CODE: **20CET202**   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, March-2022
CONSTRUCTION MATERIALS AND CONCRETE TECHNOLOGY
(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

L	T	P	C
3	0	0	3

			Marks	CO	Blooms Level
		UNIT-I			
1.		Define quarrying. Describe the methods of quarrying in blasting rocks.	(10M)	CO1	L2
		(OR)			
2.	a)	Explain the classification of various types of woods used in buildings	(5M)	CO1	L1
	b)	Discuss the different types of aggregates for making mortar and concrete	(5M)	CO1	L2
		UNIT-II	Marks	CO	Blooms Level
3.		Define Admixture? What are the different types of admixtures explain any two from each classification.	(10M)	CO2	L2
		(OR)			
4.	a)	Briefly describe water proofing materials and application	(5M)	CO2	L2
	b)	Write short notes on Plasticizer	(5M)	CO2	L1
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Describe the factors affecting the workability of concrete	(5M)	CO3	L2
	b)	Explain briefly about the slumpcone with neat sketch.	(5M)	CO3	L1
		(OR)			
6.	a)	What is the effect of mixing time and temperature on workability	(5M)	CO3	L2
	b)	Describe the quality of water used in concrete	(5M)	CO3	L2
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	Explain the following i)Water-cement ratio ii) Gel-space ratio	(5M)	CO4	L2
	b)	Describe the importance of curing and explain the different methods of curing	(5M)	CO4	L2
		(OR)			
8.		Define NDT method. What are the different types of NDT methods explain pulse velocity with neat sketch.	(10M)	CO4	L2
		UNIT-V	Marks	CO	Blooms Level
9.	a)	Distinguish between light weight concrete and high density concrete	(5M)	CO5	L2
	b)	Briefly explain about the self healing concrete and its application	(5M)	CO5	L2
		(OR)			
10.	a)	What is the significance of RMC? Explain the advantages of RMC oversite concrete mix	(5M)	CO5	L2
	b)	Write salient features of fiber reinforced concrete	(5M)	CO5	L2
		UNIT-VI	Marks	CO	Blooms Level
11.	a)	Describe in detail about Indian standard method of mix design	(5M)	CO6	L2
	b)	Discuss the Quality control of concrete in detail	(5M)	CO6	L2
		(OR)			
12.	a)	Design the Concrete mix of M25 in moderate exposures? Assume all other data	(10M)	CO6	L3

CODE: 20BST203   SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, March-2022
COMPLEX VARIABLES AND STATISTICAL METHODS
(Common to MECH & EEE Branches)

Time: 3 Hours   Max Marks: 60

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
## UNIT-I			
1. Find w such that $w = u + iv$ is an analytic function of z, given that $u = e^{x^2-y^2}\cos 2xy$.	10M	1	apply
(OR)			
2. Determine the analytic function $f(z) = u + iv$, given that $3u + 2v = y^2 - x^2 + 16xy$.	(10M)	1	apply
## UNIT-II	Marks	CO	Blooms Level
3. Evaluate $\int_C \dfrac{zdz}{(z-1)(z-2)^2}$ where C is the circle $|z-2| = 2$, using Cauchy's integral formula.	(10M)	2	apply
(OR)			
4. Evaluate $\int_0^{1+i}(x - y + ix^2)dz$, along (i) the line joining z = 0 and z=1+i, and (ii) the parabola $y = x^2$	(10M)	2	apply
## UNIT-III	Marks	CO	Blooms Level
5. Evaluate $\int_C \dfrac{(12z-7)dz}{(z-1)^2(2z+3)}$ where C is $|z+i| = \sqrt{3}$.	(10M)	3	apply
(OR)			
6. Identify the poles of $f(z) = \dfrac{z^2}{(z-2)^2(z^2+9)}$ and also find the residue at each pole.	(10M)	3	apply
## UNIT-IV	Marks	CO	Blooms Level
7. A taxicab company has 12 Ambassadors and 8 Fiats. If 5 of these taxi cabs are in the workshop for repairs and an Ambassador is as likely to be in for repairs as a Fiat, what is the probability that (a) 3 of them are Ambassadors and 2 are Fiats, (b) at least 3 of them are Ambassadors, and (c) all the 5 are of the same make.	(10M)	4	apply

(OR)

8. If X is a normal variate with mean 30 and S.D is 5 (10M) 4 apply .Determine the probabilities that $(i)\ 26 \leq X \leq 40$ $(ii) X \geq 45$.

	Marks	CO	Blooms Level
UNIT-V			

9. Sample of size 2 are taken from the population (10M) 5 apply 1,2,3,4 with replacement , Determine
   (i) The mean of the population
   (ii) Standard deviation of the population
   (iii) The mean of the sampling distribution of means
   (iv) The standard deviation of the sampling distribution of means.

(OR)

10. In two large populations there are 30% and 25% (10M) 5 apply respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations?

	Marks	CO	Blooms Level
UNIT-VI			

11. Test made on the breaking strength of 10 pieces (10M) 6 apply of a metal wire gave the results: 578, 572, 570, 568, 572, 570, 570, 572, 596 and 584 kg. Test if the mean breaking strength of the wire can be assumed as 577 kg. Use t-test for single mean.

(OR)

12. Theory predicts that the proportion of beams in (10M) 6 apply four groups A, B, C, D should be $9 : 3 : 3 : 1$. In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experiment support the theory? by using Goodness of fit.

CODE: 20BST208   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, March-2022
PROBABILITY AND STOCHASTIC PROCESS
(Electronics and Communication Engineering)

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

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
		UNIT-I			
1.	a)	Explain about conditional and joint probability.	5M	CO1	K2
	b)	A missile can be accidentally launched if two relays A and B both have failed. The probabilities of A and B failing are known to be 0.01 and 0.03 respectively. It is also known that B is more likely to fail (probability 0.06) if A has failed. Determine: i) The probability of an accident missile launch ii) The probability that A will fail if B has failed iii) Are the events "A fails" and "B fails" statistically independent?	5M	CO1	K3

(OR)

			Marks	CO	Blooms Level
2.	a)	State the total Probability theorem.	5M	CO1	K2
	b)	Two manufacturing plants produce similar parts. Plant 1 produces 1,000 parts, 100 of which are defective. Plant 2 produces 2,000 parts, 150 of which are defective. A part is selected at random and found to be defective. What is the probability that it came from plant 1?	5M	CO1	K3

			Marks	CO	Blooms Level
		UNIT-II			
3.	a)	Define and explain the Probability Density Function and its properties.	5M	CO2	K2
	b)	A random variable X has a probability density	5M	CO2	K2

$$f_X(x) = \begin{cases} \left(\dfrac{\pi}{16}\right)\cos\left(\dfrac{\pi x}{8}\right) & \text{for } -4 \le x \le 4 \\ 0 & \text{elsewhere} \end{cases}$$

Determine (i) mean of X (ii) variance of X

(OR)

			Marks	CO	Blooms Level
4.	a)	Explain in detail about moment generating function..	5M	CO2	K2
	b)	The pdf of a continuous r.v. X is given by	5M	CO2	K3

$$f_X(x) = \begin{cases} \frac{1}{3} & 0 < x < 1 \\ \frac{2}{3} & 1 < x < 2 \\ 0 & \text{otherwise} \end{cases}$$, Find the mean and variance

			Marks	CO	Blooms Level
		UNIT-III			
5.	a)	Show that mean and variance of random variable X with uniform distribution over (a,b) is (a+b)/2 and $(a-b)^2/12$ respectively.	5M	CO3	K2
	b)	Two dice are thrown five times. Determine the probability of getting 7 as sum (i) at least once (ii) Two times (iii) P(1<X<5).	5M	CO3	K3

(OR)

			Marks	CO	Blooms Level
6.	a)	Explain about binomial and Poisson distributions	5M	CO3	K2
	b)	In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the normal distribution.	5M	CO3	K3

			Marks	CO	Blooms Level
7.	a)	Define and Represent covariance and correlation interms of joint moments	5M	CO4	K2
	b)	The joint pdf of a bivariate r.v. (X, Y) is given by	5M	CO4	K3

$$f_{XY}(x,y) = \begin{cases} k\,(x+y) & 0 < x < 2; 0 < y < 2 \\ 0 & otherwise \end{cases}$$ where k is a constant.

  i. Find the value of k.
  ii. Find the marginal pdf's of X and Y.

(OR)

			Marks	CO	Blooms Level
8.	a)	Differentiate between the marginal distribution functions, conditional distribution functions.	5M	CO4	K2
	b)	The joint pdf of two random variables X and Y are given by	5M	CO4	K3

$$f_{X,Y}(x,y) = \begin{cases} Cxy & ; 0 \le x \le 2, 0 \le y \le 2 \\ 0 & ; \quad otherwise \end{cases}$$

Obtain(i) The value of C (ii) $F_{XY}(x,y)$ (iii) $F_X(x)$, $F_Y(y)$ (iv) $P(0<x\le1, 0<y\le1)$

			Marks	CO	Blooms Level
9.	a)	Define a random process and classify random processes with neat sketch.	5M	CO5	K2
	b)	If a random process X (t) =Acosωt + Bsinωt is given, where A and B are uncorrelated zero mean random variables having the variance σ². Show that X(t) is wide sense stationary.	5M	CO5	K3

(OR)

			Marks	CO	Blooms Level
10.	a)	Explain Time average and ergodicity in detail.	5M	CO5	K2
	b)	A random process is given as X(t) =At, where A is an uniformly distributed random variable on (0,2). Find whether X(t) is WSS or not.	5M	CO5	K3

			Marks	CO	Blooms Level
11.	a)	Derive the relation between auto correlation and power spectral density.	5M	CO6	K2
	b)	The cross spectral density of two random process X(t) and Y(t) is Sxy(ω) = 1+ (jω/k) for –k<ω<k, and zero elsewhere, where k>0. Find the cross correlation function between the processes.	5M	CO6	K3

(OR)

			Marks	CO	Blooms Level
12.	a)	State and prove the properties of power spectral density.	5M	CO6	K2
	b)	Compute the auto correlation function of power spectrum	5M	CO6	K3

$$S_{XX}(\omega) = \frac{8\omega^2 + 47}{\omega^4 + 13\omega^2 + 36}$$

CODE: 20EST205   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, March-2022
DIGITAL LOGIC DESIGN
(Common to CSE & IT)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		UNIT-I	Marks	CO	Blooms Level
1.	a)	Obtain the 1's and 2's complement of the following binary numbers: a) 11101010 b) 01111110 c) 00000001 d) 10000000	6	CO1	Remember
	b)	Convert decimal 9126 to both BCD and Hexa decimal.	4	CO1	Apply
		(OR)			
2.	a)	Discuss about various binary codes	5	CO1	Remember
	b)	Convert $(256.12)_8 = $ _____ i) Binary ii) Octal iii) Hexa decimal	5	CO1	Apply
		UNIT-II			
3.	a)	Draw the logical diagrams for the following Boolean expressions: (a) Y=A'B'+B(A+C). (b) Y=(A+B)(C'+D).	5	CO2	Understand
	b)	Given the Boolean function F=xy'z+x'y'z+w'xy+wx'y+wxy. (a) Obtain the truth table of the function. (b) Draw the logical diagram using the original Boolean expression. (c) Simplify the function to a minimum number of literals using Boolean algebra.	5	CO2	Analyze
		(OR)			
4.	a)	Convert the following to the other canonical SOP & POS form: (a) F (x, y , z) = $\sum$ (1,3,7) (b) F(A,B,C,D)= $\prod$ (0,1,2,3,4,6,12)	5	CO2	Understand
	b)	Demonstrate by means of truth tables the validity of the following identities: (a) DeMorgan's theorem for three variables: (x+y+z)' = x'y'z' and (xyz)'=x'+y'+z' (b) The distributive law: x+yz = (x+y)(x+z)	5	CO2	Remember
		UNIT-III			
5.	a)	What is combinational logic circuit. Explain in detail?	5	CO3	Remember
	b)	Design a half subtractor circuit with inputs x and y and outputs D and B. The circuit subtracts the bits x-y and places the difference in D and the borrow in B.	5	CO3	Create
		(OR)			
6.		Design a 4 bit comparator?	10	CO3	Create
		UNIT-IV			
7.	a)	What is Demultiplexer? Explain in detail.	5	CO4	Remember
	b)	Implement a full adder with two 4 x 1 multiplexers.	5	CO4	Apply
		(OR)			
8.	a)	Specify the truth table of an octal to binary encoder.	5	CO4	Apply
	b)	Implement 8 x1multiplexer	5	CO4	Apply
		UNIT-V			
9.		Compare PAL, PLA, PROM design for F_1 (x, y , z) = $\sum$ (1,3,5,7) F_2 (x, y , z) = $\sum$ (0,2,4,6)	10	CO5	Analyze
		(OR)			
10.		Implement the following Boolean expression with the help of programmable array logic (PAL) X =AB + AC' Y= AB' + BC'	10	CO5	Apply
		UNIT-VI			
11.		Obtain the Excitation tables of SR, D, JK and T flipflops.	10	CO6	Understand
		(OR)			
12.		Discuss about Ring and Johnson Counter	10	CO6	Remember

AR18

CODE: 18CET205   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
CONCRETE TECHNOLOGY
(Civil Engineering)

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	Explain the procedure for finding the Initial setting & final setting times of cement with neat sketches.	12M

(OR)

2.	a)	What do you mean by normal consistency of cement? What is its significance? How is it tested?	6M
	b)	Define hydration of cement? Explain its role in strength of cement.	6M

UNIT-II

3.	Explain the laboratory procedure for determination of workability of concrete by using Vee-Bee consistometer test with neat diagram.	12M

(OR)

4.	a)	Distinguish segregation and bleeding of concrete.	6M
	b)	Write short notes on: Abram's law and Gel space ratio.	6M

UNIT-III

5.	a)	List out different types of Non-Destructive equipment's.	6M
	b)	What are the advantages of NDT over destructive tests?	6M

(OR)

6.	Give a brief note on Shrinkage and its types	12M

UNIT-IV

7.	a)	What does it mean by strength, mean strength, variance, standard deviation & coefficient of variance in Mix design?	8M
	b)	What are the factors influencing choice of the mix proportions of concrete?	4M

(OR)

8.	Design a concrete mix of M45 grade. Take a standard deviation of 5 MPa. The specific gravity of coarse aggregate and fine aggregate are 2.85 and 2.75 respectively. The bulk density of coarse aggregate is 1600 kg/$m3$ and fineness modulus of fine aggregate is 2.70. A slump of 75 mm is necessary. The water absorption of coarse aggregate is 2% and free moisture in fine aggregate is 1%. Design the mix by using BIS code method. Assume any missing data suitably.	12M

UNIT-V

9.	Explain the significance of fiber reinforced concrete and explain about the factors affecting the properties of Fibre Reinforced Concrete.	12M

(OR)

10.	a)	Write short notes on High Performance Concrete (HPC).	6M
	b)	Write short notes on Light weight aggregate concrete.	6M

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AR18

CODE: 18BST204   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
COMPLEX VARIABLES AND STATISTICAL METHODS
(Common to EEE, ME & ECE)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. If *f(z)* is a regular function of *z*, Prove that $\nabla^2 |f(z)|^2 = 4|f'(z)|^2$ 12M

(OR)

2. a) Construct the analytic function, whose real part is $\dfrac{\sin 2x}{\cosh 2y - \cos 2x}$ 6M

   b) Determine the conjugate harmonic analytic function whose imaginary part is $\sinh x \sin y$ 6M

UNIT-II

3. Verify Cauchy's theorem by integrating e^{iz} along the boundary of the triangle with the vertices of the point 1+i, -1+i and -1-i.   12M

(OR)

4. a) Expand $f(z) = \dfrac{1}{z^2 - 3z + 2}$ in the region a) $1 < |z| < 2$ b) $|z| > 2$.   6M

   b) Find all poles and residues at each pole for $f(z) = \dfrac{z^2}{(z-1)^2(z+2)}$ 6M

UNIT-III

5. a) The probability that a pen manufactured by a company will be defective is 1/10. If 12 such pens are manufactured, find the probability that a) exactly two will be defective b) at least two will be defective   c) none will be defective.   6M

   b) X is a normal variate with mean 30 and standard deviation 5. Find the probabilities that i) $26 \le X \le 40$ ii) $X \ge 45$.   6M

(OR)

6. Fit a Poisson's Distribution to the following data and test the goodness of fit using Chi-square test.   12M

X	0	1	2	3	4
F	419	352	154	56	19

UNIT-IV

7. a) A trucking firm is suspicious of the claim that the average life time of certain tyres is at least 28,000 miles. To check this claim the firm puts 40 of these tyres on its trucks and gets a mean life time of 27,468 miles with a standard deviation of 1,348 miles. What can we conclude if the probability of type I error is to be at most 0.01? **6M**

   b) A company claims that its light bulbs are superior to those of its main competitor. If a study showed that $n_1 = 40$ of its bulbs has a mean life time of 647 hours with a standard deviation of 27 hours, While a sample of $n_2 = 40$ bulbs made by its main competitor had a mean lifetime of 638hours with a standard deviation of 31 hours, does this substantiate the claim at 0.05 level of significance.? **6M**

(OR)

8. a) According to the norms established for a mechanical aptitude test, persons who are 18 years old should average 73.2 with a standard deviation of 8.6. If 45 random selected persons of that age averaged 76.7. Test the null hypothesis $\mu=73.2$ against the alternative hypothesis $\mu> 73.2$ at 0.01 level of significance. **6M**

   b) A college conducts both day and night classes intended to be equally effective. A sample of 100 day-students yields examination results as $\overline{x}_1 = 72.4, S_1 = 14.8$. A sample of 200 night-students yields examination results as $\overline{x}_2 = 73.9, S_2 = 17.9$. Are two means statistically equal at 10% significance level? **6M**

UNIT-V

9. Fit a parabola of second degree to the following data. **12M**

x:	1	2	3	4	6	8
y:	2.4	3	3.6	4	5	6

(OR)

10. a) Find the rank correlation for the following data. **6M**

X:	56	42	72	36	63	47	55	49	38	42	68	60
Y:	147	125	160	118	149	128	150	145	115	140	152	155

   b) In a partially destroyed laboratory record of an analysis of correlation data, the following results are legible. Variance of x = 9, regression equations are 8x-10y+66 = 0 and 40x-18y-214 = 0.What were (i) the mean values of x and y (ii) the correlation coefficient of x and y (iii) The standard deviation of y. **6M**

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AR18

CODE: 18EST206   SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
DIGITAL LOGIC DESIGN
(Common to CSE & IT)

Time: 3 Hours   Max Marks: 60

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Find the X from the following?   6M
       i. $(4F7.A8)_{16} = (X)_8$ ii.$(23F4)_8 = (X)_2$ iii.$(110110111.01111)_2 = (X)_{16}$
    b) Subtract the following decimal numbers 2's complement method.   6M
       i. 52-17   ii. 27-75

(OR)

2. a) Simplify the following Boolean expressions to a minimum number of literals   6M
       (i) ABC+A'B+ABC'   (ii) xy + x(wz+wz')
    b) Implement XOR gate by using NAND gates   6M

UNIT-II

3. Minimize the given function using K-Map method and implement in a Universal logic.   12M
    $F(A,B,C,D) = \sum m(0,1,3,4,7,9,10,13,14,15)$.

(OR)

4. a) Design a full adder by using two half adders.   6M
    b) Explain the working of Carry LooK- Ahead- Adder.   6M

UNIT-III

5. a) Draw and explain the truth table and Logic diagram of a 3 line to 8 line   6M
       Decoder.
    b) Realize the function F=Σm (0, 1, 2, 3, 4, 10, 11, 14, 15) using 16 x1 mux?   6M

(OR)

6. a) Draw and explain the truth table and Logic diagram of a 1 line to 8 line   6M
       Demultiplexer
    b) Draw the logic diagram of encoder and explain in detail its operation. 6M

UNIT-IV

7. a) Give the comparison between PROM, PLA and PAL.   4M
    b) Explain the working of a PLA with a schematic and implement the following two Boolean   8M
       functions with a PLA:
       F1 (A, B, C) = Σ (0, 1, 2, 4) and F2 (A, B, C) = Σ(0.5.6.7).

(OR)

8   Design a combinational circuit using PAL for the following function   12M
    Y(A,B,C,D).= Σ (0,2,3,4,5,6,7,8,10,11,15).

UNIT-V

9. a) i. Differentiate between Synchronous and Asynchronous sequential circuits.   6M
        ii. With logic diagram explain the operation of a JK flip-flop
    b) Explain the operation of 4-stage Ring counter and draw the logic circuit of the same   6M
       using D flip-flops.

(OR)

10. Design of a MOD-10 asynchronous counter using JK flip-flops.   12M

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
ELECTRICAL TECHNOLOGY
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.		Explain the types of DC machines according to their field winding connection and give their voltage equations	**14M**

(OR)

2.	**a**	Derive an expression for EMF of DC Generator	**7M**
	b	A 4-pole generator, having wave wound armature winding has 51 slots, each slot containing 20 conductors, what will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mwb	**7M**

UNIT-II

3.		Discuss the constructional details of single-phase transformer and hence obtain the expression for induced e. m. f. of transformer?	**14M**

(OR)

4.		A 40KVA Transformer has iron loss of 450KW and full load copper loss of 850KW. If the power factor of the load is 0.8 lagging, calculate (i)full load efficiency (ii)the load at which the maximum efficiency occurs and (iii) the maximum efficiency(iv) Efficiency at half full load	**14M**

UNIT-III

5.	a	Explain how revolving magnetic field develops in stator of three-phase induction motor?	**7M**
	b	What are the types of three phase induction motor and discuss the differences in their construction	**7M**

(OR)

6.	**a**	Explain the principle of operation of single phase induction motor	**7M**
	b	Explain any two starting methods employed for starting three phase induction motor.	**7M**

UNIT-IV

7.		A 3-phase, star-connected alternator is rated at 1600 kVA, 13,500 V. The armature resistance and synchronous reactance are 1.5 Ω and 30 Ω respectively per phase. Calculate the percentage regulation for a load of 1280 kW at 0.8 leading power factor.	**14M**

(OR)

8.	**a**	Explain the working principle of alternator	**7M**
	b	Derive the e.m.f equation of An alternator in terms of pitch and distribution factors	**7M**

UNIT-V

9.		What is the need of Operating and Damping torques in indicating instruments and explain any two methods which provide the above.	**14M**

(OR)

10.		Explain the construction and the working principle of Moving coil instrument .Write advantages and disadvantages	**14M**

AR16

CODE: 16ME2008   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022

FLUID MECHANICS & HYDRAULIC MACHINERY
(Common to EEE & ME)

Time: 3 Hours   **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) State Newton's law of Viscosity and classify the fluids based on it.   6m
   b) Two large plane surfaces are 2.4 cm apart. The space between the surfaces is filled   8m
   with glycerine. What force is required to drag a very thin plate of surface area 0.5
   square metre between the two large plane surfaces at a speed of 0.6 m/s, if:
       (i) The thin plate is in the middle of the two plane surfaces, and
       (ii) The thin plate is at a distance of 0.8 cm from one of the plane surfaces?
         Take the dynamic viscosity of glycerine = 8.10×10^{-1} Ns/m^2

(OR)

2. a) Explain the following (i) Steady and Unsteady flow (ii) Uniform and Non-   6m
   Uniform flow (iii) Laminar and Turbulent flows
   b) A fluid flow field is given by $V = x^2y\ i + y^2z\ j - (2xyz + yz^2)\ k$ Prove that it is a case of   8m
   possible steady incompressible fluid flow. Calculate the velocity and acceleration
   at the point (2,1,3)

UNIT-II

3. a) Develop Euler's equation of motion along a stream tube and hence deduce the   7m
   Bernoulli's equation from it.
   b) A pipe of 300 mm diameter conveying 0.30 m^3/s of water has a right angled bend   7m
   in a horizontal plane. Find the resultant force exerted on the bend if the pressure at
   inlet and outlet of the bend are 24.525 N/cm^2 and 23.544 N/cm^2

(OR)

4. What is the principle in Venturimeter and explain the working of Venturimeter   14m
   with the help of a simplified sketch.

UNIT-III

5. a) Illustrate the importance of (i) Total energy line and (ii) Hydraulic gradient lines   6m
   b) Three pipes of 400 mm, 200 mm and 300 mm diameters have lengths of 400m, 200   8m
   m, and 300 m respectively. They are connected in series to make a compound
   pipe. The ends of this compound pipe are connected with two tanks whose
   difference of water levels is 16m. If co-efficient of friction for these pipes is same
   and equal to 0.005, determine the discharge through the compound pipe neglecting
   minor losses.

(OR)

6. a) Develop the condition for maximum efficiency when a jet of water strikes a series of vanes mounted on a circular disc.   7m

   b) A jet of water having a velocity of 30 m/s strikes a series of radial curved vanes mounted on a wheel which is rotating at 200 rpm. The jet makes an angle of 20^0 with the tangent to the wheel at inlet and leaves the wheel with a velocity of 5 m/s at an angle of 130^0 to the tangent to the wheel at outlet. Water is flowing from outward in a radial direction. The outer and inner radii of the wheel are 0.5 m and 0.25 m respectively. Determine: (i) Vane angles at inlet and outlet (ii) Work done per unit weight of water and (iii) Efficiency of the wheel.   7m

UNIT-IV

7. a) Classify the hydraulic turbines based on various considerations.   6m

   b) A Pelton wheel is to be designed for a head of 60 m when running at 200 rpm. The Pelton wheel develops 95.65 kW shaft power. The velocity of the buckets=0.45 times the velocity of the jet, overall efficiency =0.85 and co-efficient of the velocity is equal to 0.98.   8m

(OR)

8. a) Define specific speed and derive an expression for the specific speed of a turbine.   6m

   b) A Pelton wheel is revolving at a speed of 190 rpm and develops 5150.25 kW when working under a head of 220 m with an overall efficiency of 80%. Determine unit speed, unit discharge and unit power. The speed ratio for the turbine is given as 0.47. Find the speed, discharge and power then the turbine is working under a head of 140 m.   8m

UNIT-V

9.   List out the main components of a Centrifugal pump and make a comparison between Centrifugal and reciprocating pumps.   14m

(OR)

10. a) Explain the working of a Reciprocating compressor with the help of a neat sketch.   7m

   b) A single acting reciprocating pump running at 50 rpm delivers 0.01 m³/s of water. The diameter of the piston is 200 mm and stroke length 400 rpm. Determine: (i) The theoretical discharge of the pump , (ii) Co-efficient of discharge, and (iii) Slip and percentage slip of the pump.   7m

AR16

CODE: 16EC2011   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022
DIGITAL LOGIC DESIGN
(Common to CSE & IT)

Time: 3 Hours   **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Realise NOT, EX OR, NOR using NAND?   7M
   b) Perform Binary Subtraction using ones complement for (i) 01000-01001 (ii) 0011.1001-0001.1110?   7M

(OR)

2. a) Convert $(256.12)_8$= (-----)$_2$; $(C8F9.12FA)_{16}$ = (----)$_{10}$; $(CSE)_{16}$ = (----)$_2$?   7M
   b) Explain in detail about weighted and non-weighted codes with examples?   7M

UNIT-II

3. a) What is the need for carry look ahead adder and illustrate its operation?   7M
   b) Design Full adder using Half Adders?   7M

(OR)

4. a) Simplify F= $\sum$ (1, 3, 5, 7, 9, 11, 14, 15) using four variable K Map and obtain the expression in SOP form?   10M
   b) Illustrate the working of Binary multiplier with neat diagrams?   4M

UNIT-III

5. a) Implement F= $\sum$ (0, 1, 2, 5, 8, 9, 10, 14) using 16×1 Multiplexer?   9M
   b) Design a four bit binary to gray code convertor?   5M

(OR)

6. a) Implement 4×16 decoder.   7M
   b) Implement Half Adder using 2×4 Decoder?   7M

UNIT-IV

7. a) Realize the following switching function using PAL with help of programming table F (A, B,C,D)=$\sum$m(0,1,3,4,5,6,7,12,14,15)?   7M
   b) Distinguish between PLA, PAL, PROM with respect to its performance and advantages?   7M

(OR)

8. A combinational circuit is defined by the functions F_1(A,B,C)=$\sum$m(2,3,6,7) and F_2(A,B,C)=$\sum$m(0,2,4,7).Implement circuit with a PLA logic.   14M

UNIT-V

9. a) What is race around condition? Explain in detail about the principle of operation of Master Slave JK Flip flop with neat diagrams?   7M
   b) Design a MOD 5 Asynchronous Counter using D Flipflop?   7M

(OR)

10. a) Convert JK to T Flipflops?   7M
    b) Design Johnson counter discuss its working operation?   7M

AR13

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) What is meant by an entire function?   1M
    b) Show that the function $v = \frac{y}{x^2+y^2}$ is harmonic.   1M

    c) Find the invariant points of $f(z) = \frac{z+1}{z}$.   1M

    d) What is a pole of $f(z)$ of order m.   1M

    e) State Cauchy's Residue theorem.   1M

    f) Define conformal mapping.   1M

    g) State Baye's theorem.   1M

    h) What is probability function of Binomial distribution and write its mean and variance.   1M

    i) Define Null hypothesis and Alternate hypothesis.   1M

    j) Define degrees of freedom.   1M

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2.   Determine analytic function $f(z)$ whose real part is $u = x^3 - 3xy^2 + 3x^2 - 3y^2$.   12M

(OR)

3. a) Show that $v(r,\theta) = r^2 \cos 2\theta - r \cos\theta + 2$ is harmonic and find its conjugate harmonic.   6M

    b) Evaluate $\int_C \frac{\sin^2 z}{\left(z-\frac{\pi}{6}\right)^3} \, dz$ where $C : |z| = 1$.   6M

AR13

UNIT-II

4   Show that $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+a^2)(x^2+b^2)}\, dx = \frac{\pi}{(a+b)}$ by using Cauchy's residue theorem.   12M

(OR)

5. a)   Evaluate $\int_C \tan z\, dz$ where C is the circle $|z| = 2$.   6M

    b)   Using Cauchy's Residue theorem, evaluate $\int_{-\infty}^{\infty} \frac{1}{x^4+1}$.   6M

UNIT-III

6. a)   Discuss the transformation $w = f(z) = z^2$.   6M

    b)   Show that the Bilinear transformation $f(z) = \frac{3z+1}{z-1}$ preserves the cross ration of four points.   6M

(OR)

7.   Find the Bilinear transformation which maps $z = 1, i, -1$ into the points $w = 0, 1, \infty$.   12M

UNIT-IV

8. a)   Find the moment generating function of Binomial distribution and hence find mean and variance.   6M

    b)   Write any six properties of Normal distribution.   6M

(OR)

9   In a Normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and S.D. of the distribution.   12M

UNIT-V

10. a)   A normal population has a mean 0.1 and a S.D. of 2.1. Find the probability that the mean of simple sample of 900 members will be negative.   6M

    b)   A group of boys and girls were given an intelligence test. The mean score, S.D.s and numbers in each group are as follows.   6M

	Boys	Girls
Mean	124	121
S.D.	12	10
N	18	14

Is the mean score of boys significantly different from that of girls?

(OR)

11   A die was thrown 60 times and the following frequency distribution was observed: 12M

Faces	1	2	3	4	5	6
f_0	15	6	4	7	11	17

Test whether the die is unbiased?

CODE: 13ME2008   **SET-1**
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, March-2022

FLUID MECHANICS & HYDRAULIC MACHINES
(Electrical & Electronics Engineering)

Time: 3 Hours   Max Marks: 70
PART-A
ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) State the Newton's law of viscosity
    b) State the Hydrostatic law
    c) Distinguish between rotational and irrational flow
    d) State impulse momentum principle
    e) When the pipes are connected in parallel?
    f) Define coefficient of discharge
    g) What is reaction turbine?
    h) What is draft tube?
    i) Define NPSH of centrifugal pump
    j) Draw ideal indicator diagram for reciprocating pump

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a Explain mass density, specific weight, Specific gravity,   4M
       vapour pressure
    b An oil of viscosity 5 poise is used for lubrication between a 8M
       shaft and sleeve. The diameter of the shaft is 0.5m and it
       rotates at 200 rpm. Calculate the power lost in oil for a sleeve
       length of 100 mm. The thickness of oil film is 1.0 mm.
                               (OR)
3. a Explain the effect of temperature on viscosity of liquids and 4M
       gases.
    b Two large fixed parallel planes are 12mm apart. The space   8M
       between surfaces filled with oil of viscosity 9.72 poise. A thin
       flat plate of area $0.25m^2$ moves through the oil at a velocity of
       0.3m/s. Calculate drag force (i) when the plate is equidistance
       from both the planes (ii) When the thin plate is at a distance
       of 4mm from one of the planes

UNIT-II

4. a Define stream line, path line, streak line and stream tube. **6M**

   b A 20 cm diameter pipe divides into a 15 cm branch and a 10 **6M**
      cm branch. If the total flow is 0.5 m^3/s and if the same
      average velocity occurs in each branch, what is the discharge
      in each branch?

(OR)

5. a Write equation and applications of impulse momentum   4M

   b The water is flowing through a tapering pipe having   8M
      diameters 300 mm and 150 mm at section 1 and 3
      respectively. The discharge through the pipe is 40 litres/sec.
      The section 1 is 10 m above datum and section 2 is 6m above
      datum. Find the intensity of pressure at section 2 is that at
      section 1 is 400 kN/m^2

UNIT-III

6. Explain Reynolds experiment with the help of neat sketch   12M

(OR)

7. Derive an expression for measurement of discharge using   12 M
    venturimeter

UNIT-IV

8. Explain working of Francis turbine with the help of neat   12M
    sketch

(OR)

9. a Explain the terms unit speed, unit discharge and unit power   4M

   b A model of a Francis turbine one-fifth of full size, develops   8M
      30.8 KW at 305 rpm, under a head of 2.5 m. Find the speed
      and power of full size turbine operating under a head of 6 m

UNIT-V

10. Explain working of centrifugal pump with the help of neat   12M
     sketch.

(OR)

11. a Prove that the work done by a Reciprocating Pump is   6 M
       Proportional to the area of indicator diagram.

    b A double acting reciprocating pump having piston area   6 M
       0.125 m2 has a stroke of 0.24 m long. The pump is
       discharging 4.2m3 of water per minute at 75 rpm through a
       height of 10m.Find the slip of the pump and the power
       required to drive the pump.

AR13

PART-A

ANSWER ALL QUESTIONS [1 x 10 = 10 M]

1. a) Convert the number to decimal number $(1BC2)_{16}$.
    b) Obtain the 2's complement of the binary number:1101101.
    c) Draw the diagram for 2 inputs EX-OR gate.
    d) Give one application of Multiplexer.
    e) Write the dual of the following expression (A+B+C')(A'+C)(A+B'+C').
    f) What is the difference between encoder and decoder.
    g) What is PAL.
    h) What are asynchronous inputs for flipflops.
    i) In which circuit race around condition is eliminated.
    j) Draw the circuit of serial adder.

PART-B

Answer one question from each unit [5x12=60M]

UNIT-I

2. a) Convert the following to binary numbers.   8M
       i) $(5673)_{10}$ ii) $(46021)_8$ iii) $(4ABC)_{16}$
       iv) $(256)_8$
    b) i) obtain the 2's complement of binary number: 10110111.   4M
       ii) obtain the BCD representation of decimal number 379.

(OR)

3. a) Simplify the following Boolean representation to a minimum number of literals.   6M
       i) F=(XY+WZ) (WX+YZ)
       ii) Y=AB+A(B+C)+B(B+C).
    b) Express the following in canonical SOP form F(ABC) = (A+B') (B+C).   6M

UNIT-II

4. Simplify the given function using K-map.   12M
    F(w,x,y,z)=∑m(2,3,4,5,7,12)+∑d(10,11,13,14,15).

(OR)

5. Draw and explain 4-bit adder/ subtractor circuit.   12M

UNIT-III

6. a) Design a 4-bit gray to binary converter.   4M
    b) Design a 2-bit comparator of $A=A_1A_0$ and $B=B_1B_0$.   8M

(OR)

7. a) Draw the gate level diagram of a 3-bit binary to octal decoder.   4M
    b) Implement the function using 16×1 MUX.   8M
       F(ABCD)=∑ (0,1,5,7,9,12,14,15).

UNIT-IV

8. Design a BCD to Excess-3 code converter using PLA.   12M

(OR)

9. Implement the following Boolean function using PROM F1(ABC)= ∑ (0,1,3,5,7)   12M
    F2(ABC)= ∑ (1,2,5,6).

UNIT-V

10. a) Convert the T-flipflop to JK -flipflop.   6M
    b) Draw and explain characteristic table and excitation table of JK-flipflop.   6M

(OR)

11. Draw and explain 4-bit universal shift register.   12M