AR18

CODE: 18CET205 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

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.	a)	Explain heat of hydration of cement in detail	6M
	b)	List Various types of cement indicating their use for different applications?	6M
		(OR)	
2.	a)	What is an alkali aggregate reaction and explain the factors promoting alkali aggregate reaction?	7M
	b)	Explain i) Accelerator ii) retarder	5M

UNIT-II

3.	a)	Explain the manufacturing process of concrete in brief.	6M
	b)	What is segregation? How it can be controlled?	6M
		(OR)	
4.	a)	Define workability? Explain the effects of time and temperature on workability?	6M
	b)	Explain methods of Mixing of concrete	6M

UNIT-III

5.	a)	Explain the flexural strength test of concrete?	6M
	b)	Explain dynamic modulus of elasticity?	6M
		(OR)	
6.	a)	What is NDT test? List the types of NDT tests. Explain any one Method.	6M
	b)	Explain the factors influencing creep of concrete?	6M

UNIT-IV

7.	a)	Explain the factors effecting quality control of concrete mix proportions.	7M
	b)	Write brief notes on durability of concrete	5M
		(OR)	
8.		Design a concrete mix for the following data for M-45 as per IS code Method Type of cement – Ordinary Portland, Fine aggregate natural river sand conforming to grading zone II of Table 4, of IS: 383-1970. Coarse aggregate – Crushed (angular), coarse aggregate of 20 mm maximum size conforming to IS: 383 code requirements. Specific gravities of cement, sand and coarse aggregate are 3.14, 2.63 and 2.61 respectively. Type of exposure mild Degree of quality control – very good Degree of workability 0.80 for M-45.Assume the necessary data.	12M

UNIT-V

9.	a)	Write about High Strength concrete.	6M
	b)	Explain No Fines concrete	6M
		(OR)	
10.	a)	Briefly Explain Fibre reinforced concrete.	6M
	b)	Discuss the advantages and disadvantages of polymer concrete.	6M

AR18

CODE: 18EET206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

ELECTRICAL MACHINES-I

(Electrical and Electronics 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.	a)	Classify DC machines based on excitation.	8M
	b)	Find the resistance of the load which takes a power of 5 kW from a shunt generator whose external characteristic is given by the equation $V_t = (250 - 0.5I_L)$	4M

(OR)

2.	a)	Explain the process of commutation in a DC machine.	6M
	b)	Derive the expression for demagnetizing and cross magnetizing ampere turns per pole in a DC machine.	6M

UNIT-II

3.	a)	Explain the process of voltage build up in a dc shunt generator.	6M
	b)	Determine: i) the total torque developed ii) the useful torque of a 250 V, 4 pole series motor with 782 wave connected conductors developing 8 kW and taking 40 A with a flux per pole of 25 mWb. The armature resistance of the motor is 0.75 ohms.	6M

(OR)

4.	a)	Explain the characteristics of a DC shunt motor in detail.	6M
	b)	A 20 kW, 250 V dc shunt motor has a full-load armature current of 85 A at 1100 rpm. The armature resistance is 0.18 W. Determine: (i) the internal electromagnetic torque developed; (ii) the internal torque if the field current is suddenly reduced to 80% of its original value; (iii) The steady motor speed in part (ii) assuming the load torque to have re maintained constant. Assume: magnetic circuit to be linear	6M

UNIT-III

5.	a)	Briefly explain various losses in a DC machine and derive the condition for maximum efficiency.	6M
	b)	A 10 kW, 250 V, dc shunt motor with an armature resistance of 0.8 W and a field resistance of 275 W takes 3.91 A, when running light at rated voltage and rated speed. (i) What conclusions can you draw from the above data regarding machine losses? (ii) Calculate the machine efficiency as a generator when delivering an output of 10 kW at rated voltage and speed and as a motor drawing an input of 10 kW. What assumption if any do you have to make in this computation? (iii) Determine the maximum efficiencies of the machine when generating and when motoring.	6M

(OR)

6. a) Explain Hopkinson's test to determine the efficiency of DC generator and DC motor 6M

   b) A 10 kW, 250 V, dc shunt motor with an armature resistance of 0.8 W and a field resistance of 275 W takes 3.91 A, when running light at rated voltage and rated speed. 6M

   (i) What conclusions can you draw from the above data regarding machine losses?

   (ii) Calculate the machine efficiency as a generator when delivering an output of 10 kW at rated voltage and speed and as a motor drawing an input of 10 kW. What assumption if any do you have to make in this computation?

   (iii) Determine the maximum efficiencies of the machine when generating and when motoring.

UNIT-IV

7. a) Explain the construction features of a transformer and derive the EMF equation of transformer. 6M

   b) A 20-kVA, 50-Hz, 2000/200-V distribution transformer has a leakage impedance of 0.42 + j 0.52 Ω in the high-voltage (HV) winding and 0.004 + j 0.05 Ω in the low-voltage (LV) winding. When seen from the LV side, the shunt branch admittance Y_0 is (0.002 – j 0.015) ℧ (at rated voltage and frequency). Draw the equivalent circuit referred to (a) HV side and (b) LV side, indicating all impedances on the circuit. 6M

(OR)

8. a) State and prove the condition from maximum efficiency of a transformer. 5M

   b) In a 25 kVA, 2000/200 V transformer, the iron and copper losses are 300W and 400W respectively. 7M

   (i) Calculate the efficiency on unity power factor at full-load

   (ii) Determine the load for maximum efficiency and the iron-and the copper-loss in this case.

UNIT-V

9. a) Explain briefly about Scott connection of a transformer. 6M

   b) Explain the load sharing between two transformers connected in parallel 6M

(OR)

10. a) Explain the principle of operation of an auto-transformer. 4M

    b) The following test results were obtained for a 20 kVA, 50 Hz, 2400/240 V distribution transformer: 8M

    Open-circuit test (LV): 240 V, 1.066 A, 126.6 W

    Short-circuit test (HV): 57.5 V, 8.34 A, 284 W

    When the transformer is operated as a step down transformer with the output voltage equal to 240 V, supplying a load at unity power factor, determine the maximum efficiency and the unity power factor load at which it occurs.

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AR18

CODE: 18MET203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

FLUID MECHANICS AND HYDRAULIC MACHINES

(Mechanical 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

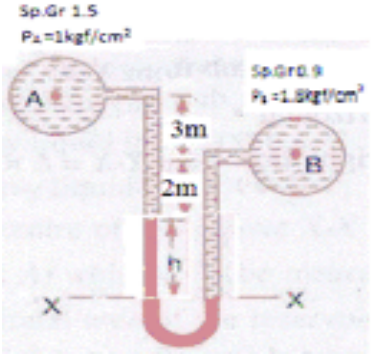
UNIT-I

1. a) Define surface tension and Derive the expression for pressure intensity of a liquid droplet. 6M

   b) A glass tube of internal diameter 4 mm is immersed in a liquid of specific gravity 12.2 and surface tension 0.55 N/m. The angle of contact with the glass is 1200. Calculate capillary rise or depression in the tube 6M

(OR)

2. A differential manometer is connected at the two points A and B of two pipes as show in figure .The pipe A contains a liquid of specific gravity 1.5 while pipe B contains Of sp.gr 0.9 pressure at A and B are 1kgf/cm^2 and 1.80kgf/cm^2 respectively. Find the difference in mercury level in the differential manometer. 12M



UNIT-II

3. a) Check whether the following velocity relations satisfy the requirements for steady irrotational flow. 6M
   (i) $u = x + y$, $v = x - y$ (ii) $u = xt^2 + 2y$, $v = x^2 - yt^2$ (iii) $u = xt^2$, $v = xyt + y^2$

   b) Explain with a example of i) stream line ii) path line iii) streak line 6M

(OR)

4. Write the Bernoulli's statement and write the assumptions in it. Derive the expression for Bernoulli's equation 12M

UNIT-III

5. a) Derive the coefficient of discharge for Venturimeter 6M
   b) The difference in water surface levels in two tanks, which are connected by three pipes in series of lengths 300 m, 170 m and 210m and diameters 300 mm, 200 mm and 400 mm respectively, is 12 m. Determine the rate of flow of water if coefficient of friction are 0.005, 0.0052 and 0.0048 respectively, neglecting minor losses 6M

(OR)

6. a) A jet of water of diameter 100 mm strikes a curved plate at its centre with a velocity of 15 m/sec. The curved plate is moving with a velocity of 7 m/sec in the direction of the jet. The jet is deflected through an angle of 1500. Assuming the plate is smooth find (i) force exerted on the plate in the direction of the jet (ii) power of the jet (iii) efficiency 6M
   b) Explain the concepts of velocity triangles by considering a jet striking an unsymmetrical moving curved vane tangentially at one of the tips 6M

UNIT-IV

7. a) A Kaplan turbine works under a head of 60m at a speed of 145rpm utilizing $175m^3/s$ of water. Diameter of runner and hub are 5.60m & 3.20m. Turbine Develops 82500 kW. Find i) flow ratio ii) speed ratio iii) overall efficiency iv)specific speed 6M
   b) Explain what is meant by unit quantities in turbines. Derive expressions for unit speed, unit discharge and unit power of a turbine 6M

(OR)

8. a) What is a draft-tube? Why is it used in a reaction turbine? Describe with neat sketch two different types of draft tubes 6M
   b) A turbine is to operate under a head of 25 meters at 200 rpm. The discharge is 9 m^3/sec. If the turbine efficiency is 90% determine: (i) specific speed of the turbine (ii) power generated (iii) performance under a head of 20 meters. Also state the type of the turbine 6M

UNIT-V

9. a) Draw and discuss characteristic curves of a pump 6M
   b) A double acting reciprocating pump having piston area 0.1m has a stroke of 0.30m long. The pump is discharging 2.4 m3 of water per minute at 45 rpm through a height of 10 m. Find the slip of the pump and power required to drive the pump 6M

(OR)

10. a) A centrifugal pump runs at 800 rpm and delivers 5000 L/min against a head of 7m. The impeller has an outer diameter of 25 cm and a width of 5 cm at the outlet. If the backward curved vane at the outlet makes an angle of 450, determine the manometric efficiency. What is the specific speed of the pump 6M
    b) Differentiate between reciprocating pump and centrifugal pump 6M

AR18

CODE: 18ECT205 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

ELECTRONIC CIRCUITS ANALYSIS

(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

UNIT-I

1.	a)	Explain why RC Phase shift oscillators are not used at high frequencies.	4 M
	b)	Derive the expression for frequency of oscillations and the condition for starting oscillations of a wein-bridge oscillator	8 M
		(OR)	
2.	a)	In the Hartley oscillator L2=0.4m H, C=0.004μF. Find L1 if the frequency of oscillations is 120 KHz	4 M
	b)	Draw the Crystal oscillators and derive the condition for oscillations	8 M

UNIT-II

3.	a)	Draw and explain the small-signal high frequency model of CE configuration.	6 M
	b)	Derive the Expression for unity gain frequency of CE amplifier.	6 M
		(OR)	
4.	a)	Explain the Small signal operation of CS amplifier. Find the expressions for input resistance (R_{in}), Output resistance (R_{out}), voltage gain (A_v) and overall voltage gain (G_v).	8 M
	b)	State and prove Millers theorem	4 M

UNIT-III

5.	a)	Differentiate between direct and capacitive coupling of multiple stages of amplifiers. With the help of a neat circuit diagram, describe the working of a cascade amplifier	6 M
	b)	Show that the voltage gain increases with cascading.	6 M
		(OR)	
6.	a)	Derive expressions for Ri, Ro ,Av&Ai using h-parameter model of a CC- CE amplifier?	8 M
	b)	Explain the operation of Darlington pair circuit.	4 M

UNIT-IV

7. a) A single stage Common Emitter amplifier is measured to have a voltage-gain bandwidth fH of 5 MHz's with RL = 500 Ohms. Assume hfe = 100, gm = 100 *mA/V,* rbb' = 1000, Cc = 1 pf, and fT = 400 MHz's .Find the value of the source resistance that will give the required bandwidth. 6 M

   b) Draw the equivalent diagram of a single stage CE amplifier at high frequencies. Derive the expression for gain under short circuited load conditions 6 M

(OR)

8. a) A particular BJT operating at I_C = 2 mA has C_μ = 1 pF, C_Π = 10 pF and β= 150. What are f_T and f_β for this situation? 4 M

   b) For a CE amplifier, R_{sig} = 5 KΩ, R_1 = 33 KΩ, R_2 = 22 KΩ, R_E = 3.9 KΩ, R_C = 4.7 KΩ, R_L = 5.6 KΩ, V_{CC} = 5 V. The DC emitter current can be shown to be I_E = 0.3 mA at which β_o = 120, r_o = 300 KΩ, and r_x =50Ω. Find the input resistance R_{in} and the midband gain A_M. If the transistor specified to have f_T = 700 MHz and C_μ = 1 pF, find the upper 3-dB frequency f_H. 6 M

UNIT-V

9. a) Detail the operation of Class A Output stage with derivation of Power Conversion efficiency. 8 M

   b) Explain Crossover distortion? 4 M

(OR)

10. a) Explain the basic principle of Tuned Amplifiers. 4 M

    b) Derive the expression for centre frequency and quality factor of a tuned Amplifier 8 M

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AR18

CODE: 18EST206 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

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)	Simplify the following three variable Boolean expression using Boolean algebra f(A,B,C)= ∑m(0,2,4,6).	6M
	b)	Encode the decimal numbers into: (i) (56)10 = ( )Gray (ii) (20.305)10 = ( )Excess-3code (iii) (32.89)10 = ( )BCD code	6M

(OR)

2.	a)	Implement Ex-OR gate and Ex-NOR gates using NAND gates only.	6M
	b)	Express the following decimal numbers in 642-3 and 84-2-1 codes (i) 286 (ii) 807 (iii) 429.5	6M

UNIT-II

3.	a)	Simplify the following Boolean expression using K-map method: f(A,B,C,D) = ∑m(2,3,4,5,10,12,13).	6M
	b)	Explain binary multiplier.	6M

(OR)

4.	a)	Show how a full-adder can be converted to a full-subtractor with the addition of one inverter circuit.	6M
	b)	Explain the operation of carry look ahead adder with a neat diagram.	6M

UNIT-III

5.	a)	Implement the following Boolean function with 8:1,16:1 multiplexer F(A,B,C,D)= ∑ m(0,2,6,10,11,12,13)	6M
	b)	Design and implement 3-bit Binary-Gray and Gray-Binary code converters.	6M

(OR)

6.	a)	Design a 4 bit priority encoder.	4M
	b)	Implement the following Boolean function using 8:1 MUX. . f(A,B,C,D) = ∑m(0,1,3,5,8,11,12,14,15).	8M

UNIT-IV

7.	a)	Compare PLA and PROM.	4M
	b)	Implement the following two Boolean functions using a PLA. i) F1(A,B,C) = ∑(0,1,2,4). ii) F2(A,B,C) = ∑(0,5,6,7).	8M

(OR)

8.	a)	Implement f (A,B,C,D) = ∑m(0,1,3,5,6,8,9,11,12,13) using PROM and explain its procedure.	6M
	b)	Implement Full-subtractor using PLA.	6M

UNIT-V

9.	a)	Explain the operation of Mod 8 synchronous counter with necessary timing diagram.	6M
	b)	Convert D-flip-flop to a JK flip-flop.	6M

(OR)

10.	a)	Design a 4-bit universal shift register.	6M
	b)	What is the race-around condition and explain how it can be eliminated using master-slave JK flip-flops.	6M

AR16

CODE: 16CE2002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

STRENGTH OF MATERIALS-I

(Civil 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. a) A steel wire 2m long and 3mm in diameter is extended by 0.75mm when a weight W is suspended from the wire. If the same weight is suspended from a brass wire, 2.5 m long and 2mm in diameter, it is elongated by 4.64 mm. Determine the modulus of elasticity of brass if that of steel be $2x10^5$ N/mm^2. 10M

   b) Explain (a) Hook's law, (b) Poisson's ratio, (c) Volumetric strain (d) Percentage elongation. 4M

(OR)

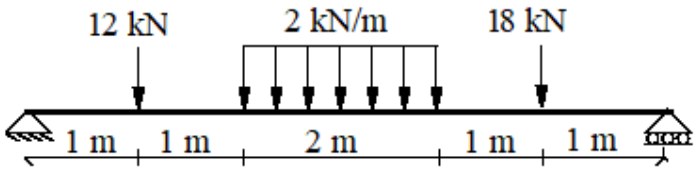
2. a) A concrete column of cross-sectional area 400 mm x 400 mm is reinforced by four longitudinal steel bars of 32 mm diameter placed at each corner. If the column carries a comprehensive load of 300 kN, determine the loads carried and compressive stress produced in the concrete and steel bars. Young's modulus of elasticity of steel is 15 times that of concrete. 10M

   b) An aluminium bar is fixed at both ends. If the temperature of the bar is raised by 20° C, find the stress developed in the bar. The modulus of elasticity and the coefficient of thermal expansion of the material are 80 GPa and 12×10^{-6}/°C. 4M

UNIT-II

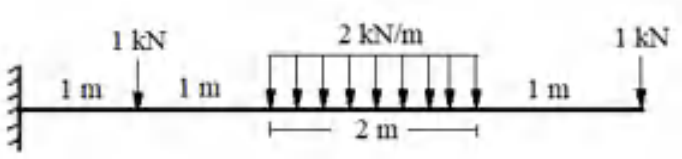
3. a) Describe various types of loads and types of beams with the help of neat sketches. 4M

   b) Draw the shear force and bending moment diagrams for the beam loaded as shown in Figure. Clearly mark the position of the maximum bending moment and determine its value. 10M

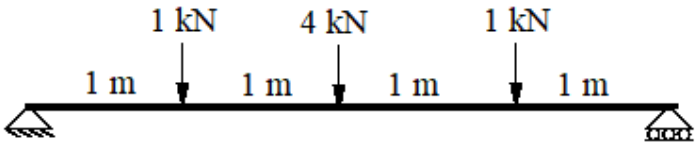


(OR)

4. a) Draw the shear force and bending moment diagrams for cantilever loaded as shown in Figure. Locate the point of contra flexure, if any. 8M



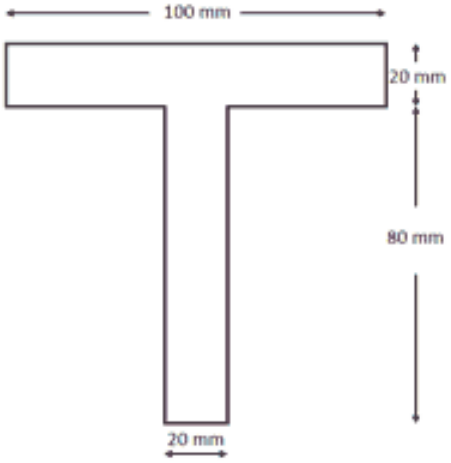
b) Draw the shear force and bending moment diagrams for simply supported beam loaded as shown in Figure. 6M



UNIT-III

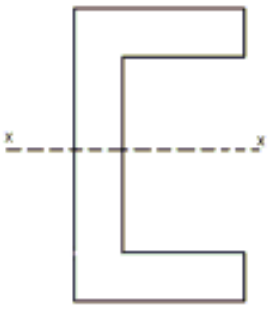
5. a) State the assumptions made in simple bending theory. Write down the pure bending equation and describe each parameter. 6M

b) Find the section modulus of a beam section shown in figure. 8M



(OR)

6. a) Is it possible to use simple bending equation to find the bending stress in the following beam section? Explain. 4M



b) A simply supported beam of square cross section 500 mm in size and 8 m span carries an UDL of 10kN/m over the entire span and a point load of 5kN at mid span. Find the maximum bending stress at mid span and at 2m from right support? 10M

UNIT-IV

7. a) Derive the equation of shear stress variation across a beam section with usual notation. $\tau = \frac{V A \bar{y}}{I b}$ 8M

   b) Draw the variation of shear stress across the beam cross section of size 300 mm × 500 mm when it is subjected a maximum shear force of 300 kN. 6M

(OR)

8. a) Draw the variation of shear stress across the beam cross section of size 300 mm in diameter when it is subjected a maximum shear force of 300 kN. 6M

   b) A simply supported beam of span 1.5 m, has cross section of T shape. The horizontal flange width is 150 mm and flange thickness is 10 mm, the height of web is 90 mm and its width is 10 mm. Calculate the uniformly distributed load which can be applied over the entire span length such that maximum shearing stress induced in the cross-section is not to exceed 3.0 MN/m^2. 8M

UNIT-V

9. a) Explain i) Maximum shear strain energy theory ii) Maximum principal strain theory of failure. 4M

   b) A leaf spring consists of 7 plates each of 30 mm wide and 5 mm thick. The length of plate is 800 mm. Find the maximum central point load it can carry if the bending stress is not to exceed 150 MPa and deflection is limited to 15 mm. Take Young's modulus as 200 GPa. 10M

(OR)

10. a) Derive the torsion equation with the help of neat figures. 7M

    b) A closely coiled helical spring is of 10 mm diameter steel wire having 10 coils with 80 mm diameter. If the spring is subjected to an axial twist of 10 kNm, determine the bending stress and increase in the number of turns. Take E=200 GPa. 7M

AR16

CODE: 16EE2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, October-2021
ELECTRICAL MACHINES-I
(Electrical and Electronics 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.	a)	Explain with relevant diagrams, the different methods of excitation of DC machines	10M
	b)	Distinguish between lap and wave winding.	4M
		(OR)	
2.	a)	Explain the constructional features of DC machine with a neat sketch	9M
	b)	Derive EMF equation of a DC generator.	5M

UNIT-II

3.	a)	A certain 5(1/2)-KW 125-volt d-c generator was operated as a long shunt motor at no load for determination of core and friction losses. With 135volts--equal to generated voltage at full load-applied to the armature, and normal speed of 1700rpm, the current input to the armature was found to be 2.5amp. Resistance of the armature circuit with full-load current flowing was found to be 0.2 ohm, of the series field 0.025 ohm, and of the shunt-field circuit 100 ohms. Determine the various losses and calculate the full-load efficiency.	6M
	b)	Discuss the losses and power flow diagram of a DC generator.	8M
		(OR)	
4.	a)	Explain the internal and external characteristic of a shunt and series DC generator.	8M
	b)	A 10-kW 250-V self-excited generator, when delivering rated load, has an armature-circuit voltage drop that is 5% of the terminal voltage and a shunt-field current equal to 5% of rated load current. Calculate the resistance of the armature circuit and that of the field circuit.	6M

UNIT-III

5.	a)	Describe how efficiency can be calculated for dc machine by Swinburne's test.	8M
	b)	In a motor the armature resistance is 0.1 ohm. When connected across 110-volt mains the armature takes 20 amp, and its speed is 1,200 rpm. Determine its speed when the armature takes 50 amp from the same mains, with the field increased 10 percent.	6M
		(OR)	

6. a) Explain with a neat connection diagram , the working of a Three point starter used for a DC Shunt motor 8M

b) A 50-hp, 500-volt shunt motor draws a line current of 4.5 amperes at no load. The shunt field resistance is 250 ohms and the armature resistance, exclusive of brushes, is 0.3 ohm. The brush drop is 2 volts. The full-load line current is 84 amperes. What is the horsepower output and efficiency? 6M

UNIT-IV

7. a) With neat diagrams explain the equivalent circuit of a transformer and mention its parameters. 7M

b) The following data were obtained when a short-circuit test was performed upon a 100-kva [(2,400) / (240)]-volt distribution transformer: E_{SC} = 72 volts; I_{SC} = 41.6 amp? P_{SC} = 1,180 watts. All instruments high side, and the low side was short-circuited. (1) Calculate: (a) the equivalent resistance, impedance, and reactance; (b) the per cent regulation at a power factor of 0.75 lagging. (2) Calculate the copper losses when the load is (a) 125 kVA, (b) 75 kVA, (c) 85 KW at a power factor of 0.772. 7M

(OR)

8. a) Derive the condition for maximum efficiency of a single phase transformer 7M

b) The emf per turn of a single phase 10 kVA, 2200/220V, 50 Hz transformer is 10V. Calculate (i) the number of primary and secondary turns, (ii) the net cross-sectional area of core for a maximum flux density of 1.5T. 7M

UNIT-V

9. a) Explain the advantages and operation of auto-transformers 7M

b) What are the conditions and advantages of parallel operation of transformer? 7M

(OR)

10. Draw the connection diagrams and explain the features of Y-Y, Y-Δ, Δ-Y and Δ-Δ three-phase connections. 14M

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AR16

CODE: 16ME2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

PRODUCTION TECHNOLOGY

(Mechanical 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.	(a)	What is Aspiration effect in casting process? Explain the elements of gating system with a neat sketch?	10M
	(b)	Why spherical risers are not advisable in casting process though their surface to volume ratio is the best.	4M

(OR)

2.	(a)	Differentiate pin holes and blow holes with the help of neat sketches	7M
	(b)	Mention the role of runner extension in casting process? State the reason why pouring basin requires a reservoir?	7M

UNIT-II

3.	(a)	Define welding. Explain gas welding process with a neat sketch? Discuss about advantages and limitations of gas welding?	6M
	(b)	What is resistance welding? Differentiate between spot and seam welding processes	8M

(OR)

4.		Compare and contrast MIG and TIG welding processes. Explain the metal transfer modes in MIG with a neat sketch.	14M

UNIT-III

5.	(a)	Define cold working process? Explain the effect of cold working on mechanical properties of the material with a trend curves?	7M
	(b)	Explain various methods of hot working process	7M

(OR)

6.	(a)	Compare and contrast between direct extrusion and indirect extrusion process with a neat sketch	7M
	(b)	Explain wire drawing process with a neat sketch? explain the merits and demerits of wire drawing ?	7M

UNIT-IV

7. Explain the following forging processes 14M
   (i) Smith forging,
   (ii) Drop forging with neat sketches

(OR)

8. Explain the principle of sheet metal working operations with suitable sketches 14M
   (i) Punching
   (ii) Blanking
   (iii) Cup drawing

UNIT-V

9. Explain fallowing methods with suitable figures 14M
   (i) High velocity forming methods
   (ii) Magnetic pulse forming

(OR)

10. (a) Explain different types of plastics? Explain few applications of plastics 6M
    (b) Compare and contrast between injection moulding and blow moulding with a neat sketch 8M

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AR16

CODE: 16EC2006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

ELECTRONIC CIRCUITS – I

(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.	a)	Explain the working and operation of full wave rectifier with neat diagrams	7M
	b)	Mention the purpose of filters in the rectifier circuits	7M
		(OR)	
2.	a)	What is meant by ripple factor? Mention its importance	7M
	b)	In a bridge rectifier, the transformer is connected to 220v, 60 Hz mains and the turns ratio of the step down transformer is 11:1. Assuming the diodes to be ideal, find (i) the voltage across the load, (ii) $I_{d.c}$ and (iii) PIV	7M

UNIT-II

3.	a)	Explain how the self bias scheme improves stability in a common emitter BJT circuit and derive an expression for the stability factor.	7M
	b)	What is the necessity of compensation techniques? Also explain the method of diode compensation technique against the variation of I_{co}.	7M
		(OR)	
4.	a)	Draw a fixed bias circuit and derive an expression for the stability factor	7M
	b)	What is thermal runaway? How it can be avoided?	7M

UNIT-III

5.	a)	Justify the validity of approximate hybrid model applicable in low frequency region.	7M
	b)	Determine the h parameters from the characteristics of CE configuration	7M
		(OR)	
6.	a)	Determine the h-parameters from the characteristics of CB configuration.	7M
	b)	Derive the equations for voltage gain and current gain for a BJT approximate h-parameter model for CE configuration.	7M

UNIT-IV

7.	a)	For a single stage transistor amplifier R_s=5K Ω and R_l=20K Ω the h parameter values are h_{fe}=50 ,h_{ie}=1.1KΩ, h_{re}= 2.5x10^{-4} and hoe=25μA/V. Find A_i, A_v, A_{vs}, R_i, R_o for CE transistor configuration	7M
	b)	Draw the low frequency model of FET and advantages over BJT.	7M
		(OR)	
8.	a)	Derive the expressions for voltage gain and current gain for CE amplifier	7M
	b)	Draw the equivalent circuit of common source FET amplifier and derive the expression for voltage gain	7M

UNIT-V

9.	a)	If the input resistance of an amplifier is 100KΩ and output resistance is 10 KΩ. What will be the input resistance and output resistance of a current series feedback amplifier with gain 100 and feedback factor 0.99	7M
	b)	Draw the block diagram of a feedback amplifier and explain each block giving its function.	7M
		(OR)	
10.	a)	If the input resistance of an amplifier is 100KΩ and output resistance is 10 KΩ. What will be the input resistance and output resistance of a voltage shunt feedback amplifier with gain 100 and feedback factor 0.99	7M
	b)	Explain the concept of feedback and write the advantages of negative feedback	7M

AR16

CODE: 16EC2011 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October-2021

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

1.	a)	Find 9's complement (i)$(25.639)_{10}$ (ii)(72532 - 03250) using 9's complement	7
	b)	State and prove consensus theorem and Transposition theorem?	7
		(OR)	
2.	a)	Add and subtract the following in BCD ADDITION OF 974+595 (ii)Excess-3 code (29)+(39)	7
	b)	Convert the given expression into standard SOP f(a,b,c) = A+ABC	7
3.	a)	Reduce the following function using K-map technique and implement using basic gates F(A,B,C,D)= A'B'D+ABC'D'+A'BD	7
	b)	Identify all the prime implicants and essential prime implicants of the following functions Using karnaugh map. F(A,B,C,D) = Σ(0,1,2,5,6,7,8,9,10,13,14,15).	7
		(OR)	
4	a)	Realize the logic diagram for given expression (AB+C) D	7
	b)	Simplify the Boolean function F= Σm(0,1, 3,5, 7,8,9, 10,12,13, 15)	7
5.	a)	Design a circuit to implement binary adder and subtractor?	7
	b)	Design a 4 bit Magnitude Comparator.	7
		(OR)	
6	a)	Construct a 4 to 16 line decoder using 2 to 4 line decoders	7
	b)	Implement the following Boolean function with 8:1,16:1 multiplexer F(A,B,C,D)= ∑ m(0,2,6,10,11,12,13)	7
7	a)	Explain PROM, PAL, PLA?	7
	b)	Design a PLA using following functions i) F(A,B,C) = ∑m(1,2,5,7) ii) F(A,B,C,D) = ∑m(0,1,2,5,7,9,11,15)	7
		(OR)	
8	a)	Design a function generator F= x2 where x is a 3-bit unsigned binary number. What size of ROM is required for this generator? Show your ROM and its content.	7
	b)	Design a BCD to excess-3 code converter using PAL.	7
9	a)	Explain in detail about synchronous counters?	7
	b)	Explain different types of flipflops?	7
		(OR)	
10	a)	Explain in detail about asynchronous counters?	7
	b)	Explain in detail about Registers?	7

AR13

CODE: 13CE2001 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, October-2021

STRENGTH OF MATERIALS-I
(Civil Engineering)

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

PART-A

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

1. a) Define stress and strain
   b) List any four types of loads acting on beams.
   c) Sketch the variation of bending stress over an I section.
   d) What is shear stress?
   e) State the importance of calculating deflection of beams.
   f) State the relationship between young's modulus and modulus of rigidity.
   g) Define shear force and bending moment.
   h) What is the importance of section modulus?
   i) What is the ratio of maximum shear stress to average shear stress of a rectangular section?
   j) State moment of area theorems.

PART-B

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

UNIT-I

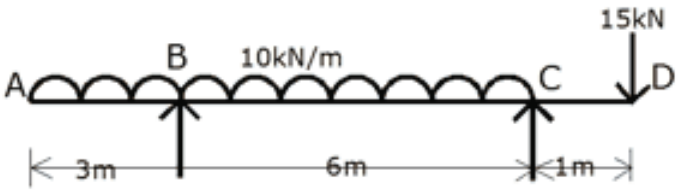
2. a) A bar of 25 mm diameter is subjected to a pull of 40 kN. The measured extension on gauge length of 200 mm is 0.085 mm and change in diameter is 0.003 mm. Calculate poission's ratio and value of young's modulus and modulus of rigidity. 6
   b) Derive the relation between modulus of elasticity and modulus of rigidity. 6

(OR)

3. a) A steel rod of 3 cm diameter and 5 m long is connected to two grips and the rod is maintained at a temperature of 90^0C. Determine the stress and pull exerted when the temperature falls to 30^oC, if (i) the ends do not yield and (ii) the ends yield by 0.13 cm. Take E = $2.1x10^5$ N/mm^2 and $\alpha = 12x10^{-6}/^o$C. 8
   b) A bar of length 20 cm tapers uniformly from 40 mm dia. to 35 mm dia. calculate the change in its length due to an axial pull of 100 kN, if E = 200 GPa. 4

UNIT-II

4. a) Derive the expression for the relation between bending moment and shear force. 4
   b) Draw the shear force and bending moment diagrams. 8



(OR)

5. a) What do you mean by point of contraflexure and state any one difference between point of contraflexure and point of inflexion? 4

b) Draw the shear force and bending moment diagram for the beam. 8

UNIT-III

6. A timber beam of rectangular section of length 8 m is simply supported. The beam carries a UDL of 12 kN/m run over the entire length and a point load of 10 kN at 3 m from the left support. If the depth is two times the width and the stress in the timber is not to exceed 8 N/mm^2, find the suitable dimensions of the section. 12

(OR)

7. a) Derive the bending equation from first principles. 8

b) A cantilever of length 2 m fails when a load of 2 kN is applied at the free end. If the section of the beam is 40 mm * 60 mm, find the stress at the failure. 4

UNIT-IV

8. An I – section beam 350 mm × 250 mm has a web thickness of 12 mm and flange thickness of 20mm. It carries a shear force of 120 kN. Sketch the shear stress distribution across the section. 12

(OR)

9. a) Derive an expression $\tau = Fay/ Ib$. 6

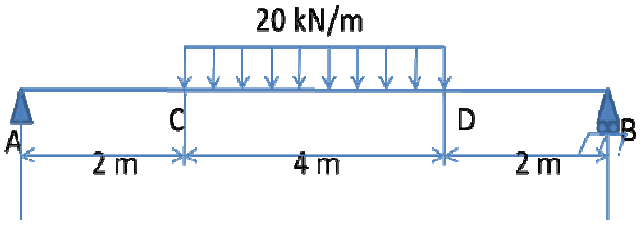
b) A timber beam of rectangular section is simply supported at the ends and carries a point load at the centre of the beam. The maximum bending stress is 12 N/mm^2 and maximum shear stress is 1 N/mm^2, find the ratio of span to the depth. 6

UNIT-V

10. A simply supported beam of span 5 m, carrying a point load of 5 kN at a distance of 3 m from the left end. Find (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection. Take E= 2 x 10^5 N/mm^2 and I = 1 x 10^8 mm^4. Use double integration method 12

(OR)

11. a) Derive the expressions for slope and deflection for the following beam using Macaulay's method.



6

b) Determine the slopes at A,B and deflection at the centre of the span for the above beam. 6

AR13

CODE: 13EE2005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, October-2021
ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

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

PART-A

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

1. a) Write the energy balance equation for motor.
   b) What is the basic principle on which a generator operates?
   c) Is it necessary to use a large number of coils and commutator segments with the coils evenly distributed around the surface of the armature of a DC machine?
   d) Why is commutator employed in DC machines?
   e) What is meant by OCC of a DC generator?
   f) A DC series generator is not considered suitable for general electric supply. Why?
   g) Why large variable speed DC motors are fitted with compensating windings?
   h) Which method is adopted to control the speed of a DC shunt motor above its base speed?
   i) Can a Swinburne's test be applied to a DC series motor? Justify.
   j) What do you mean by "energy loss" in a machine?

PART-B

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

UNIT-I

2. Derive the expression for the magnetic force developed in a multiply excited magnetic system. 12M

(OR)

3. a) Derive the emf equation of DC generator and outline the parameters that affect the emf generation. 6M
   b) The armature of a four-pole DC generator has 90 slots on its armature with 6 conductors per slot. If the armature is lap-wound, flux per pole is 6 × 10–2 Wb and running at 1000 rpm, determine its induced emf. Also determine the electrical power output of the machine if the current per conductor is 100 amperes. 6M

UNIT-II

4. Derive the expression of ATd / pole and ATc / Pole and show the relation to neutralize the demagnetizing effect. 12M

(OR)

5. a) Explain the practical commutation process in DC machine. 6M
   b) A four-pole lap-wound DC machine has an armature of 20 cm diameter and runs at 1500 rpm. If the armature current is 120 A, thickness of the brush is 10 mm and the self-inductance of each coil is 0.15 mH, determine the average emf induced in each coil during commutation (average reactance voltage). 6M

UNIT-III

6. a) Draw and explain the characteristics of DC series generators. 6M
   b) Identify the possible causes of failure of excitation in self-excited generator. 6M

(OR)

7. Explain the parallel operation of DC compound generators and state the reason for connecting equalizer bar in over compounded machine. Also give the conditions for parallel operation of DC generators. 12M

UNIT-IV

8. a) Explain the working principle of a 3-point starter of a DC shunt motor. 6M
   b) Derive the torque equation of a DC machine. 6M

(OR)

9. a) Explain the armature voltage control method of DC shunt motor 6M
   b) The electromagnetic torque developed in a DC machine is 80 Nm for an armature current of 30 A. What will be the torque for a current of 15 A? Assume constant flux. What is the induced emf at a speed of 900 rpm and an armature current of 15 A? 6M

UNIT-V

10. To determine no-load losses, Swinburne's test is performed. Explain it with neat sketch and mention its limitations. 12M

(OR)

11. The following test data is obtained after performing a field test on two identical, mechanically coupled DC series motors (with their field windings connected in series): 12M

    Motor:

    Armature current-50 A, Armature voltage-500 V; Field winding voltage drop 35 V

    Generator:

    Armature current-38 A; Armature voltage-400 V; Field winding voltage drop-32 V; Resistance of each armature is 0.2 Ω.

    Calculate the efficiency of each machine at this load.

AR13

CODE: 13EC2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, October-2021
DIGITAL LOGIC DESIGN
(Common to CSE and IT)

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

PART-A

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

1. a) What is the binary equivalent of the decimal number $(368)_{10}$?
   b) $(734)_8 = ()_{16}$
   c) Define r's and (r-1)'s complement
   d) Draw the circuit of NAND gate with truth table
   e) Define digital clock .
   f) What is Multiplexer?
   g) Difference between Latch and Flip flop.
   h) What is Asynchronous circuit?
   i) What is Parity bit?
   j) What is Duality theorem in Boolean algebra?

PART-B

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

UNIT-I

2. a) Express the following numbers in decimal. 6
      i) $(10110.0101)_2$ ii) $(16.5)_{16}$ iii) $(26.24)_8$
   b) Discuss the subtraction of two numbers using radix complement and diminished radix complement forms 6

(OR)

3. a) What are the universal logic gates? why they are so called? Perform the realization of all the logical gates using NAND gates 6
   b) Obtain the Dual and complement of the following. 6
      i) A'B +A'BC'+A'BCD+ A'BC'D'E

UNIT-II

4. a) Explain in brief the concept of grouping cells for simplification in K-map. 6
   b) Simplify the following Boolean function 6
   $F(A,B,C,D)= \sum m(1,3,7,11,15) + \sum d(0,2,5)$

(OR)

5. a) With the help of logic diagram explain a parallel adder/Subtractor using 2's complement system 6
   b) Design a Full Subtractors using Two half Subtractors. 6

UNIT-III

6. a) Draw the logic circuit of 8 to 3 line Encoder using three 4 input NAND gates. 6
   b) Design a combinational circuit for Multiplexer 6

(OR)

7. a) Explain the operation of priority encoder with a neat diagram. 6
   b) Design a combinational circuit for binary to BCD converter. 6

UNIT-IV

8. a) Draw the block diagram of PLA and explain its operation. 6
   b) Implement the following functions using PROM 6
      i) F1= ∑(0,2,5,7,8,9,10,12)
      ii) F2 = ∑m(1,2,3,4,6,7,8,11,13,15)

(OR)

9. a) Tabulate the PLA programming table for the following Boolean function 6
      i) F1 (x, y, z)= ∑m(0,2,3,7) ii). F2 (x,y,z)= ∑m(1,3,4,6)
      iii) F3(x,y,z)= ∑m(1,4)
   b) Give the comparison between PROM,PLA and PAL. 6

UNIT-V

10. a) Explain the Master-Slave JK Flip Flop, explain its operation and how the race around condition is avoided. 6
    b) Write the characteristic, Excitation tables for JK ,T and D Flip Flops. 6

(OR)

11. a) Draw the circuit diagram of Johnson counter using D- Flip Flops and explain its operation with the help of bit pattern. 6
    b) Define parallel counters. Draw the logic diagram for Synchronous counter that count from 0000 to 1111 . Explain how it counts the numbers. 6

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