BIT251-2082 ✡

Tribhuvan University
Institute of Science and Technology
2082
✡

Bachelor Level / Second Year/ Fourth Semester
Bachelors in Information Technology (BIT 251)
(Web Technology I)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions

Attempt any TWO questions. **[2 × 10 = 20]**

1. What is the use of HTML in web technology? Write HTML script to create a page. The page should contain header and footer tags with some contents. There should be a div with id="BIT_Div". The div should have an image with a hyperlink to www.tu.edu.np. The div should have a paragraph tag with class="class1". The title of the page should be "BIT Exam November". Also display the text BIT, BCA and BSC CSIT using ordered list of type roman. [2+8]

2. How can you perform form validation using JavaScript? Create a form with at least five form elements including radio button, check box and select. Write JavaScript for validating the form. Use your own assumption for the validation rules. [3+7]

3. How can you make web page designs responsive? Create a HTML page with some elements and texts. Write external CSS for styling the page. Set the font color, font style, background etc. Your CSS should also include the positioning of some elements and set it to float. Also define CSS using class and id selectors. [3+7]

Section B

Short Answer Questions.

Attempt any EIGHT questions. **[8 × 5 = 40]**

4. Differentiate Web1.0 from Web2.0. [5]

5. Write HTML script to create a page that contains a table with two rows and three columns. The table should have a caption "Sample BIT". Also show the use of rowspan and colspan properties. [5]

6. How slicing is done to convert image design into HTML? [5]

7. How can you define variables in JavaScript? Write a program for demonstrating variable definition and declaration. [5]

8. Create a XML file with simple and complex type elements. Also write equivalent XSD for the XML file. [2+3]

9. What is the use of XSLT in XML? Write XSLT for some XML document. [2+3]

10. Write a program to demonstrate jQuery. [5]

11. Explain HTTP request and response objects. [5]

12. Explain the keyboard events used in HTML. [5]

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Bachelor Level / Second Year/ Fourth Semester
Bachelors in Information Technology (BIT 252)
(Artificial Intelligence)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions

Attempt any TWO questions. **[2 × 10 = 20]**

1. How problem is formulated in state space representation? Create a state space representation with start and goal state. Configure the states with appropriate heuristics and actual cost. Show search path using Greedy Best First Search. [2+2+6]

2. How unification and lifting is done in predicate logic? Construct a knowledge base in first order predicate logic for following statements and convert them to CNF form:

   All students are smart people. All smart people are not intelligent. Someone is intelligent. Either all students are intelligent or all students are hardworking. [4+6]

3. What is learning rule? How learning is done in ANN using back propagation algorithm? [2+3+5]

Section B

Short Answer Questions.

Attempt any EIGHT questions. **[8 × 5 = 40]**

4. What is artificial intelligence? State Turing Test. [5]

5. What is intelligent agent? Construct PEAS framework a particle picking robot. [1+4]

6. How iterative deepening search is used to find goal in state space? Illustrate using example. [5]

7. State the Dempster-Shafer Theory. How is it used in statistical reasoning? [3+2]

8. Describe the mathematical model of ANN? Differentiate feed-forward ANN from feed-back ANN. [2+3]

9. How learning by genetic algorithm is performed? [5]

10. How expert system works? Explain the architecture of expert system. [2+3]

11. Discuss the discourse and pragmatic analytics in natural language processing. [5]

12. How knowledge is represented using scripts? Support your answer with example. [5]

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Bachelor Level / Second Year/ Fourth Semester
Bachelors in Information Technology (BIT 253)
(Systems Analysis and Design)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions
Attempt any TWO questions. **[2 × 10 = 20]**

1. Describe the activities performed during planning, analysis, and design. List different participants involved in JAD. Explain how JAD session is carried out. [4+1+5]

2. Draw DFD up to level 1for the following scenario:

   An online college recommendation system provides recommendation based on the student's requirements. It takes input such as faculty name, standard, and location. It also tracks the intake of each college. The system also provides notification to students regarding the remaining available seats and fee structures. The admin of the system is able to add, delete, and update the list of colleges based on the ratings of the existing students: [10]

3. Explain three steps that are carried out in the process of designing dialogues. Illustrate dialogue design issues in a graphical environment. [7+3]

Section B

Short Answer Questions.
Attempt any EIGHT questions. **[8 × 5 = 40]**

4. Explain different types of maintenance. [5]
5. Define normalization. Explain first and second form of normalization. [1+4]
6. Explain any three types of information gathering techniques. [5]
7. Why corporate strategic planning is required? Explain generic competitive strategies that need to be followed to achieve its objectives and missions. [1+4]
8. Explain any two feasibility studies that are carried out before developing the product with an example. [5]
9. How the project plans can be represented and scheduled? Explain? [5]
10. What are the principles of agile development? What are its advantages? [3+2]
11. Explain different phases of OOAD-based development. [5]
12. Write short notes on [2x2.5=5]
    a. Single-location installation b) Decision Tree

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Bachelor Level / Second Year/ Fourth Semester
Bachelors in Information Technology (BIT 254)
(Network and Data Communications)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions
Attempt any TWO questions. **[2 × 10 = 20]**

1. What are the services provided by Data Link Layer? A channel has a bandwidth of 5 MHz and a signal-to-noise ratio of 1000. Calculate the Shannon Capacity. [6+4]

2. Differentiate between packet and circuit switched network. Explain the layers of OSI Reference Model in brief. [4+6]

3. Why TCP is known as reliable protocol? Explain. Divide the network 192.168.1.0/24 into 8 subnets and find its subnet ID, subnet mask, broadcast address and network ranges of each. [2+8]

Section B

Short Answer Questions.
Attempt any EIGHT questions. **[8 × 5 = 40]**

4. Write down the major difference between IPv4 and IPV6 protocol. [5]

5. Explain Link State Routing with suitable example. [5]

6. What is DHCP? Explain DNS name resolution process with suitable example. [1+4]

7. Discuss different unguided transmission medium in brief. [5]

8. Encode the bit stream 11100101 1 with: i) Manchester ii) NRZ-I and iii) NRZ-L scheme. [5]

9. A bit stream 11011001 is transmitted using a standard CRC method. The generator polynomial is x^3+x+1. Show the actual bit string transmitted and show the error checking on the receiver side. [5]

10. What are the major differences between noise, distortion and attenuation? [5]

11. Briefly explain ALOHA and Slotted ALOHA protocol with suitable diagram. [5]

12. Write Short notes on: [2x2.5=5]
    a. Sliding Window Protocol
    b. HTTP Protocol

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Bachelor Level / Second Year/ Fourth Semester
Bachelors in Information Technology (BIT 255)
(Operations Research)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Long Answer Questions

Attempt any TWO questions. **[2 × 10 = 20]**

1. A small cafe sells freshly made **vegetable sandwiches** each day. Unsold sandwiches cannot be stored overnight and thus become **worthless at the end of the day.** Following is the distribution of the **daily demand** for sandwiches observed over **100 days:**

No. of sandwiches demanded	220	230	240	250	260
No. of days	5	20	30	35	10

(a) Find the optimal quantity that will maximize the expected profit.
(b) Find the expected profit with perfect information (EPPI).
(c) Find the expected value of perfect information (EVPL).

C.P = 20 per sandwich
S.P = 25 per sandwich

2. A software company is working on two new IT projects - Project A (Mobile App) and Project B (Web Portal). Each project generates profit contributions of Rs. 20,000 per unit for Project A and Rs. 30,000 per unit for Project B. Both projects require resources from three specialized departments: Design (D1), Programming (D2), and Testing (D3). Project A requires 3 hours of design department, 5 hours of programming department and 2 hours of testing department while Project B requires 3 hours of design department, 2 hours of programming department and 6 hours of testing department. The available time in hours per week are 36, 50 and 60 for the department of design, programming and testing respectively. Formulate this problem as L.P.P. How should the company schedule his production in order to maximize contribution? Use simplex method.

3. The table below represent the profit of a company earned from different plants to different market. Develop a transportation schedule that maximizes the profit of the company.

Plants	Market			Supply (units)
	M1	M2	M3	
P1	22	25	24	170
P2	15	20	18	130
P3	30	21	20	100
Demand (units)	200	130	120	400 / 450

Section B

Short Answer Questions.

Attempt any EIGHT questions. **[8 × 5 = 40]**

4. A publication employs typist on hourly basis. There are five typists for service and their charges are different. According to earlier understanding, only one job is given to one typist. Find the least cost allocation for the following data:

Typists	Jobs				
	P	Q	R	S	T
A	85	75	65	125	75
B	90	78	66	132	78
C	75	66	57	114	69
D	80	72	60	120	72
E	76	64	56	112	68

5. In a certain bank, customers arrive in a Poisson fashion with an average time of 20 minutes between arrivals of the customers. The service time of the bank cashier follows the exponential distribution with mean time 15 minutes. Under the assumptions of single channel queuing model, find
   (a) The average time spent by a customer in the queue.
   (b) The probability that there are 3 customers in the bank.

6. Considering this information, answers the question given below.

Player A's strategy	Player B's strategy				
	B_1	B_2	B_3	B_4	B_5
A_1	20	20	20	120	80
A_2	80	-20	-40	60	60
A_3	-60	-40	20	20	140
A_4	120	80	-60	60	140

   (a) What would be the optimal strategy for each player?
   (b) What is value of the game?

7. The table given below gives the information about the activities, their predecessors and time duration required to complete the activities of the project.

Activity	A	B	C	D	E	F	G
Predecessor	–	–	B	B	B	E	A, D, C
Time in days	18	8	14	14	16	10	20

Find the shortest time duration of the project within which the project can be completed.

8. The TechZone Software Company combines two key resources - Front-End Developers (A) and Back-End Developers (B) - to complete a software system that must involve exactly 150 person-hours of total work. Each Front-End Developer hour costs Rs. 2,000, and each Back-End Developer hour costs Rs. 8,000. The company must use at least 14 hours of Back-End work and no more than 20 hours of Front-End work in a project. Formulate objective function and constraints of this LPP.

9. Describe modified distribution (MODI) method of obtaining the optimal solution of transportation problem.

10. Describe different operation characteristics of single channel queueing model.

11. Describe the dominance rule of solving game theory problem.

12. Write short notes on:
   (a) Vogel's Approximation Method (VAM)
   (b) Objectives of operations research.