Date 17\10\2024

(Time: 1 hours)

Total Marks: 30

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **non-programmable** calculators is **allowed**.

1. **Attempt *any three* of the following:** .   15
   a. Explain Two-dimensional array with example.
   b. Write a program to calculate factorial of a number.
   c. Explain history of C.
   d. Explain logical operators with example.
   e. Explain int, float, char data types C programming.

2. **Attempt *any three* of the following:**   15
   a. What is Union in C, and how is it declared? Provide a syntax example.
   b. Write a program to swap two numbers using pointers.
   c. Write a short note on random access file.
   d. Explain any five file handling functions in C.
   e. What is a pointer in C programming? How do you declare and initialize a pointer?

Date 18/10/2024

N. B.: (1) **All** questions are **compulsory**.
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       (3) Answers to the **same question** must be **written together**.
       (4) Numbers to the **right** indicate **marks**.
       (5) Draw **neat labeled diagrams** wherever **necessary**.

3.   **Attempt _any three_ of the following:**   15
f.   Explain the characteristics of Database Management System.
g.   Write a note on Relational Data Model.
h.   Discuss the responsibilities and skills required for Database Administrator.
i.   Explain First Normal Form with example.
j.   Discuss Strong Entity and Weak Entity with example.

4.   **Attempt _any three_ of the following:**   15
f.   Explain the classification of SQL commands.
g.   Explain column alias, distinct clause and sorting in SQL with syntax and example.
h.   Discuss Inner Equi and Non-Equi join with syntax and example.
i.   What is a view? Explain Horizontal View, Vertical view and read only view with example.
j.   Write appropriate query for the table Product (pid, pname, category, price)
     i. Insert a record into the above schema.
     ii. Display all records from Product table.
     iii. Change the price of product named Laptop to 57000.
     iv. Rename the pname column to product_name.
     v. Remove all records from the Product table but keep the table structure intact.

Date 22/10/2024

(Time: 30 min)

Total Marks: 15

N. B.:   (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1.   **Attempt *any three* of the following:**   15

a.   What is a Binary Coded Decimal? Explain with suitable example. Discuss advantages and disadvantages.

b.   Solve the following:
   iv) $(4\ 7\ 2)_{10} = (x)_{BCD}$
   v) $(1\ 1\ 0\ 1\ 0) = (x)_{Gray\text{-}Code}$
   vi) $(6\ 8\ 3)_{10} = (x)_{XS\text{-}3}$

c.   What is a Gray Code? How to convert 4-bit binary into 4-bit gray code? Design a circuit for the same.

d.   Design a logic circuit whose output is HIGH when binary input is an even number. Assume that input to the circuit is 4-bit binary ABCD.

e.   Write a short note on weighted and non-weighted codes.

Date 24/10/2024

(Time:1 hour)   Total Marks: 30

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.

1.   **Attempt _any three_ of the following:**   15
a.   Elaborate the importance of oral communication.
b.   What are the advantages and disadvantages of horizontal communication?
c.   Explain the preparation required for job interview as a candidate?
d.   Explain the importance of space and time in nonverbal communication.
e.   What one should avoid in group discussion?

2.   **Attempt _any three_ of the following:**   15
a.   Write the important features of organizational charts.
b.   Explain cubical etiquettes.
c.   What are the skills required for elocution?
d.   Explain language barriers and ways to overcome these barriers.
e.   What are the steps involved in preparing a presentation?

Date 23/10/2024

(Time: 1 hour)

Total Marks: 30

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1.   **Attempt *any three* of the following:**   15
a.   What is Green Computing? What steps can be taken to reduce carbon emission?
b.   List and explain the various toxins present in computer systems.
c.   What is carbon footprint? Briefly explain how to compute company's carbon footprint?
d.   Write a short note on RoHS.
e.   What are the steps taken to green the data centres?

2.   **Attempt *any three* of the following:**   15
a.   Explain any two low-cost devices for checking power on workstations.
b.   Explain how to involve the utility company to reduce power costs?
c.   How you can minimize excessive power output from wireless devices?
d.   List the tips to keep water usage under control. Also list the issues to prevent wasted water.
e.   Briefly explain steps in setting up a telecommuting program.

Date 25|10|2024

Instructions:

1. Q.1 is Compulsory.
2. Attempt any 2 from Q. 2 to Q.4.
3. Figures to the right-hand side indicate full marks.

1. **Answer the following**   10

   Read the passage and answer the following questions given below:-

   PASSAGE :

   Water resource management in ancient India was an essential and sophisticated practice that significantly influenced agriculture, settlement, and daily life. Recognizing the importance of water, communities constructed reservoirs, tanks, and stepwells to effectively capture and store rainwater, particularly in regions reliant on seasonal monsoons. Iconic stepwells, such as the Rani ki Vav in Gujarat, not only provided water but also served as social and cultural hubs.

   Large-scale irrigation systems, including canals and embankments, were developed to divert river water to fields, greatly enhancing agricultural productivity and supporting growing populations. Local governance was crucial, with communities collectively managing water resources, fostering a sense of responsibility and sustainable practices. Texts like the Arthashastra highlighted the importance of equitable water distribution and conservation techniques.

   Cultural reverence for rivers, particularly the Ganges and Yamuna, influenced water management practices, integrating spiritual beliefs with environmental stewardship. Rituals emphasized purity and respect for water sources, further motivating conservation efforts. Additionally, ancient techniques such as bunds and check dams were implemented to prevent erosion and promote groundwater recharge. This holistic approach to water management not only addressed immediate needs but also laid the foundation for sustainable practices that resonate in contemporary water management strategies.

   QUESTIONS:

   1. What structures did ancient Indian communities build for water management?
   2. Name any two of the irrigation systems in ancient India.
   3. What role did local governance play in water resource management? Which Ancient text described about the importance of equitable water distribution and conservation techniques.
   4. How did cultural beliefs influence water management practices?
   5. What techniques were used to promote groundwater recharge in ancient India?

2. **Answer the following:**
   a. Explain any five types of town planning as per Mansara Shilpa Shastra classification?   5
   b. Explain the significance of Antecedents of Modern Tourism in India?   5

3. **Answer the following:**
   a. Elaborate the history of town planning in India.   5
   b. How did the early trade routes of the world influence the spread of tourism in Ancient India?   5

4. **Answer the following:**
   a. Ancient cities like Harappa and Mohenjo-Daro.   5
   b. Importance of wood carvings in Ancient India.   5

F.Y.B.Sc.(I.T.) – Semester I
Principles of Digital Electronics

(Time: 1 hour)

Total Marks: 30

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(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculators is **allowed**.

1.   **Attempt *any three* of the following:**   15
a.   What is a Base or Radix of a number system? Discuss various number systems.
b.   What is a Ex-OR gate? Draw logic symbol and truth table for the same. Construct EX-OR using Basic gates.
c.   Solve the following:
    i) $(479.25)_{10} = (X)_{16}$
    ii) $(1\ 1\ 0\ 0\ 1\ 0\ 1\ 1)_2 = (X)_{10}$
    iii) $(B\ D\ 7.\ A\ E\ )_{16} = (X)_2$

d.   Simplify the following logical equations using Boolean Algebra:
    i) $F = XY + \bar{X}.\bar{Y}.Z + \overline{XY}.Z$
    ii) $F = W\bar{X}(W + Y) + WY(\bar{W} + \bar{X})$

e.   Solve the following:
    i) $(1\ 0\ 1\ 1\ 1)_2 + (1\ 0\ 1\ 1)_2$
    ii) $(1\ 1\ 0\ 1)_2 - (0\ 1\ 1\ 0)_2$
    iii) $(1\ 0\ 1\ 1)_2 \times (1\ 0\ 1)_2$

2.   **Attempt *any three* of the following:**   15
a.   What is Sum of Product (SOP) and Product of Sum equations? With suitable examples, explain the concept of minterm and maxterm.
b.   What is a half adder? Design a half adder using k-map and also draw logic circuit for the same.
c.   Simplify the following using K-map:
    i) $Y = f(A, B,C,D) = \sum m (1,3,4,5,7,9,11,13,15)$
    ii) $Y = f(A, B,C) = \prod M (2,3,4,5,6,7)$
d.   Define a flip flop? Explain in detail SR flip flop.
e.   What is a De-Multiplexer? With neat and labelled diagram explain 1:4 De-Multiplexer circuit.

(Time: 1 hour)

Total Marks: 30

N. B.: (1) **All** questions are **compulsory**.
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   (3) Answers to the **same question** must be **written together**.
   (4) Numbers to the **right** indicate **marks**.
   (5) Draw **neat labeled diagrams** wherever **necessary**.
   (6) Use of **Non-programmable** calculators is **allowed**.

1 Attempt _any three_ of the following: 15

a Find the truncation error in the series of exponential function given as

$$e^{-x} = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + - - - - - \frac{x^n}{n!}$$ for the computation of first 5 terms in the
expansion at $x = 2.8$

b Let $u = \frac{4}{3}x^3y^2z^4$. Find relative error of given function at $x = 1.1, y = 1.2, z = 1.3$
   & $\Delta x = 0.001, \Delta y = 0.015, \Delta z = 0.002$.

c Find approximate root of non-linear equation $x^3 + x - 1 = 0$ using bisection method up to 4
   stages.

d Find the real root of non-linear equation $3x - cosx - 1 = 0$ using secant method.

e Solve the following system of linear equations by Gauss-Seidel method
   $20x + y + z = 22$, $x + 14y + 2z = 17$, $x + 3y + 16z = 20$

2 Attempt _any three_ of the following: 15

a Fit second degree curve of the form $y = a + bx + cx^2$ passing through given set of values & hence
   find y at $x = 2.8$

x	1	2	3	4	5
y	6	16	32	54	82

b Find $\frac{dy}{dx}$ at $x = 0.2$ from the given set of values of (x, y)

x	0.2	0.3	0.4	0.5	0.6
y	1.2214	1.3499	1.4918	1.6487	1.8221

c Apply appropriate interpolation formula to estimate y at $x = 14$

x	10	12	15	20
y	2.3026	2.4849	2.7081	2.9957

d Fit an equation of straight line of the form $x = a + by$ passing through given set of values &
   hence find x at $y = 3.8$

x	44	30	42	26	22	34
y	3	10	4	12	14	8

e Evaluate: $\int_1^9 \frac{dx}{3x+5}$ dividing the interval into 8 equal parts by using appropriate rule.