

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) What is self-exploitation? Explain with examples.	7	1	K2
	b) Describe the ethical behaviour in the work place.	7	1	K2
(OR)				
2.	a) Briefly explain the work ethics and prosperity morals.	7	1	K2
	b) What is value education and explain briefly.	7	1	K2
<u>UNIT-II</u>				
3.	a) Explain the different activities between the 'I' and the 'Body'. Give one example of an activity of the 'I'.	7	2	K2
	b) Explain the three main activities of the Self ('I') – Desire, Thought, and Expectation.	7	2	K2
(OR)				
4.	a) How can we ensure harmony in self “I” with example.	7	2	K2
	b) Elaborate distinction between the Sentient 'I' and the Material 'Body' in the context of Human Co-existence.	7	2	K2
<u>UNIT-III</u>				
5.	a) Discuss the human relationship and understanding harmony in the family.	7	3	K2
	b) Why Trust is the foundational value? differentiate between Intention and Competence.	7	3	K2
(OR)				
6.	a) “The Family is the basic unit of human interaction, providing the natural environment for the expression and fulfilment of relationship values”. Justify the statement.	7	3	K3
	b) Explain the difference between the respect and differentiation. Explain the other salient values in relationship.	7	3	K2
<u>UNIT-IV</u>				
7.	a) Explain the concept of Interconnectedness and Mutual Fulfilment among the four orders of nature (Material, Plant, Animal, Human).	7	4	K2
	b) Explain why realizing coexistence is the foundation for harmony at all the levels.	7	4	K2
(OR)				
8.	a) Discuss the meaning of harmony at the level of Nature/Existence.	7	4	K2
	b) Define the principle of Self-Regulation in Nature? Explain how this principle is concretely expressed through the two key mechanisms of Recyclability and Growth.	7	4	K3
<u>UNIT-V</u>				
9.	a) What do you understand by a Humanistic Constitution?	7	5	K2
	b) Define Humanistic Universal Order? Explain how this order is an organic extension of the family.	7	5	K2
(OR)				
10.	a) Define Ethical Human Conduct? Explain its necessity for human-human harmony.	7	5	K2
	b) Discuss how the form of education, rooted in the holistic understanding of harmony, directly contributes to the development of Ethical Human Conduct.	7	5	K2

Time: 3 Hours

Max Marks: 70

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UNIT-I

Marks CO BTL

1. a) A single card is drawn from a 52 card dacy. 7 1 1
- (i) What is the probability that the card is a jack?
- (ii) What is the probability that the card will be a 5 or smaller?
- (iii) What is the probability that the card is a red 10?
- b) A box contains 9 tickets numbered 1 to 9 inclusive. If 3 tickets are drawn from the box one at a time, what is the probability that they are alternatively either odd, even, odd or even, odd, even. 7 1 1

(OR)

2. a) A, B, C hit a target with probabilities $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}$ respectively. 7 1 1
- If all of them fire at the target, what is the probability P that (i) none of them hits the target (ii) at least one of them hits the target.
- b) Box I contains 1 white, 2 red, 3 green balls, Box II contains 2 white, 3 red, 1 green balls, Box III contains 3 white, 1 red, 2 green balls. Two balls are drawn from a box chosen at random. These are found to be one white and one red. Find the probability that the balls so drawn came from box II. 7 1 1

UNIT-II

3. If X is a discrete random variable with probability mass function given in table. 14 2 2

X	-2	-1	0	1	2
P(X)	1/5	2/5	1/10	1/10	1/5

Obtain (i) mean $E[X]$ (ii) mean square $E[X^2]$ (iii) variance of X (iv) $E[(2X+1)^2]$

(OR)

4. a) A Gaussian random variable X has $\mu_x = 2$, and $\sigma_x = 2$ 7 2 2
- then (i) Compute $P\{X \geq 1.0\}$ (ii) Compute $P\{X \leq -1.0\}$
- b) The natural number are the possible values of a random variable X ; that is, $x_n = n, n = 1, 2, 3, \dots$. These numbers occur with probabilities $P(x_n) = \left(\frac{1}{2}\right)^n$. Compute the expected value of X . 7 2 2

UNIT-III

5. Two events A and B defined on a sample space S are related to a joint sample space through random variables X and Y and are defined by $A = \{X \leq x\}$ and $B = \{y_1 < Y \leq y_2\}$. Make a sketch of the two sample spaces showing areas corresponding to both events and the event $A \cap B = \{X \leq x, y_1 < Y \leq y_2\}$. 14 3 2

(OR)

6. Given the function $f(x) = \begin{cases} \frac{(x^2+y^2)}{8\pi}, & x^2 + y^2 < b \\ 0, & elsewhere \end{cases}$ then Compute a constant b so that this is a valid joint density function. 14 3 2

UNIT-IV

7. A random process is defined by $Y(t) = X(t) \cos(\omega_0 t + \theta)$, where $X(t)$ is a wide sense stationary random process that amplitude-modulates a carrier of constant angular frequency ω_0 with a random phase θ independent of $X(t)$ and uniformly distributed on $(-\pi, \pi)$. Then (a) construct $E[Y(t)]$. (b) construct the autocorrelation function of $Y(t)$. 14 4 3

(OR)

8. Given two random processes $X(t)$ and $Y(t)$. Build expressions for the autocorrelation function of $W(t) = X(t) + Y(t)$ if (a) $X(t)$ and $Y(t)$ are correlated. (b) They are uncorrelated. 14 4 3

UNIT-V

9. Obtain the autocorrelation and average power of the WSS random process $X(t)$ has psd 14 5 4

$$S_{xx}(\omega) = \frac{\omega^2}{(\omega^4 + 13\omega^2 + 36)}$$

(OR)

10. Determine which of the following functions can and cannot be valid power density spectrums. For those that are not, explain why? 14 5 4

(a) $\frac{\cos(2\omega)}{1+\omega^2}$ (b) $\frac{1}{(1+\omega^2)^2}$
(c) $\frac{|\omega|}{1+2\omega+\omega^2}$ (d) $\frac{1}{\sqrt{1-3\omega^2}}$

2 of 2

NUMERICAL METHODS

(Common to CIVIL & MECH Branches)

Time: 3 Hours

Max Marks: 70

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UNIT-I

- | | | Marks | CO | BTL |
|----|---|-------|----|-----|
| 1. | a) Make use of bisection method to get a root of $x^3 - x - 11 = 0$ which lies between 2 and 3. | 7 | 1 | 3 |

- | | | | |
|---|---|---|---|
| b) Find a real root of the equation $x^3 = 6x - 4$ using Newton-Raphson Method. | 7 | 1 | 3 |
|---|---|---|---|

(OR)

- | | | | | |
|----|---|---|---|---|
| 2. | a) Make use of the method of false position to get the fourth root of 32 correct to three decimal places. | 7 | 1 | 3 |
| | b) Make use of Newton's iteration method to get the real root of $x \log_{10} x = 1.2$ correct to three decimal places. | 7 | 1 | 3 |

UNIT-II

- | | | | | |
|----|--|---|---|---|
| 3. | a) Determine Newton's forward interpolation polynomial for the following data: | 7 | 2 | 5 |
|----|--|---|---|---|

x:	4	6	8	10
y:	1	3	8	16

Hence evaluate y for $x = 5$.

- | | | | |
|---|---|---|---|
| b) Estimate the value of $f(42)$ from the following data using Newton's backward formula. | 7 | 2 | 5 |
|---|---|---|---|

x:	20	25	30	35	40	45
f(x):	354	332	291	260	231	204

(OR)

- | | | | | |
|----|--|----|---|---|
| 4. | Using Lagrange's interpolation formula, Find $y(10)$ from the following table: | 14 | 2 | 5 |
|----|--|----|---|---|

x	5	6	9	11
y	12	13	14	16

UNIT-III

- | | | | | |
|----|--|----|---|---|
| 5. | Construct $y'(0)$ and $y''(0)$ from the following table using Newton's forward interpolation formula | 14 | 3 | 3 |
|----|--|----|---|---|

x:	0	1	2	3	4	5
y:	4	8	15	7	6	2

(OR)

- | | | | | |
|----|--|----|---|---|
| 6. | Utilize Lagrange's formula to compute first & second derivatives of y at $x=4$ from the following table. | 14 | 3 | 3 |
|----|--|----|---|---|

x:	2	4	6	8	10
y:	0	0	1	0	0

UNIT-IV

- | | | | | |
|----|--|----|---|---|
| 7. | Use the Trapezoidal rule to estimate the integral $\int_0^2 e^{x^2} dx$ taking 10 intervals. | 14 | 4 | 4 |
|----|--|----|---|---|

(OR)

- | | | | | |
|----|---|----|---|---|
| 8. | Compute the value of $\int_{0.2}^{1.4} (\sin x - \log x + e^x) dx$ using Simpson's $\frac{3}{8}$ th rule. | 14 | 4 | 4 |
|----|---|----|---|---|

UNIT-V

- | | | | | |
|----|---|----|---|---|
| 9. | Solve $y' = 3x + y^2$, $y(0) = 1$ using Taylor's series method and then compute $y(0.1)$. | 14 | 5 | 3 |
|----|---|----|---|---|

(OR)

- | | | | | |
|-----|---|----|---|---|
| 10. | Apply Runge-Kutta fourth order method to compute an approximate value of y when $x = 0.2$. given that $\frac{dy}{dx} = x + y$ and $y = 1$ when $x = 0$. | 14 | 5 | 3 |
|-----|---|----|---|---|

TRANSFORM THEORY
(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a) Construct $L[4e^{5t} + 6t^3 - 3 \sin 4t + 2 \cos 2t]$.	7	1	3
	b) Construct $L[te^{at} \sin at]$.	7	1	3
	(OR)			
2.	a) Construct $L[e^{-4t} \cosh 2t]$.	7	1	3
	b) Construct $L\left\{\int_0^t \frac{\sin u}{u} du\right\}$.	7	1	3
	<u>UNIT-II</u>			
3.	Use convolution theorem to evaluate $L^{-1}\left\{\frac{s^2}{(s^2+a^2)^2}\right\}$.	14	2	5
	(OR)			
4.	Estimate the solution of $y'' + 7y' + 10y = 4e^{-3t}$, $y(0) = 0$, $y'(0) = -1$ using Laplace transforms.	14	2	5
	<u>UNIT-III</u>			
5.	Build the Fourier series expansion of $f(x) = x^2$ when $0 < x < 2\pi$. Hence deduce $\frac{\pi^2}{6} = \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots$	14	3	3
	(OR)			
6.	Build the Fourier series expansion of $f(x) = \begin{cases} 1 + \frac{2x}{\pi} & \text{if } -\pi \leq x \leq 0 \\ 1 - \frac{2x}{\pi} & \text{if } 0 \leq x \leq \pi \end{cases}$ hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$	14	3	3
	<u>UNIT-IV</u>			
7.	Find the Fourier Transform of $f(x) = \begin{cases} x, & \text{for } x \leq a \\ 0, & \text{for } x > a \end{cases}$	14	4	1
	(OR)			
8.	Find $f(x)$ if its Fourier cosine transform is $\frac{1}{2\pi}\left(a - \frac{s}{2}\right)$ if $s < 2a$ and zero if $s \geq 2a$.	14	4	1
	<u>UNIT-V</u>			
9.	a) Build the Z-transform of $2n + 5 \sin \frac{n\pi}{4} - 3a^4$.	7	5	3
	b) Build the inverse Z-transform of $\frac{z^3 - 20z}{(z-2)^3(z-4)}$	7	5	3
	(OR)			
10.	Using Z-transform solve the difference equation $u_{n+2} + 6u_{n+1} + 9u_n = 2^n$ with $u_0 = u_1 = 0$.	14	5	3

Digital Logic Design**(Common TO CSE & IT Branches)****Time: 3 Hours****Max Marks: 60**

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UNIT-I

1. a) Convert the Hexadecimal number 2AC5 to decimal, octal, and binary. 6 M
b) Determine the value of base x , if $(211)_x = (152)_8$. 6 M
- (OR)**
2. a) Convert the following numbers: 6 M
i) 11001101.0101 to base 8 and base 4
ii) $(1776)_{10}$ to base 6
iii) 11001010.0101 to base 10
b) Convert the following binary numbers into gray code. 6 M
i) 10100101 ii) 01011011

UNIT-II

3. a) State and Prove DeMorgan's theorems 6 M
b) Convert the following expressions into sum of products form: 6 M
i) $(AB + C)(B + C'D)$
(i) $x' + x(x + y')(y + z')$
- (OR)**
4. a) What are the various logic gates, give the representation along with the truth table. 6 M
b) Minimize the following function using K-map and realize using NAND gates: 6 M
$$F(w, x, y, z) = \sum (0, 2, 3, 4, 6, 7, 8, 10, 13) + d(5, 14)$$

UNIT-III

5. a) Draw and explain the truth table and Logic diagram of a 3 line to 8 line Decoder. 6 M
b) Realize the function $F = \sum m(0, 1, 2, 3, 4, 10, 11, 14, 15)$ using 8 x 1 mux? 6 M
- (OR)**
6. a) Design a combinational circuit for 2-bit magnitude comparator with inputs as a_1a_0 , b_1b_0 and outputs as $altb$, $aeqb$ and $agtb$. 6 M
b) Design a 4-bit universal shift register using D flip flops and multiplexers? 6 M

UNIT-IV

7. a) Construct the PROM using the conversion from BCD code to Excess-3 code? 6 M
b) Implement the following function using PAL $F = \sum m(0, 2, 3, 7, 9, 11, 15)$ 6 M
- (OR)**

8. a) List the major differences between PLA and PAL 6 M
b) Implement the following Boolean functions with a PLA having three inputs, four products and two outputs. $F_1(X,Y,Z) = \Sigma(0,1,2,4)$ $F_2(X,Y,Z) = \Sigma(0,5,6,7)$ 6 M

UNIT-V

9. a) Draw the logic diagram of positive edge-triggered D-flipflop using NAND gates and explain. 6 M
b) Write the differences between sequential and combinational circuits. 6 M
- (OR)**
10. a) Draw the function table and logic diagram of JK-flip flop and explain. 6 M
b) Explain ring counter with the help of logic diagram. 6 M

2 of 2

II B.Tech I Semester Supplementary Examinations, November-2025
COMPLEX VARIABLES AND STATISTICAL METHODS
(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

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<u>UNIT-I</u>		Marks	CO	BTL
1.	If $f(z)$ is a holomorphic function of z , Show that $\left\{\frac{d}{dx} f(z) \right\}^2 + \left\{\frac{d}{dy} f(z) \right\}^2 = f'(z) ^2$.	10	1	K2
(OR)				
2.	Show that the function $u(x, y) = e^{-x}(x \sin y - y \cos y)$ is harmonic. Determine its harmonic conjugate $v(x, y)$ and hence find an analytic function $f(z) = u + iv$	10	1	K1
<u>UNIT-II</u>				
3.	Write Cauchy's integral formula and evaluate $\int_C \frac{\sin^2 z}{(z-\frac{\pi}{6})^3} dz$ Where C is the Circle $ z = 1$.	10	2	K4
(OR)				
4.	Evaluate $\oint_C \frac{dz}{z^2(z^2+16)}$ where C is the region $1 \leq z \leq 2$	10	2	K4
<u>UNIT-III</u>				
5.	Write Residue theorem and Evaluate $\int_C \frac{1-2z}{z(z-1)(z-2)} dz$ where $C: z =1.5$ by Residue theorem.	10	3	K4
(OR)				
6.	Show that $\int_0^{2\pi} \frac{d\theta}{a+b\sin\theta} = \frac{2\pi}{\sqrt{a^2-b^2}}$.	10	3	K4
<u>UNIT-IV</u>				
7.	The probability density function of a Variable X is $\begin{array}{ccccccccc} X: & 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ P(X): & K & 3K & 5K & 7K & 9K & 11K & 13K \end{array}$ (i) Find $P(X < 4)$, $P(X \geq 5)$, $P(3 < X \leq 6)$ (ii) What will be the minimum value K so that $P(X \leq 2) > 3$.	10	4	K2
(OR)				
8.	If X is a normal variate with mean 30 and S.D is 5. Determine the probabilities that (i) $26 \leq X \leq 40$ (ii) $X \geq 45$	10	4	K2
<u>UNIT-V</u>				
9.	Find the mean, standard deviation and the mean of the sampling distribution of means of population consisting of 4 numbers 2,3,4,5 by drawing samples of two with replacement.	10	5	K3
(OR)				
10.	A sample of 900 members is found to have a mean of 3.4 cm. Can it be reasonably regarded as a truly random sample from a large population with mean 3.25 cm and S.D 1.61cm.	10	5	K3

UNIT-VI

11. On the basis of information given below about the treatment of 200 patients suffering from a disease. State whether the new treatment is comparatively superior to the conventional treatment by using χ^2 – test

	Favorable	Not Favorable
New	60	30
Conventional	40	70

(OR)

12. Two Samples of sizes 9 and 8 give the sum of squares of deviations from their respective means equal to 160 inches² and 91 inches² respectively. Can these be regarded as drawn from the same normal Population?

2 of 2

Time: 3 Hours

Max Marks: 60

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UNIT-I

- | | | Marks | CO | BTL |
|----|---|-------|-----|-----|
| 1. | a) Define probability through axiomatic approach, | 6 | CO1 | K2 |
| | b) A card is drawn at random from a deck of 52 playing cards. Find the probability of drawing (i) a hearts (ii) 7 or an ace | 4 | CO1 | K3 |

(OR)

- | | | | | |
|----|---|---|-----|----|
| 2. | a) State and prove total probability. | 4 | CO1 | K2 |
| | b) From a pack of 52 cards. define event A as drawing a jack card, event B as drawing a king or queen card, event C as drawing a heart card, find which are statistically dependent and independent events. | 6 | CO1 | K3 |

UNIT-II

- | | | | | |
|----|---|---|-----|----|
| 3. | a) Define Probability Distribution Function and mention its properties | 5 | CO2 | K2 |
| | b) Find the relation between Central moments and Moments about Origin for $n=2$. | 5 | CO2 | K3 |

(OR)

- | | | | | |
|----|---|---|-----|----|
| 4. | a) Define Moment Generating Function and write its properties. | 5 | CO2 | K2 |
| | b) Find Characteristic function for a random variable with density function $f_x(x) = e^{- x }$ | 5 | CO2 | K3 |

UNIT-III

- | | | | | |
|----|--|---|-----|----|
| 5. | a) Determine mean and variance of Binomial distribution function | 5 | CO3 | K3 |
| | b) If X is uniform random variable with pdf $f_x(x) = 1/10$ for $-5 < x < 5$ then find $E[X]$ and $E[x^2]$. | 5 | CO3 | K3 |

(OR)

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|----|--|---|-----|----|
| 6. | a) Determine mean and variance of Gaussian distribution function | 5 | CO3 | K3 |
| | b) In a city, on an average there are three murders per week. The occurrence follows a poisson distribution. | 5 | CO3 | K3 |
| | i) What is the probability that there are 5 or more murders in a given week? | | | |
| | ii) On an average, how many weeks in a year can this city expect to have no murders? | | | |

UNIT-IV

7. a) Define marginal and conditional distribution functions and their properties. 5 CO4 K2
- b) X is a random variable uniformly distributed between 0 and 5, Y is another random variable, independent of X, uniformly distributed between +3 and -3. The new random variable is given by $W = X + Y$. What is the Pdf of new random variable W ? 5 CO4 K3

(OR)

8. a) Define covariance and write its properties. 5 CO4 K2
- b) Consider the bivariate r.v. (X, Y) 5 CO4 K3

$$f_{XY}(x, y) = \begin{cases} k(x + y) & 0 < x < 2, 0 < y < 2 \\ 0 & \text{otherwise} \end{cases}$$

Obtain the conditional pdf's $f_{Y|X}(y|x)$ and $f_{X|Y}(x|y)$.

UNIT-V

9. a) State and explain various properties of autocorrelation function 5 CO5 K3
- b) A random process is given as $X(t) = At$, where A is a uniformly distributed random variable on (0,2). Find $X(t)$ is WSS or not. 5 CO5 K3

(OR)

10. a) Explain the following with respect to random process 4 CO5 K2
- i) Strict sense stationary ii) Mean ergodic process
- b) Obtain the mean and variance of stationary random process whose auto correlation function is given by 6 CO5 K3

$$R_{xx}(\tau) = 18 + \frac{2}{6 + \tau^2}$$

UNIT-VI

11. a) State and explain various properties power spectral density function 5 CO6 K3
- b) Find cross correlation function for psd $S_{xy} = 1/(25 + \omega^2)$. 5 CO6 K3

(OR)

12. a) Derive the relationship between Power spectrum and Auto correlation 5 CO6 K3
- b) Compute the auto correlation function of power spectrum $S_{xx}(\omega) = \frac{8\omega^2 + 47}{\omega^4 + 13\omega^2 + 36}$ 5 CO6 K3

Time: 3 Hours**Max Marks: 60**

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UNIT-I

- | | Marks | CO | BTL |
|---|-------|-----|-----|
| 1. a) Classify stones based on their geological origin and describe their uses in construction. | (5M) | CO1 | K2 |
| b) Explain the process of stone quarrying and list the precautions taken during blasting. | (5M) | CO1 | K2 |

(OR)

- | | | | |
|--|------|-----|----|
| 2. a) Classify the different types of timber used in building construction and explain their uses. | (5M) | CO1 | K2 |
| b) What are the three common defects in timber? How do they impact timber quality in construction? | (5M) | CO1 | K2 |

UNIT-II

- | | | | |
|--|------|-----|----|
| 3. a) Explain the composition of ordinary Portland cement and its properties. | (5M) | CO2 | K2 |
| b) Describe any three types of cement and their specific applications in construction. | (5M) | CO2 | K2 |

(OR)

- | | | | |
|---|------|-----|----|
| 4. a) Discuss the properties and uses of Ground Granulated Blast Furnace Slag (GGBS). | (5M) | CO2 | K2 |
| b) How does metakaolin affect the strength and durability of concrete? | (5M) | CO2 | K2 |

UNIT-III

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|---|------|-----|----|
| 5. a) Define workability of concrete and list the factors that affect it. | (7M) | CO3 | K2 |
| b) Mention the various methods used to measure the workability of fresh concrete. | (3M) | CO3 | K2 |

(OR)

- | | | | |
|---|------|-----|----|
| 6. a) What role does the quality of mixing water play in concrete production? | (5M) | CO3 | K2 |
| b) How do you determine the setting times of concrete? | (5M) | CO3 | K2 |

UNIT-IV

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|--|------|-----|----|
| 7. a) Explain Abram's Law and its relevance to the water/cement ratio in concrete. | (5M) | CO4 | K2 |
| b) What is the gel-space ratio, and how does it affect the strength of concrete? | (5M) | CO4 | K2 |

(OR)

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|---|------|-----|----|
| 8. a) What are the non-destructive testing (NDT) methods used for testing concrete? Provide examples. | (5M) | CO4 | K2 |
| b) Discuss the relationship between compressive and tensile strength of concrete. | (5M) | CO4 | K2 |

UNIT-V

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|--|------|-----|----|
| 9. a) Differentiate between lightweight aggregate concrete and high-density concrete. | (5M) | CO5 | K2 |
| b) What is fibre-reinforced concrete (FRC)? Discuss the factors affecting its performance. | (5M) | CO5 | K2 |

(OR)

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|---|------|-----|----|
| 10. a) Explain the significance of polymer concrete in construction applications. | (5M) | CO5 | K2 |
| b) What are the advantages of high-performance concrete over conventional concrete? | (5M) | CO5 | K2 |

UNIT-VI

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|--|------|-----|----|
| 11. a) What are the key factors to consider in the choice of mix proportions for concrete? | (5M) | CO6 | K2 |
| b) Discuss the importance of durability in concrete mix design. | (5M) | CO6 | K2 |

(OR)

- | | | | |
|---|------|-----|----|
| 12. a) How do you proportion concrete mixes to achieve the desired strength and durability? | (5M) | CO6 | K2 |
| b) Write detailed note on corrosion of reinforcement bars in concrete. | (5M) | CO6 | K2 |

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		<u>UNIT-I</u>		
1.	a)	Convert	Marks 5M	CO 1
		(i)(657) ₈ into decimal. ii) Convert (2348) ₁₀ into hexa decimal		BTL L3
	b)	What is the use of complements? explain about 1's compliment and 2's compliment with an example.	5M	1
		(OR)		L2
2.	a)	Perform subtraction using r's and (r-1)'s complements for (a) 725 – 432 in decimal and (b) (10110) ₂ – (1101) ₂ in binary.	5M	1
	b)	.Explain the difference between weighted and non-weighted codes with examples.	5M	1
		(OR)		L2
3.	a)	Obtain the simplified expression in sum of products for the following Boolean function $F(A,B,C,D) = \sum(2,3,12,13,14,15)$.	5M	2
	b)	Explain about Ex-OR and EX- NOR gate	5M	2
		(OR)		L2
4.	a)	What are the various logic gates, give the representation along with the truth table.	5M	2
	b)	Simplify the Boolean function $F(A,B,C,D) = \sum(0,1,2,5,8,9,10)$ using K-map and implement it using NAND gates only	5M	2
		(OR)		L2
5.	a)	Design a half subtractor circuit using basic gates.	5M	3
	b)	Implement a carry look-ahead adder for two 4-bit numbers and derive the carry equations for each bit.	5M	3
		(OR)		L2
6.	a)	Construct a BCD adder and explain how it differs from a binary adder	5M	3
	b)	Design a 4-bit binary adder using full adders. Show the circuit and explain the carry propagation	5M	3
		(OR)		L2
7.	a)	Explain about 3*8 decoder in detail.	5M	4
	b)	Design a 2 bit magnitude comparator.	5M	4
		(OR)		L2
8.	a)	Implement the Boolean function $F(A,B,C,D) = \sum(2,3,5,7,8,9,10,11)$ using a 4:1 multiplexer	5M	4
	b)	Design and explain the working of a seven-segment display driver for displaying hexadecimal digits	5M	4
		(OR)		L2
9.	a)	Compare PLA and PAL in various aspects.	5M	5
	b)	Implement the following Boolean functions using PLA with 3 AND gates. $F1(ABC) = \sum(3,5,7)$, $F2 = \sum(4,5,7)$.	5M	5
		(OR)		L2
10.	a)	A combinational circuit is defined by the functions: $F1 = m(3,5,7)$ $F2 = m(4,5,7)$. Implement the circuit with a PLA having 3 inputs, 3 product terms and two outputs	5M	5
	b)	Compare PROM, PLA and PAL.	5M	5
		(OR)		L2
11.	a)	Discuss about operation of SR flip-Flop with neat diagrams.	5M	6
	b)	Explain what is meant by race around condition. How this can be avoided.	5M	6
		(OR)		L2
12.	a)	Convert JK flip flop to D flip flop.	5M	6
	b)	Discuss about operation of master slave JK flipflop	5M	6
		(OR)		L2