Tribhuvan University
Institute of Science and Technology
Model Question, 2079

Bachelor Level/ Second Year/ Fourth Semester/Science **Full Marks: 60**
Information Technology (BIT251) **Pass Marks: 24**
(Web Technology I) **Time: 3 hours**

Section A

Attempt any two questions. (2 × 10 = 20)

1. Write HTML script to generate following output. [10]

   Create a table like below. Set link to www.facebook.com in the text "Null". The title of your HTML page should be "Test". The table should be in a div having id dv1.

Title	**Page**	**Price**
Test	200	140
Hello	100	300
		Null

   The above table is about the;
   a. Use of rows and *columns*
   b. Use of **rows**
   c. $\mathbf{X^y}$

2. What is the use of CSS? Describe various methods of inserting CSS in HTML. Give proper examples. [2+8]

3. Create a HTML form with fields like username, password, email, country. The username should be textbox, password and email should be the password and email fields. The country should be drop down. Now write JavaScript function for form validation.Your function should validate the username to be of length 5, password should start with digit and should be alphanumeric. The email should be valid. The country field should be selected. [10]

Section B

Attempt any eight questions. (8 × 5 = 40)

4. Describe the client server architecture and its types. [5]

5. Write HTML script to show the use of Video and Canvas elements. [5]

6. Describe the relative, float and absolute positioning with suitable examples. [5]

7. Consider a HTML page contains two divisions and one paragraph tags. The divisions have id div1 and div2 respectively. The color of text in both od divisions should be red and background color of the divisions should be green. The font style in paragraph should be Arial and the size of font should be 14. Write necessary CSS for the given scenario. [5]

8. How array is defined in JavaScript? Illustrate with example. [2+3]

9. What is cookie? Write a JavaScript code to create cookie object. [2+3]

10. What is the use of XML? Discuss the XML elements. [5]

11. What is DTD? How can you use CDATA and PCDATA in DTD? [1+4]

12. Given following XML, write its equivalent XSD. [5]

```
<university?
        <college name=”pmc”>
                <program> BIT </program>
        </college>
</university>
```

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Bachelor Level/ Second Year/ Fourth Semester/Science **Full Marks: 60**
Information Technology (BIT252) **Pass Marks: 24**
(Artificial Intelligence) **Time: 3 hours**

Section A

Attempt any two questions. (2 × 10 = 20)

1. List the PEAS description for autonomous taxi driving system. Describe the different types of environments for agent with example. [5+5]

2. Illustrate the concept of AO* search with an example. Which search will work on multiple goals environment? What are the four evaluation factors of searching algorithm? [5+1+4]

3. Why do we need recurrent neural network? How does back propagation learn to minimize the error? Explain. [2+8]

Section B

Attempt any eight questions. (8 × 5 = 40)

4. What types of ambiguities does NLP suffer with? Describe. [5]

5. How do you develop expert system? [5]

6. Describe the different operators used in genetic algorithm. [5]

7. All living things are either animal or plant. All animals who can bark are dogs. Puppy is living thing and it is not a plant. Using rules of inference show that Puppy can bark. [5]

8. Differentiate between DFS and BFS. [5]

9. Does Turing test is sufficient to test the intelligence of machine? Justify your opinion. [1+4]

10. Define agent. Describe the heuristic function of A* search? [5]

11. How do you express knowledge using semantic network? Describe with an example. [1+4]

12. What does alpha and beta refer in min max algorithm? Write the script for a shopping at department store. [5]

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Bachelor Level/ Second Year/ Fourth Semester/Science **Full Marks: 60**
Information Technology (BIT253) **Pass Marks: 24**
(Systems Analysis and Design) **Time: 3 hours**

Section A

Attempt any two questions. (2 × 10 = 20)

1. Why do we need system development life cycle (SDLC)? Explain each phase of SDLC in detail. [2+8]
2. What is feasibility study? Explain different types of feasibility tests in detail. How do you measure economic feasibility? [2+5+3]
3. Explain different components of data flow diagram (DFD) with example. Draw context diagram and data flow diagram for a retail store in a mall which sells different items to its customers. [4+6]

Section B

Attempt any eight questions. (8 × 5 = 40)

4. What is spiral development approach? Explain. [5]
5. How do you represent project schedules? Explain. [5]
6. Explain process of initiating and planning information system development project in brief. [5]
7. Explain joint application design (JAD) approach to collect information requirements for developing information system. [5]
8. Why do we need ER diagram during information system development? Explain with example. [2.5+2.5]
9. Why software testing in important? Explain any three software testing techniques. [2+3]
10. How do you format forms and reports? Explain. [5]
11. What are the benefits of object-oriented database? What is object identity? [3+2]
12. Write short notes on [2x2.5=5]
    a. Object Oriented development
    b. System maintenance

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Model Question, 2079

Bachelor Level/ Second Year/ Fourth Semester/Science **Full Marks: 60**
Information Technology (BIT254) **Pass Marks: 24**
(Network and Data Communications) **Time: 3 hours**

Section A

Attempt any two questions. (2 × 10 = 20)

1. Explain TDMA, FDMA and WDMA with necessary diagrams. Represent bit sequence 100100111 by the following waveform [6+4]

    a. NRZ-L
    b. NRZ-I
    c. Manchester
    d. Differential Manchester

2. Explain leaky-bucket algorithm. Illustrate it with an example. What are its advantages and disadvantages? [4+3+3]

3. Explain the procedure for pure ALOHA. Highlight on the vulnerable time of pure ALOHA. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the requirement to make this frame collision-free? [5+3+2]

Section B

Attempt any eight questions. (8 × 5 = 40)

4. Explain different layers of OSI. [5]

5. Differentiate between circuit switching and packet switching. What are their practical implications? [3+2]

6. Briefly explain satellite network. Consider a noiseless channel with a bandwidth of 3400 Hz transmitting a signal with two signals. Calculate the maximum bit rate. [3+2]

7. Explain about ARP operation. [5]

8. Describe user datagram format. List at least four ports used with UDP. [4+1]

9. Briefly explain recursive resolution, iterative resolution and caching. [5]

10. List one difference between open-loop and closed-loop congestion control. Explain acknowledgment policy and discarding policy. [1+4]

11. What is MAC-address? The message sequence is 11001000 and generator polynomial $G(X) = x^3 + x + 1$. Calculate the transmitted encoded frame. [2+3]

12. Write short notes on [2x2.5=5]

    a. Attenuation
    b. SNMP

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Bachelor Level/ Second Year/ Fourth Semester/Science **Full Marks: 60**
Information Technology (ORS255) **Pass Marks: 24**
(Operations Research) **Time: 3 hours**

Section A

Attempt any two questions. (2 × 10 = 20)

1. Solve the given Linear Programming Problem (LPP) by using simplex method and interpret the results. [10]

   Max. $Z = 10\ X_1 + 20X_2$
   Subject to:
   $4X_1 + 2X_2 \leq 60$
   $4X_1 + 10\ X_2 \leq 100$
   $2X_1 + 3X_2 \leq 38$
   And $X_1, X_2 \geq 0$

2. Find the optimum transportation schedule from the following data in order to minimize transportation costs by using modified distribution method. [10]

Plant	Market			Supply (units)
	X	Y	Z	
A	5	2	8	150
B	4	3	5	150
C	2	4	-	200
D	6	3	4	250
Demand (units)	250	200	175	750 / 625

3. The following activities must be completed in order to complete the project. Determine critical path and time duration of the project based slack time of the activity. [10]

Activity	A	B	C	D	E	F	G	H	I	J
Predecessor	–	–	A, B	B	A	C	E, F	D, F	G, H	I
Time (in days)	3	8	4	2	1	7	5	6	8	9

Section B

Attempt any eight questions. (8 × 5 = 40)

4. A work project consists of twelve activities labeled A through L. Upon being asked to specify the order in which the jobs had to be done, the manager answered as follows: [5]

A, B, and C are the first activities of the project and can start simultaneously and immediately; A and B precede D while B precedes E, F and H. Activities F and C precede G while E and H precede I and J. The activities C, D, F and J precede K which, in turn, precedes L. Further I, G and L are the terminal activities of the project. Draw a network diagram corresponding to the project.

5. A marketing manager has four salesmen and four sales districts. Considering the capabilities of the salesmen and nature of districts, the marketing manager estimates that sales per month in hundreds of rupees for each salesmen in each district would be as follows: [5]

Salesmen	Districts			
	A	B	C	D
P	32	38	40	28
Q	40	24	28	21
R	41	27	33	30
S	22	38	41	36

Make the use of Hungarian method to assign the salesmen in different districts in such a way that total sales would be maximized.

6. The following table gives the payoff in million in the competitive situation between Nepal Telecom Communication (NTC) and Ncell. Determine the optimal strategies for each of the company and find the game value. [5]

NTC's Strategies	Ncell's Strategies		
	No advertising	Medium advertising	High advertising
No advertising	50	40	28
Medium advertising	70	50	45
High advertising	75	52	50

7. An airlines organization has one reservation clerk on duty in its local branch at any given time. The clerk handles information regarding passenger reservations and flight timing. Assume that the number of customers arriving during any given period is Poisson distributed with an arrival rate of eight per hour and that the reservation clerk can service a customer in six minutes on an average, with an exponentially distributed service time. [5]

(a) What is the probability that the system is busy?

(b) What is the average time a customer spends in the system?

8. A newspaper boy estimates the probability of the demand for a new magazine is as follows: [5]

Demand	11	12	13	14	15
Probability	0.10	0.15	0.30	0.25	0.20

A copy of the magazine cost of Rs. 8 can be sold for Rs. 10. Based on this information, find optimal number of the newspaper that would maximize the profit by using marginal analysis approach.

9. The XYZ Company combines factors A and B to form a product which must weigh 50pounds. At least 20 pounds of A and no more than 40 pounds of B can be used. The cost of A is Rs. 25 per pound and of B is Rs. 10 per pound. Formulate LPP to find the amount of factor A and B which should be used to minimize the cost. [5]

10. What is called a game in a competitive market? State the assumptions underlying in game theory. [5]

11. What is called a queue? Describe the operating characteristics of the single channel queuing model. [5]

12. Write short notes on: [2x2.5=5]
    a. Importance of operation research on objective optimization
    b. Dominance Rule Method in game theory