Hall Ticket Number:

LIB

CB111(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

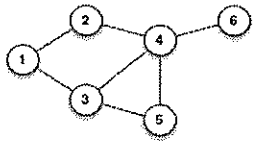
Semester I [First Year] (Supplementary)

DISCRETE MATHEMATICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Define a set.	CO2
(b)	State Pigeonhole principle.	CO1
(c)	Define a function.	CO2
(d)	Find the number of ways of placing 5 distinct balls in 3 distinct bins.	CO1
(e)	Define a group.	CO2
(f)	State Principle of duality	CO2
(g)	Construct the input/output table for $f(x_1, x_2) = (x_1 . \bar{x}_2) + x_1$	CO1
(h)	Define conjunctive normal form.	CO2
(i)	"Conjunction of two tautologies is also a tautology" Test whether it is true or false	CO1
(j)	Define satisfiability.	CO2
(k)	What is the converse statement of $(P \vee R) \rightarrow (Q \wedge R)$	CO3
(l)	Find the $\delta(G)$ for the graph 	CO1
(m)	Define Plannar graph.	CO2
(n)	State Four-color theorem.	CO1

UNIT – I

2. (a) A group of 8 scientists is composed of 5 psychologists and 3 sociologists. In how many ways can a committee of 5 be formed that has 3 psychologists and 2 sociologists. (7M) CO1

   (b) Prove by induction,

$$P(n):\ 1^3+2^3+3^3+\ldots+n^3=\frac{n^2(n+1)^2}{4}$$

(7M) CO1

(OR)

3. (a) Find the coefficient of X^{14} in $(1+X+X^2+X^3)^{10}$ (7M) CO1

   (b) Solve the recurrence relation $a_n-2a_{n-1}+a_{n-2}=4,\ n\geq 2.$ (7M) CO1

UNIT – II

4. (a) Let $G=\{x: x\in R-\{-1\}\}$ and "*" defined as $a*b=a+b+ab\ \forall a,b\in G$ then show that $\langle G,*\rangle$ is a Group. (7M) CO1

   (b) State and prove Lagrange's theorem. (7M) CO2

(OR)

5. (a) Express F=$xy+x'z$ as a product of maxterms. (7M) CO2

   (b) Show that a Boolean algebra is associative under the operations of addition and multiplication. (7M) CO2

UNIT – III

6. (a) Show that $[p\wedge(p\rightarrow q)]\rightarrow q$ is a Tautology. (7M) CO2

   (b) Obtain the PCNF of $p\rightarrow[(p\rightarrow q)\wedge\neg(\neg q\vee\neg p)]$ (7M) CO3

(OR)

7. (a) Show that $S\vee R$ logically follows from $P\vee Q$, $P\rightarrow R$, $Q\rightarrow S$ (7M) CO2

   (b) Show that the following premises are inconsistent $P\rightarrow Q$, $P\rightarrow R$, $Q\rightarrow\neg R$, P (7M) CO2

UNIT – IV

8. (a) In a graph G show that every u-v path contains a simple u-v path. (7M) CO2

   (b) Show that in any graph, the number of vertices of odd degree is even. (7M) CO2

(OR)

9. (a) Show that a simple non-directed graph G is a tree iff G is connected and contains no cycles. (7M) CO2

   (b) State and prove Euler's formula. (7M) CO1

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9. (a) Evaluate $\int_{1}^{e}\int_{1}^{\log y}\int_{1}^{e^x} \log z \, dz dx dy$ (7M) CO4

(b) Find the volume of the sphere using triple integrals. (7M) CO4

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Hall Ticket Number:

CB112(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester I [First Year] (Supplementary)

INTRODUCTORY TOPICS IN STATISTICS, PROBABILITY AND CALCULUS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define Sample. CO1
   (b) Define secondary data. CO1
   (c) Define marginal frequency distribution. CO1
   (d) Define conditional probability. CO2
   (e) State Bayes theorem. CO2
   (f) Define continuous random variables. CO3
   (g) What is probability distribution function in discrete random variable? CO3
   (h) What is mean and standard deviation of Poisson distribution? CO3
   (i) What is binomial distribution? CO3
   (j) What is t-distribution? CO3
   (k) What is the volume formula using double integral/ CO4
   (l) Evaluate $\int_{-1}^{1}\int_{-1}^{1} xy dx dy$ CO4
   (m) Evaluate $\int_{0}^{\frac{\pi}{2}}\int_{0}^{1} r\sin\theta dr d\theta$ CO4
   (n) What is the formula for volume generated by the revolution about y-axis? CO4

UNIT – I

2. (a) Explain about central tendency and dispersion. (7M) CO1
   (b) Find the Standard deviation of the following data: (7M) CO1

Class interval	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	35	15	86	57	8	12

(OR)

3. (a) Explain various methods of collecting data. (7M) CO1
   (b) The following data give the number of boys of a particular age in a class of 40 students. Calculate the mean age of students. (7M) CO1

Age	15	16	17	18	19	20
Frequency	3	8	9	11	6	3

UNIT – II

4. (a) A bag contains 3 red, 6 white and 7 blue balls. What is the probability that two balls drawn are white or blue? (7M) CO2
   (b) Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is even if
   (i) the two cards are drawn together
   (ii) the two cards are drawn one after the other with replacement (7M) CO2

(OR)

5. (a) The probabilities that students A, B, C, D solve a problem are 1/3, 2/5, 1/5 and 1/4 respectively. If all of them try to solve the problem, what is the probability that the problem is solved? (7M) CO2
   (b) There are two boxes in box I, 11 cards are the numbered 1 to 11 and in box II, 5 cards numbered 1 to 5. A box is chosen and a card is drawn. If the card shows an even number then another card is drawn from the same box. If card shows an odd number another card is drawn from the other box. Find the probability that (i) both are even (ii) both are odd (7M) CO2

UNIT – III

6. (a) If the probability density function of a random variable X is $f(x)=\begin{cases}0 & for\ x\le 0\\ kxe^{-4x^2} & for\ x>0\end{cases}$. Find k. (7M) CO3
   (b) If 60% of bulbs manufactured by a company are defective, what is the probability that among 40 bulbs manufactured by the company at most 12 bulbs are defective? (7M) CO3

(OR)

7. (a) Fit a binomial distribution to the following frequency distribution:

x	0	1	2	3	4	5	6
f	13	25	52	58	32	16	4

(7M) CO3
   (b) If a random variable X has the moment generating function is given by $M(t)=\frac{2}{2-t}$, find the variance of X. (7M) CO3

UNIT – IV

8. (a) Evaluate $\iint_R xydxdy$ where R is the region bounded by $x=0, y=0, x+y=1$ (7M) CO4
   (b) Find the area of a circle using double integral. (7M) CO4

(OR)

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Hall Ticket Number:

CB114(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester I [First Year] (Supplementary)

FUNDAMENTALS OF COMPUTER SCIENCE

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Mention the benefits of Flowchart.	CO1
(b)	What is ANSI C?	CO1
(c)	Write about Little Endian and Big Endian.	CO1
(d)	List any 3 Bitwise Operators.	CO1
(e)	What is preprocessor?	CO2
(f)	List 3 standard library functions.	CO2
(g)	Define static variable.	CO2
(h)	Write about command line arguments.	CO3
(i)	Define bit-fields.	CO3
(j)	What is Address Arithmetic?	CO3
(k)	What is standard I/O?	CO4
(l)	Define error.h.	CO4
(m)	How to use unlink?	CO4
(n)	Is user defined header possible in C? Justify.	CO4

UNIT – I

2. (a) Draw the Flowchart to find the Fibonacci series upto the given number N. (7M) CO1
   (b) Define Data Type. Explain the Primitive Data Types with their range. (7M) CO1

(OR)

3. (a) Is operator precedence is really important? Justify the answer with an example. (7M) CO1
   (b) Discuss about Naming a Variable and Hungarian Notation. (7M) CO1

UNIT – II

4. (a) Write a C program to demonstrate 'goto' statement and explain how it works? (7M) CO2
   (b) Describe about structured and unstructured programming. (7M) CO2

(OR)

5. (a) Write a C program to implement the do...while statement and explain. (7M) CO2
   (b) Define Recursion. Write a C program to find the GCD using recursion. (7M) CO2

UNIT – III

6. (a) Write a C program to demonstrate the Pointer Arrays. (7M) CO3
   (b) Discuss about Pointers and Functions. (7M) CO3

(OR)

7. (a) Write a C program to implement Array of structures. (7M) CO3
   (b) Compare Structure Vs. Union with an example. (7M) CO3

UNIT – IV

8. (a) Write a C program to demonstrate fscanf( ) and fprintf( ) functions. (7M) CO4
   (b) Discuss in detail about Formatted Input and Formatted Output. (7M) CO4

(OR)

9. (a) Write a C program to implement stdin( ) and stdout( ) functions. (7M) CO4
   (b) Explain about Debugging and Macros. (7M) CO4

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(OR)

7. (a) Derive E.M.F. equation of a transformer. (7M) CO3
   (b) A single phase 50 Hz transformer has 80 turns on the primary winding and 400 turns on the secondary winding. The net cross sectional area of the core is 200 cm^2. If the primary winding is connected to a 240 V, 50 Hz supply, determine e.m.f. induced in the secondary winding. (7M) CO3

UNIT – IV

8. (a) What is the function of transducer? Explain the working of piezoelectric transducer? (7M) CO4
   (b) What are the basic requirements for electrical measuring instruments? Explain. (7M) CO4

(OR)

9. (a) Draw and explain the basic layout of distribution system in detail. (7M) CO3
   (b) Comparison of different battery types for electric vehicles applications. (7M) CO3

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Hall Ticket Number:

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CB115(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

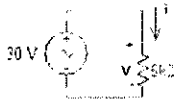
Semester I [First Year] (Supplementary)

PRINCIPLES OF ELECTRICAL ENGINEERING

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) In the given circuit, calculate current I, the conductance G and the power P?



CO1

   (b) State two salient points of a series combination of resistance. CO1
   (c) State Ohm's law. CO1
   (d) Obtain the star connected equivalent for the given delta circuit.

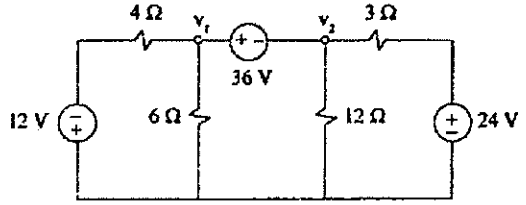
CO1

   (e) What are the limitations of superposition theorem? CO2
   (f) What is the response of R-L series circuit? CO2
   (g) Define power and draw the power triangle. CO1
   (h) Mention the Properties of a parallel RLC circuit. CO1
   (i) State Ampere's Law. CO3
   (j) Why transformer rated in VA? CO3
   (k) What is meant by electrostatic field? CO3
   (l) What is the purpose of the measurement? CO4
   (m) Classify Standards of measurements. CO4
   (n) What is the need for electrical earthling? CO4

UNIT – I

2. (a) Explain the concepts of dependent and independent sources in detail. (7M) CO1

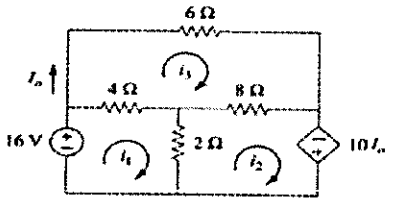
   (b) Determine the Voltages V_1 and V_2 in the circuit shown below. (7M) CO1



(OR)

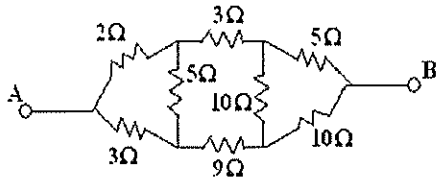
3. (a) State and explain Kirchhoff's laws with example. (7M) CO1

   (b) Using mesh analysis, find the loop currents in the figure shown below. (7M) CO1

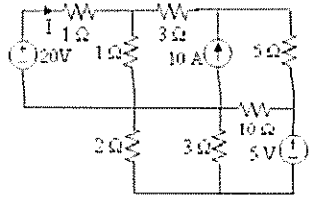


UNIT – II

4. (a) Find the voltage to be applied across AB in order to drive a current of 5A into circuit by using star-delta transformation. Refer below figure. (7M) CO2

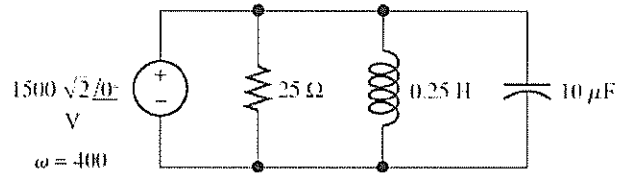


   (b) Determine the current I in the circuit shown below using Superposition theorem. (7M) CO2



(OR)

5. (a) Find the Power, Reactive Power, and Apparent Power delivered by the source in Figure shown below. Find the Power Factor seen by the source and state whether it is leading or lagging. (7M) CO2



   (b) A balanced three phase delta connected load of (5+j10) Ω per phase is connected to a three phase 440V, 50 Hz supply. Find the phase and line currents, total active and reactive power. (7M) CO2

UNIT – III

6. (a) Two coils connected in series have an equivalent inductance of 0.8 H when connected in aiding, and an equivalent inductance of 0.5 H when the connection is opposing. Calculate the mutual inductance of the coils and coupling coefficient. (7M) CO3

   (b) A parallel plate capacitor has plates of area $4m^2$ separated by a distance of 0.5 mm. The capacitor is connected across a cell of emf 100 volts. Find the capacitance, charge & energy stored in the capacitor if a dielectric slab of dielectric constant k = 3 and thickness 0.5 mm is inserted inside this capacitor after it has been disconnected from the cell. (7M) CO3