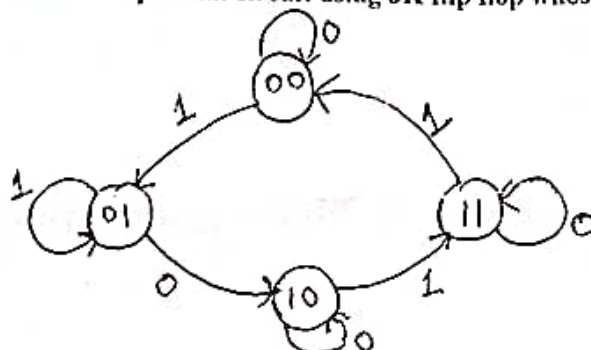
[CO3, 4]

Q. 2 Design a 2-bit magnitude comparator using 1-bit magnitude comparator.

[CO2, 4]

Q. 3 Design the clocked sequential circuit using JK flip flop whose state diagram is shown below:

[CO3, 4]



Q. 4 Design a MOD-5 counter to count the random sequence 0, 1, 3, 7, 6. Design should be circulatory to ensure that if we end in any unwanted state, the next clock pulse will reset the counter to zero.

Implement the circuit using T-flip flop.

[CO3, 4]

Q. 5 Design a 4-bit bidirectional shift register with parallel load such that its mode control is as given below. (using 4 x 1 MUX)

[CO3, 4]

Mode Control		Register Operation
S1	S0	
0	0	Parallel load
0	1	No change
1	0	Shift right
1	1	Shift left