AR18

CODE: 18CET204 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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 the functions of cement ingredients.	5M
	b)	What are advantages of admixtures in concrete? Explain any two types of mineral admixtures with their purpose in concrete.	7M
		(OR)	
2.	a)	Write in detail about classification and properties of aggregates.	7M
	b)	Write about hydration of cement.	5M

UNIT-II

3.	a)	Explain quality of water to be used for mixing concrete.	5M
	b)	Define water cement ratio? What is the significance of water cement ratio?	7M
		(OR)	
4.	a)	Briefly explain various stages of manufacturing of concrete.	7M
	b)	Explain the relation between strength and gel space ratio?	5M

UNIT-III

5.	a)	Differentiate between compressive strength and tensile strength of concrete.	7M
	b)	List the factors affecting the creep of concrete?	5M
		(OR)	
6.	a)	Explain with neat sketch non- destructive testing of concrete using pulse velocity method.	7M
	b)	Define modulus of elasticity and shrinkage? Write types of shrinkage.	5M

UNIT-IV

7.	a)	Write short notes on the factors in the choice of mix proportions?	7M
	b)	Write about concept of mix design?	5M
		(OR)	
8.		Design the mix proportions with the following data using IS code method . Characteristic compressive strength of concrete is 25 MPa aggregate, 20 mm maximum size of aggregate , medium degree of workability, specific gravity of cement is 3.13,specific gravity of coarse and fine aggregates are 2.72 and 2.67. Assume any other data suitably .	12M

UNIT-V

9.	a)	Write briefly about the fiber reinforced concrete and their advantages.	7M
	b)	Write about the light weight concrete?	5M
		(OR)	
10.	a)	Explain about polymer concrete and its applications.	5M
	b)	Write about differentiation between High strength and high performance concrete.	7M

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AR18

CODE: 18EET206 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

ELECTRICAL MACHINES-1

(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) Explain the armature reaction in DC generator. 6M
   b) Calculate the flux per pole required on full-load for a 50kW, 400v, 8-pole, 600 r.p.m dc shunt generator with 256 conductors arranged in lap-connected winding. The armature winding resistance is 0.1 Ω, the shunt field resistance is 200 Ω and there is a bruch contact voltage drop of 1 v at each brush on full load? 6M

(OR)

2. a) Derive the EMF equation of DC generator. 6M
   b) What are the methods for improving commutation? 6M

UNIT-II

3. The occ of dc generator driven at 400 rev/min as follows: 12M

Filed current (A)	2	3	4	5	6	7	8	9
Terminal volts	110	155	186	212	230	246	260	271

Find:
i) voltage to which the machine will excite when run as a shunt generator at 400rev/min with shunt field resistance equal to 34Ω
ii) Resistance of shunt circuit to reduce the o.c voltage to 220v.
iii) Critical value of shunt field circuit resistance.
iv) The critical speed when the field circuit resistance is 34 Ω.

(OR)

4. a) Explain the internal & external characteristics of dc series generator? 8M
   b) Derive the torque equation of dc motor? 4M

UNIT-III

5. a) With the help of neat circuit diagram, explain Hopkinson`s test and derive the relations for efficiency (both for generator and motor 6M

   b) a 220v,14.92 kW dc shunt motor when tested by the Swinburne method gave the following results: Running light: armature current was 6.5 A and field current 2.2 A. with the armature locked, the current was 70A.When a potential difference of 3 V was applied to the brushes, Estimate the efficiency of the motor when working under full load conditions? 6M

(OR)

6. a) Explain with neat circuit diagram how a brake test is conducted on a dc shunt motor? 6M
   b) Explain the principle of operation of 3 point starter. 6M

UNIT-IV

7.	a)	Discuss the principal and working of transformer	6M
	b)	Derive the EMF equation of transformer..	6M
		(OR)	
8.	a)	Derive the approximate of a expression for voltage regulation of a transforme	6M
	b)	The no-load current of a transformer is 5A at 0.25pf when supplied at 235V, 50Hz. The number of turns on the primary winding is 200. Calculate (i) the maximum value of flux in the core (ii) the core loss (iii) the magnetizing component	6M

UNIT-V

9.	Explain the O.C and S.C test of a single phase transformer.	12M
	(OR)	
10.	A 10 KVA,2500/250V, 50Hz single phase transformer gave the following test results OC test: 250V, 0.8A, 50W SC test: 60V, 3A, 45W (i) Calculate the load (kVA output) at which maximum efficiency occurs and also the value of maximum efficiency at 0.8 pf. (ii) Compute the voltage regulation and the secondary terminal voltage under rated load at power factor of 0.8 leading	12M

AR18

CODE: 18MET203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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 specific weight, mass density, specific gravity and specific volume.	8M
	b)	Determine the specific gravity of a fluid having viscosity 0.05 poise and kinematic viscosity 0.035 stokes.	4M
		(OR)	
2.	a)	State and prove Pascal's law.	6M
	b)	Differentiate between (i) Absolute and gauge pressure (ii)simple manometer and differential manometer.	6M

UNIT-II

3.	a)	If for a 2D potential flow, the velocity potential is given by $\phi = x(2y-1)$ determine the velocity at that point P (4, 5). Determine also the value of stream function Ψ at the point P.	6M
	b)	The diameters of a pipe at the sections 1 and 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5m/s. Determine also the velocity at section 2.	6M
		(OR)	
4.	a)	A pipe of 300 mm diameter conveying 0.3 m^3/sec of water has a right angled bend in a horizontal plane. Find the resultant force exerted on the bend if the pressure at the inlet and outlet of the bend are 24.525 N/cm^2 and 23.544 N/cm^2.	8M
	b)	Derive Bernoulli's equation from Euler's equation.	4M

UNIT-III

5.	a)	Derive an expression for Darcy weisbach formula.	6M
	b)	Determine the difference in the elevations between the water surfaces in the two tanks which are connected by a horizontal pipe of diameter 400 mm and length 500 m. The rate of flow of water through the pipe is 200 litres/s. Consider all losses and take the value of f = 0.009.	6M
		(OR)	
6.	a)	Derive an expression for the force exerted by a jet of water on the moving curved plate, when the jet strikes the curved plate at the centre.	4M
	b)	A jet of water having a velocity of 20m/s strikes a curved vane, which is moving with a velocity of 10 m/s. The jet makes an angle of 20° with the direction of motion of vane at inlet and leaves at an angle of 130° to the direction of motion of vane at outlet. Calculate (i) vane angles, if the water enters and leaves the vane without shock (ii) work done per second per unit weight of water striking the vanes per second.	6M

UNIT-IV

7. a) A turbine develops 7225 kW power under a head of 25 meters at 135 r.p.m. Calculate the specific speed of the turbine and state the type of turbine. 4M

   b) The penstock supplies water from reservoir to the pelton wheel with a gross head of 500m. One third of the gross head is lost in friction in the pen stock. The rate of flow of water through the nozzle fitted at the end of the penstock is 2.0 m^3/sec. The angle of deflection of the jet is 165^0. Determine the power given by the water to the runner and also hydraulic efficiency of the pelton wheel. Take speed ratio =0.45 and C_v= 1 8M

(OR)

8. a) Define draft tube? Describe with sketch two different types of draft-tubes. 4M

   b) A Kaplan turbine runner is to designed to develop 7357.5 kW shaft power. The net available head is 5.50 m. Assume that the speed ratio is 2.09 and flow ratio is 0.68. If the overall efficiency is 60% and diameter of the boss is $\frac{1}{3}$rd of the diameter of the runner. Find the diameter of the runner, its speed and specific speed. 8M

UNIT-V

9. a) Find the number of pumps required to take water from a deep well under a total head of 89 m. All the pumps are identical and are running at 800 r.p.m. The specific speed of each pump is given as 25 while the rated capacity of each pump is 0.16 $m^{3/}$s. 6M

   b) A centrifugal pump delivers water against a net head of 14.5 metres and a design speed of 1000 r.p.m. The vanes are curved back to an angle of 30^o with the periphery. The impeller diameter is 300 mm and outlet width is 50 mm. Determine the discharge of the pump if manometric efficiency is 95%. 6M

(OR)

10. a) Define indicator diagram. Prove that area of indicator diagram is proportional to the work done by the reciprocating pump. 6M

    b) A double acting reciprocating pump, running at 40 r.p.m., is discharging 1.0 m^3 of water per minute. The pump has a stroke of 400 mm. The diameter of the piston is 200 mm. The delivery and suction head are 20 m and 5 m respectively. Find the slip of the pump and power required to drive the pump. 6M

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AR18

CODE: 18ECT205 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech. I Semester Supplementary Examinations, January-2020

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)	Derive the condition for oscillations? Discuss.	6 M
	b)	Draw the RC-phase shift oscillator and derive the condition for oscillations.	6 M
		(OR)	
2.	a)	Why LC oscillators are not used at low frequencies.	4 M
	b)	With the help of suitable schematic explain the operation of a Colpitts oscillator and derive an expression for its frequency of operation	8 M

UNIT-II

3.	a)	What is Millers theorem?	4 M
	b)	Find the voltage gain, input and output resistances of a emitter follower at high frequencies.	8 M
		(OR)	
4.	a)	Analyse the CS amplifier with source degeneration resistance to find the expressions for R_{in}, R_{out}, A_v and G_v.	8 M
	b)	Define f_T and derive an expression for it.	4 M

UNIT-III

5.	a)	Which configuration is the best in cascade for an output stage and for an intermediate stage? Explain?	4 M
	b)	Analyze the two stage RC coupled Amplifier with respect to gain, band width?	8 M
		(OR)	
6.	a)	Draw the circuit for CASCODE Amplifier. Explain its working; obtain overall values of the circuit in terms of h-parameters.	8 M
	b)	Discuss about the effect of cascading on bandwidth of multistage amplifiers.	4 M

UNIT-IV

7.	a)	Explain about different types of Hybrid-π Capacitances.	8 M
	b)	Explain voltage gain for CE Amplifier	4 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)	What is a Giacelletto model of a Transistor? Derive the relationship between various parameters.	8 M

UNIT-V

9.	a)	Draw Collector Current waveforms of Class A & Class B & Class AB Output Stages.	4 M
	b)	Derive the expressions for Power Conversion Efficiency & Power Dissipation of Class – B Output Stage.	8 M
		(OR)	
10.	a)	Explain about different types of tuned Amplifiers.	6 M
	b)	Explain briefly about Synchronous and stagger tuning.	6 M

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AR18

CODE: 18EST206 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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)	Convert the Binary Number 1101101.101 to i) Decimal ii) Octal iii) Hexadecimal	6M
	b)	Prove NAND and NOR gates are Universal gates.	6M
		(OR)	
2.	a)	Simplify the expression $F = y'z + wxy' + wxz' + w'x'z$ using Boolean Theorems and draw using Basic gates.	8M
	b)	Convert the following to the other canonical form i) F(x,y,z)=Π(0,3,6,7). ii) F(x,y,z)= ∑ (0,1,3,7)	4M

UNIT-II

3.		Draw the simplified logic circuit using NAND gates using K-map F(w,x,y,z)= ∑ (2,3,12,13,14,15) + ∑d(0,8,10,11).	12M
		(OR)	
4.	a)	Draw and explain 4-bit adder using Half-adders and Full-adders.	4M
	b)	Design 2-bit binary multiplier using Half-adder and gates.	8M

UNIT-III

5.	a)	Draw and explain the operation of Full-adder using 3×8 Decoder and OR gates.	6M
	b)	Design 2-bit comparator.	6M
		(OR)	
6.	a)	Design a 4×2-line priority encoder.	6M
	b)	Design a 3-bit binary to Gray code convertor.	6M

UNIT-IV

7.	a)	Draw and explain PLA block diagram.	6M
	b)	Implement the circuit with PLA having 3 inputs and 2 outputs. $F_1(A,B,C)= \sum (1,3,5,7) F_2(A,B,C)= \sum (0,2,4,6)$	6M
		(OR)	
8.	a)	Compare PLA, PAL and PROM.	6M
	b)	Implement the following function using PAL F= ∑m (0,2,4,5,7,11,15)	6M

UNIT-V

9.	a)	Draw and explain 3-bit ring counter.	6M
	b)	Convert D-Flip-flop to SR-Flip-flop.	6M
		(OR)	
10.		Draw and explain all operations of universal shift register.	12M

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AR16

CODE: 16CE2002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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) The fallowing observations were made during a tensile test on a mild steel specimen 40mm in diameter and 200mm in long. Elongation with 40KN load (with in limit of the proportionality), δl =0.0304mm **6m**

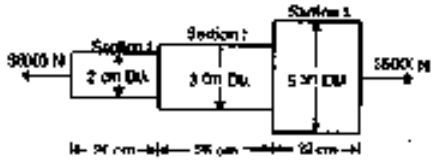
   yield load =161KN
   maximum load =242KN
   length of specimen at fracture =249 mm
   determine:
   (i) Young's modulus of elasticity (ii) Yield point stress
   (iii) Ultimate stress, and (iv) Percentage elongation.

   b) Three bars made of copper, zinc and aluminium are of equal length and have cross section 600, 750, and 1000 square mm respectively. They are rigidly connected at their ends. If this compound member is subjected to a longitudinal pull of 250KN, estimate the proportional of the load carried on each rod and the induced stresses. Take the value of E for copper = $1.3x10^5 N/mm^2$, for zinc =$1.0 x10^5$ N/mm^2, for aluminium = $0.8x10^5$ N/mm^2. **8m**

(OR)

2 a) Draw the neat sketches and explain stress strain curve for mild steel. **6m**

b) An axial pull of 35000N. Is acting on a bar consisting of three lengths as shown in fig. If the young's modulus = $2.1 x10^6 N/mm^2$,determine **8m**
(i) Stress in each section and (ii) total extension of the bar



UNIT-II

3. a) Explain different type's supports with neat sketches? **4m**

b) A cantilever 1.5m long is loaded with a uniformly distributed load of 2 KN/m run over a length of 1.25m. from the free end. It also carries a point load of 3KN at a distance of 0.25 m from the free end. Draw the shear force and bending moment diagrams of the cantilever. **10m**

(OR)

4. a) Draw S.F.D & B.M.D for a simply supported beam carrying a load whose intensity varies uniformly from zero at each end to W per unit run at the mid span. **4m**

b) A Overhanging beam of length 4m between supports A and B, length of overhanging portion BC is 1 m carries two concentrated loads 12KN at 1m from left support A and 8 KN Draw Shear & Moment diagrams. **10m**

UNIT-III

5 a) What are the assumptions considered in the theory of pure bending. 4m

b) Derive the expression for flexural stresses 10m

(OR)

6. a) A steel plate of width 120 mm and of thickness 20 mm is bent into a circular arc of radius 10 m. Determine the maximum stress induced and the bending moment which will produce the maximum stress. Take E= $2* 10^5$ N/mm^2 **4m**

b) A timber beam of rectangular section of length 8m is simply supported. The beam carries a U.D.L of 12KN/m. Run over the entire length and a point load of 10KN at 3m 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. **10m**

UNIT-IV

7. Determine the diameter of a solid soft which will transmit 440KW at 280 r.p.m the angle of twist should not exceed one degree per meter length and the maximum torsional shear stress is to be limited to 40N/mm^2. Assume G=84 KN/mm^2. **14m**

(OR)

8. A timber beam 100mm wide and 150mm deep supports a uniformly distributed load of a span of 2m. If the safe stresses are 28 N/mm^2, in bending and 2KN/mm^2 in shear, calculate the maximum load which can be supported by the beam. **14m**

UNIT-V

9. a) Assumptions in the theory of pure torsion. **4m**

b) Find the maximum torque that can be transmitted by a hallow shaft of outer and inner diameters 150mm and 100mm and for a permissible shear stress of 80N/mm^2. **10m**

i)What is the maximum torque transmitted by solid shaft at the same weight

ii)What is the maximum torque transmitted by hallow shaft at the same weight and 200mm outer diameter

(OR)

10. The external and internal diameters of a hallow shaft are 50mm and 40mm respectively find the maximum power that can be transmitted by the shaft at 600 r.p.m., if the permissible shear stress is 100N/mm^2 and the permissible rate of twist is 30 per meter. Take C= 80x 10^4 N/mm^2 **14m**

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AR16

CODE: 16EE2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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 Discuss briefly armature reaction in D.C generators.
   b A 500V, Wave wound 750rpm D.C shunt generator supplies a load current of 195A. The armature has 720 conductors and shunt field resistance is 100ohms. Find AT_d if the brushes are advanced through 3 commutator segments at this load. Also calculate the extra field turns required to neutralize the armature reaction.

(OR)

2. a Derive the EMF equation of D.C Generator.
   b A compound generator delivers a load current of 50A at 500V. The armature resistance is 0.05Ω, R_{se}=0.03 Ω and R_{sh}=250 Ω. Find the induced e.m.f if the brush contact drop is 1volt per brush. Neglect armature reaction . Assume a)Long shunt. b)Short shunt connecting.

UNIT-II

3. a Explain the Speed-Current, Torque-Current and Speed-Torque characteristics of a D.C shunt and series motors.
   b A 250V shunt motor has an R_a =0.2 Ω and R_{sh} = 250 Ω. The motor draws 25A runs at 1000rpm. Calculate the speed when the line current is 50A if armature reaction weakens the field by 3%. Determine the torque in both cases.

(OR)

4. a Name the losses of D.C machine and classify them into constant and variable losses.
   b A long shunt generator delivers 190A at a terminal P.D of 250V. The armature and series field resistances of 0.03 Ω and shunt field resistance of 50 Ω respectively. The stray losses being 950W. Find a)e.m.f. generated b)copper losses c)output of the prime mover d)commercial efficiency.

UNIT-III

5. a Derive torque equation of a D.C motor from first principles.
   b Explain with neat circuit how brake test is conducted on a DC shunt motor.

(OR)

6. Explain Hopkinson's test in detail with the help of neat circuit .In the above test the following are the readings obtained. Line voltage 230V, line current excluding field currents 50A.Motor armature current 380A.Field currents are 5A&4.2A.Calculate the efficiency of each machine. The armature resistance of each machine is0.02Ω.

UNIT-IV

7. Explain the principle and working of single phase transformer.
   Derive the EMF equation of a single phase transformer.

(OR)

8. A 100KVA, three phase, 50HZ, 3300/400V transformer delta connected on HV and star connected on LV.The resistance of HV winding is 3.5 ohms /phase and that of LV winding is 0.02 ohms/phase. Calculate the iron loss of transformer at normal voltage and frequency its full load efficiency be 95.8% at 0.8Pf lag.

UNIT-V

9. A 10KVA, 230/100V, single phase transformer was subject to OC and SC tests and following results were observed. The input primary current is 2.6A at 0.3Pf when secondary terminals are open and primary winding is supplied at normal voltage. A voltage of 18V applied to the primary causes the full current in secondary when the secondary terminals are short circuited and power input being 240W.Calculate
   a)Efficiency of transformer at full load at UPF b)The load at maximum efficiency occurs.
   c)The value of maximum efficiency.

(OR)

10. a Explain about Scott connection with neat diagram.
    b Explain about the Sumpner's test with neat sketch.

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AR16

CODE: 16ME2006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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 pattern? Discuss about different types of pattern and allowances?	6M
	b)	Differentiate between CO_2 moulding and shell moulding?	8M
		(OR)	
2.		List out various categories of casing defects? Explain briefly about defects and remedies related to cavities with neat sketches?	14M

UNIT-II

3.	a)	What is the difference between fusion and non-fusion welding processes? What are different welding joints and their characteristics?	10M
	b)	Define flux, slag, weld beam, and Arc in conventional welding process. ?	4M
		(OR)	
4.	(a)	Explain about mode of metal transfer in GMAW process	7M
	(b)	Explain the principle of projection welding with the help of neat sketch	7M

UNIT-III

5.	a)	Derive the expression for length of deformation in rolling process	7M
	b)	Explain rolling stand arrangements?	7M
		(OR)	
6.		Define the process of extrusion and classify them with sketch & explain Hydrostatic extrusion?	14M

UNIT-IV

7.		Define forging and explain different types of forging processes with neat sketches, classify the different types of dies?	14M
		(OR)	
8.		Explain fallowing sheet metal working operations with neat sketches (a) Punching (b) Blanking (c) Bending (d) Embossing (e) Coining	14M

UNIT-V

9.		Explain fallowing methods with suitable figures (a) Magnetic pulse forming methods (b) Electro hydraulic forming	14M
		(OR)	
10.		(a) Explain the major components and their functions of injection moulding process with a neat sketch (b) What is blow moulding? Explain merits and demerits of the blow moulding process ?	14M

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AR16

CODE: 16EC2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech. I Semester Supplementary Examinations, January-2020

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 Full Wave Rectifier with neat sketch.	9 M
	b)	Derive ripple factor of L section filter.	**5** M
		(OR)	
2.	a)	Derive an expression for ripple factor in a Full-wave rectifier with resistive load.	7 M
	b)	An LC filter is used to provide a d.c. output with 1 % ripple from a full-wave rectifier operating at 50 Hz. Assuming L/C =0.01, determine the required values of L.	7 M

UNIT-II

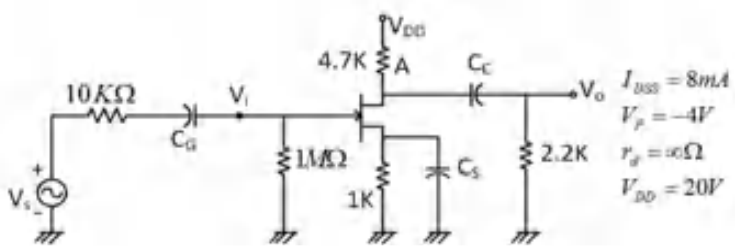
3.	a)	Discuss about thermal runaway	4 M
	b)	Derive and explain the stability factor of self bias circuit.	10 M
		(OR)	
4.	a)	Design a self-bias circuit to have ICQ=2mA and VCEQ=4V with a BJT having β=100 and draw the designed circuit and bring out the advantages of self-bias circuit.	8 M
	b)	What is the need for biasing? Explain the stabilization factors.	6 M

UNIT-III

5.	a)	Derive the h-parameters equations of current gain, voltage gain, input and output impedance for Common Emitter Configuration.	10 M
	b)	Compare CE, CB, CC amplifier configurations?	4 M
		(OR)	
6.	a)	Derive the conversion formulas for the parameters of three transistor configurations.	12 M
	b)	Explain how two port network models can be used to model a transistor.	2 M

UNIT-IV

7.	a)	Explain about different types of Hybrid-π Capacitances.	10 M
	b)	Explain Miller's theorem.	4 M
		(OR)	
8.		Determine the mid band gain for the network shown in figure using the following parameters. C_G = 0.01 µf, C_C = 0.05 µf, C_S = 2 µf	14 M



UNIT-V

9.		Explain different types of negative feedback amplifier circuits (Topologies) and its advantages.	14 M
		(OR)	
10.		What is the effect of a voltage series negative feedback in the following performance measures: (i) Input resistance (ii) Output resistance (iii) Distortion (iv) noise	14 M

AR13

CODE: 13CE2001 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020
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 Hooks law?
   b) What are the temperature stresses?
   c) What is rate of loading
   d) Discuss the differnet types of supports used in SF and BM calculations
   e) Define shear stress?
   f) Write briefly on the assumptions made in the theory of simple bending
   g) What is meant by section modulus?
   h) List out the methods for find the slope and deflection profile of beam?
   i) What is meant by elastic line of beam
   j) Explain briefly the Moment area method

PART-B

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

UNIT-I

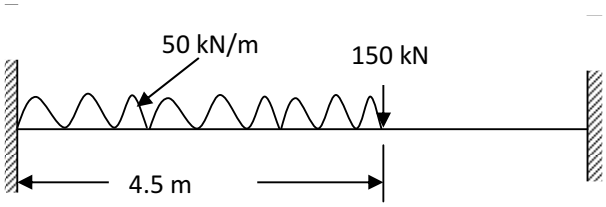
2. Define E, K and C and derive relation $E = 2C(1+\mu)$, $E = 3K(1-2\mu)$, 12M

(OR)

3. A rectangular block of size 50 mm X 100 mm X 80 mm is subjected to the following axial loads. 12 M
   a) 500 kN (tensile) on 100 mm X 80 mm faces
   b) 900 kN (tensile) on 500 mmX 80 mm faces
   c) 1000 kN (Compressive) on 500 mm X 100 mm faces
   Taking the Poisson's ratio as 0.3, find the change in volume of the block. If E=200GPa, find the modulus of rigidity and the bulk modulus.

UNIT-II

4. Draw the shear force and bending moment diagrams of a fixed beam of span 6.0 m and loaded as shown in the Figure. 12 M



(OR)

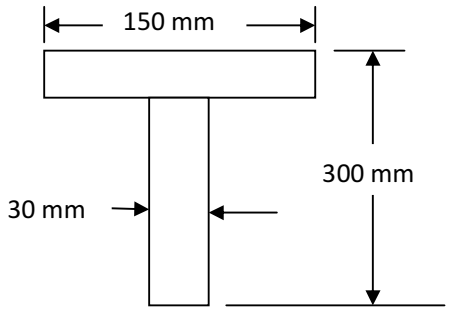
5. A horizontal beam simply supported on a span of 10 m carries a total load of 1000 kg. The load distribution varies parabolically from zero at each end to a maximum at mid span. Calculate the maximum BM, shearing force at quarter span 12 M

UNIT-III

6. a What are the assumptions made in simple theory of bending? 6 M
   b Derive relation between bending moment and bending stress 6 M

(OR)

7. For a T-section shown in figure below and obtain section modulus and hence obtain the maximum bending stress if it is subjected to a B.M of 20KN-m — 12 M



UNIT-IV

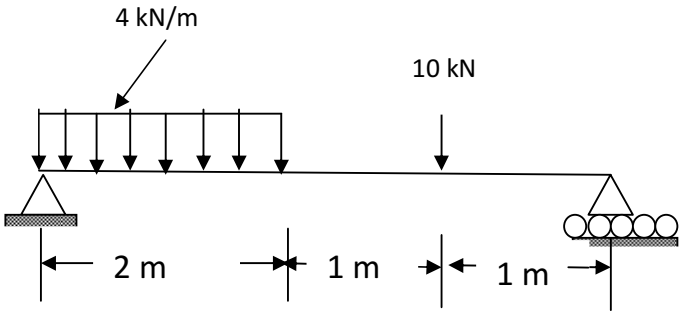
8. A cantilever beam, span 1 m, consists of a box section 60 mmX40 mmX5 mm thick is subjected to a concentrated load of 10 kN at its free end ? The plane of action of the load is passing through the centroid and making an angle 30^0 with respect to vertical. Determine the maximum stresses at a section 0.25 m from the fixed end. — 12 M

(OR)

9. a Derive an expression for shear stress distribution across I-section — 5 M
   b A hollow steel cylinder 20 cm external diameter, 10 cm internal diameter acting as a beam is subjected to a shearing force F perpendicular to the axis. Determine the mean stress and the average shearing stress at the neutral axis and at 25 mm from neutral axis as a fraction of the mean value. — 7 M

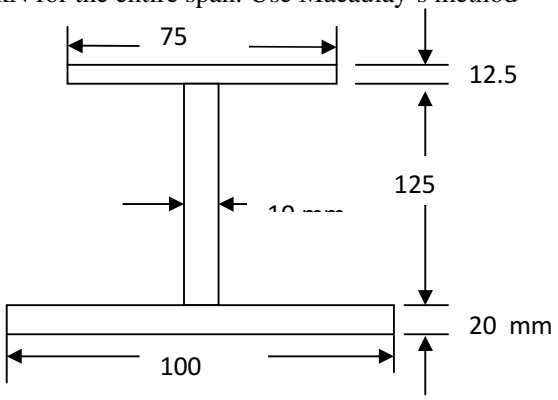
UNIT-V

10. a Explain indetail the moment area method with suitable example. — 4 M
    b Using Macaulay's, calculate the mid-span diction for a simply supported beam loaded as shown in Figure. — 8 M



(OR)

11. Determine the maximum deflection in a simply supported beam of length 12 m carrying a concentrated load of 250 kN at 3 m from right hand side and also carrying a uniformly distributed load of 6 kN for the entire span. Use Macaulay's method — 12 M



AR13

CODE: 13EC2006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020

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) Convert the number to decimal number $(1BC2)_{16.}$
   b) Obtain the 2's complement of the binary number:1101101.
   c) Draw the circuit diagram for 2 inputs EX-OR gate with least possible number of NAND gates.
   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. 6M
   i) $(5673)_{10}$ ii) $(46021)_8$ iii) $(4ABC)_{16}$
   b) i) obtain the 2's complement of binary number: 10110111. 6M
   ii) obtain the BCD representation of decimal number 379.
   iii)what is the odd parity bit for binary number:1101010.

(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 conical 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. 6M
   b) Design a 2-bit comparator of $A=A_1A_0$ and $B=B_1B_{0.}$ 6M

(OR)

7. a) Draw the gate level diagram of a 3-bit binary to octal decoder. 6M
   b) Implement the function using 8×1 MUX. F(ABCD)=∑ (0,1,5,7,9,12,14,15). 6M

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, transition table, and excitation table of JK-flipflop. 6M

(OR)

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

AR13

CODE: 13EC2002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech. I Semester Supplementary Examinations, January, 2020

ELECTRONIC CIRCUITS-I
(ELECTRONICS AND COMMUNICATION ENGINEERING)

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

PART-A

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

1. a) What is a Bleeder resistance?
   b) What is the difference between a Zener diode and an ordinary diode?
   c) What is early effect?
   d) What is the advantage of self bias over other biasing techniques?
   e) Draw the h - parameter model of a transistor in CE configuration.
   f) For an n - channel JFET, given V_{GG} = -2V, V_{DS}= 8V, I_D = 7mA. what is the value of I_G?
   g) State miller's theorem
   h) CE amplifier produces 180 degrees phase shift between input and output. justify.
   i) As the frequency increases beyond upper cut-off frequency, gain of the amplifier decreases. why?
   j) On what factors does the gain bandwidth product depends on?

PART-B

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

UNIT-I

2. a) Write a short note on Avalanche breakdown and Zener breakdown 3M
   b) Explain the operation of a bridge rectifier with neat sketches and waveforms. 9M

(OR)

3. a) In a full wave rectifier, the secondary of the transformer used is 30 – 0 – 30 V. The secondary resistance is 20Ω. The diodes have forward resistance of 20 Ω and load resistor of 170 Ω 8M
   (i) Calculate Peak, average and rms currents,
   (ii) Calculate DC output power, ac input power and efficiency
   (iii) Calculate form factor, ripple factor and % regulation.
   b) Compare Half Wave Rectifiers to that of the Full Wave. 4M

UNIT-II

4. a) Explain how a FET acts as a voltage variable resistor with neat sketches. 6M
   b) If the emitter current of a transistor is 8 mA and I_B is 1/100 of I_C, determine the levels of I_C and I_B. 6M

(OR)

5. a) What is thermal runaway? Explain. 4M
   b) Discuss about self bias circuit with stability factor. 8M

UNIT-III

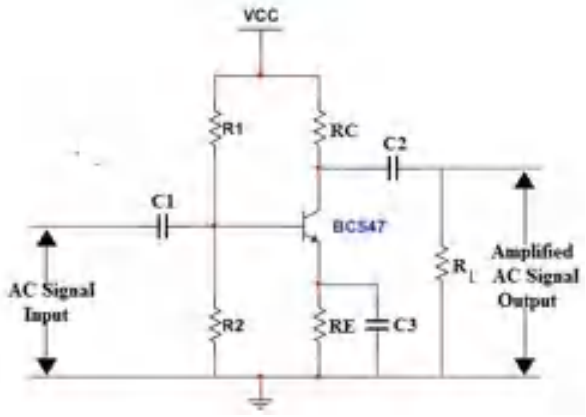
6. a) Given , h_{fe} = 50, h_{ie} = 1.1KΩ, h_{oe} = 25μA/V and h_{re} = 2.5X10^{-4}, calculate the values of h_{fb}, h_{ib}, h_{ob} and h_{rb} 6M
   b) Draw the small Signal model of a JFET and derive the expressions for input and output impedances. 6M

(OR)

7. Derive the h-parameters expressions for Voltage gain, current gain, input impedance and output impedance of a CE amplifier. 12M

UNIT-IV

8. Consider a single stage amplifier with R_S = 1KΩ, R_1 = 50KΩ, R_2 = 2KΩ, R_C = 1KΩ, R_L = 1.2KΩ, h_{fe} = 50, h_{ie} = 1.1KΩ, h_{oe} = 25μA/V and h_{re} = 2.5X10^{-4} as shown. Find A_V, A_I, Z_i, A_{IS}, A_{VS} and Z_o 12M



(OR)

9. a) Explain Miller's theorem 4M
   b) Explain simplified CE h-parameter model. 8M

UNIT-V

10. a) On what factors does the Gain bandwidth product of a High frequency model depend up on? justify the reasons. 6M
    b) CE short circuit current gain of a transistor is 25 at a frequency of 2MHz if f_β = 200KHz. Calculate (i) f_T (ii) h_{fe} (iii) $|A_i|$ at a frequency of 10MHz. 6M

(OR)

11. a) Write a short note on hybrid - π capacitances. 6M
    b) Derive hybrid - π capacitance. 6M

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CODE: 13EE2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020

ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

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

PART-A

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

1. a) What are the necessary conditions for parallel operation of DC shunt generators?
   b) What are the losses in DC motor?
   c) What are the tests performed to find the efficiency of a DC shunt motor?
   d) Write the expression for field energy of a double excited system.
   e) What is the significance of starter in DC motors?
   f) Why a DC series motor cannot be started under no-load?
   g) What are the advantages of Swinburne's test?
   h) Write the advantages of BLDC over DC motor
   i) What is the importance of back e.m.f in a dc motor?
   j) State the condition for maximum efficiency in dc machine

PART-B

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

UNIT-I

2. a) Obtain the expression for mechanical force of a singly excited system. 6M
   b) Assume reluctance path is negligible, the exciting current is 2.25A, the plunger is allowed to move slowly from g=1cm to 0.2cm. Find the electrical energy to the exciting coil and mechanical output. 6M

(OR)

3. a) Drive an expression for induced EMF of DC generator. 6M
   b) A short shunt compound generator delivers a load current of 30A at 220V and has armature, series field and shunt field resistance of 0.05Ω, 0.3Ω, 200Ω respectively. Calculate the induced E.M.F and armature current. Allow 1 V per brush for contact drop. 6M

UNIT-II

4. a) What are interpoles, their purpose, location and excitation? Explain. 6M
   b) Derive the expression for cross magnetizing and demagnetizing ampere conductors in D.C machine. 6M

(OR)

5. a) Explain about the commutation process in D.C generator with neat schematic. 6M
   b) What are the methods for improving commutation? 6M

UNIT-III

6. a) What is the importance of parallel operation of D.C generators. 4M
   b) Two shunt wound generators running in parallel have each an armature resistance of 0.02Ω & field resistance of 50Ω. The combined external load current is 5000A. The emf induced in machine-I is 600V & machine-II is 610V. Calculate bus bar voltage and output of each machine. 8M

(OR)

7.	a)	Briefly explain the characteristics of DC compound generator with relevant equations.	6M
	b)	List the factors involved for voltage build-up in a shunt generator.	6M

UNIT-IV

8.	a)	Derive the expression for torque developed by a DC motor from fundamentals.	6M
	b)	Briefly explain the characteristics of DC series motor with relevant equations.	6M

(OR)

9.	a)	Explain the methods of speed control of D.C series motor.	6M
	b)	A 250V D.C shunt motor has an armature resistance of 0.5Ω and shunt field resistance of 250Ω.when driving a constant load torque at 600 r.p.m the motor draws a line current of 21A.what will be the new speed if an additional resistance of 250Ω is inserted in the field circuit.	6M

UNIT-V

10.		Explain fields test carried out on D.C series machine.	12M

(OR)

11.		Explain the test by which a D.C machine performance is predetermined as motor and generator.	12M

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CODE: 13ME2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020
PROUCTION TECHNOLOGY
(Mechanical Engineering)

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

PART-A

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

1. a) Define casting yield
   b) What are the types of allowances?
   c) What are types of resistance welding processes?
   d) Why filler material is used in the welding process?
   e) What type of process is used to fabricate tooth paste tubes?
   f) Major difference between blanking and punching operation?
   g) What are types of drawing process?
   h) Define spring back effect
   i) What are the types of high velocity forming processes?
   j) What is function of filler material in plastic processing?

PART-B

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

UNIT-I

2.	a)	Explain the step by step procedure to design the raiser in sand casting for a given product?	5
	b)	Describe the construction and working principle of cupola furnace with neat diagram?	7
		(OR)	
3.		Design a casting mould with all gating elements with proper dimension for casting the aluminium cube of 200 mm ×100 mm × 200 mm dimension?	12

UNIT-II

4.	a)	Describe various modes of metal transfers in arc welding process?	7
	b)	Explain in detail about Oxy-Acetylene flame process with neat diagram?	5
		(OR)	
5.	a)	Differentiate between TIG and MIG welding process with at least one application	4
	b)	Explain Laser welding process with neat diagram and also discuss about its process parameters?	8

UNIT-III

6.	a)	Explain various types of metal working processes with diagram	8
	b)	Explain major advantages of forming process compared to other manufacturing processes?	4
		(OR)	
7.	a)	Explain step by step rolling passes to obtain polygon shape from cylindrical rod in rolling process	6
	b)	Analysis the rolling process for reducing the thickness of the given product	6

UNIT-IV

8.	a)	Suggest a suitable process to fabricate 1 mm diameter wire from 10 mm diameter rod and explain that process with step by step procedure?	9
	b)	Differentiate between impact and hydrostatic extrusion process	3
		(OR)	
9.	a)	Explain in detail about die forging and roll forming with neat diagram?	8
	b)	Explain the following processes such as punching, blanking, spinning, and coining with neat diagram?	4

UNIT-V

10.		Explain fallowing methods with suitable figures (a) Magnetic pulse forming methods (b) Electro hydraulic forming	12
		(OR)	
11.	a)	Explain calendaring and blow moulding process in detail with neat diagram?	6
	b)	Explain various processes for fabricating thermoplastic plastics with neat diagram?	6

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