AR20

CODE: 20CET205 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

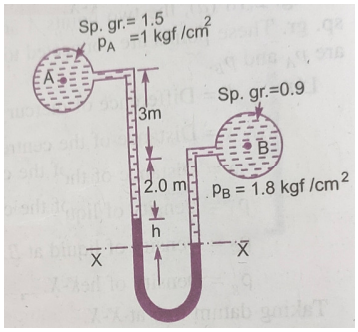
II B.Tech I Semester Supplementary Examinations, June, 2022

FLUID MECHANICS AND HYDRAULIC MACHINES

(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	Marks	CO	Blooms Level
1.	a)	Explain about the simple manometers with neat sketches.	4	CO1	Remember
	b)	A rectangular plane surface is 2 m wide and 3 m deep. It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and (a) coincides with water surface, (b) 2.5 m below the free water surface.	6	CO1	Apply
		(OR)			
2.	a)	A differential manometer is connected at the two points A and B of two pipes as shown in figure. The pipe A contains a liquid of sp. gr. – 1.5 while pipe B contains a liquid of sp. gr. – 0.9. The pressure at A and B are 1 kgf/cm^2 and 1.80 kgf/cm^2 respectively. Find the difference in mercury level in the differential manometer. 	5	CO1	Apply
	b)	A rectangular plane surface 2 m wide and 3 m deep lies in water in such a way that its plane makes an angle 30^o with the free surface of water. Determine the total pressure and position of centre of pressure when the upper edge is 1.5 m below the free water surface.	5	CO1	Apply

			Marks	CO	Blooms Level
		UNIT-II			
3.	a)	A block of wood of specific gravity 0.7 floats in water. Determine the meta centric height of the block if its size is 2 m x 1 m x 0.8 m.	5	CO2	Apply
	b)	A Steam function is given by $\Psi = 5x - 6y$. Calculate the velocity components and also magnitude and direction of the resultant velocity at any point.	5	CO2	Apply
		(OR)			
4.	a)	The following cases represents the two velocity components, determine the third component of velocity such that they satisfy the continuity equation. $u = x^2 + y^2 + z^2$; $v = xy^2 - yz^2 + xy$.	5	CO2	Apply
	b)	A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s, find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s.	5	CO2	Apply

			Marks	CO	Blooms Level
		UNIT-III			
5.	a)	A pipe, through which water is flowing, is having diameter, 20 cm and 10 cm at the cross section 1 and 2 respectively. The velocity of water at section 1 is given by 4.0 m/s. find the velocity head at sections 1 and 2 also rate of discharge.	5	CO3	Apply
	b)	A 20 cm x 10 cm venturimeter is inserted in a vertical pipe carrying oil sp. gr. 0.8, the flow of oil is in upward direction. The difference of levels between the throat and inlet section is 50 cm. The oil mercury differential manometer gives a reading of 30 cm of mercury. Find the discharge of oil. Neglect losses.	5	CO3	Apply
		(OR)			

6.	a)	250 litres/s of water is flowing in a pipe having a diameter of 300 mm. If the pipe is bent by 135^o (that is change from initial to final direction is 135^o), find the magnitude and direction of the resultant force on the bend. The pressure of water flowing is 39.24 N/cm^2.	6	CO3	Apply
	b)	Explain Reynold's experiment with neat sketch.	4	CO3	Remember
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	Find the bed slope of trapezoidal channel of bed width 6 m, depth of water 3 m and side slope of 3 horizontal to 4 vertical, when the discharge through the channel is 30 m^3/s. Take Chezy's constant, C = 70.	5	CO4	Apply
	b)	Determine the maximum discharge of water through a circular channel of diameter 1.5 m when the bed slope of the channel is 1 in 1000. Take C = 60.	5	CO4	Apply
		(OR)			
8.	a)	Find the longitudinal bed slope of a rectangular channel of bed width 6 m and depth of flow 2 m while the rate of flow is 20 m^3/s. Take Chezy's constant, C=50.	4	CO4	Remember
	b)	Define sequent depths of hydraulic jump and derive the expression for head loss through hydraulic jump.	6	CO4	Apply
		UNIT-V	Marks	CO	Blooms Level
9.	a)	Explain about classification of hydraulic turbines.	4	CO5	Remember
	b)	A reaction turbine works at 300 rpm under a head of 120 m. Its diameter at inlet is 120 cm and the flow area is 0.4 m^2. The angles made by absolute and relative velocities at inlet are 20^0 and 60^0 respectively with the tangential velocity. Determine (i) the volume flow rate (ii) The power developed and (iii) Hydraulic efficiency. Assume whirl at outlet is zero.	6	CO5	Apply

(OR)

			Marks	CO	Blooms Level
10.	a)	Explain the main components of Kalpan turbine with neat sketch.	4	CO5	Remember
	b)	A reaction turbine works at 450 rpm under a head of 120m. Its diameter at inlet is 120 cm and the flow area is $0.4m^2$. The angles made by absolute and relative velocities at inlet are 20^0 and 60^0 respectively with the tangential velocity. Determine (i) the volume flow rate (ii) The power developed and (iii) Hydraulic efficiency. Assume whirl at outlet is zero.	6	CO5	Apply

UNIT-VI

			Marks	CO	Blooms Level
11.	a)	Explain main parts of a centrifugal pump with neat sketch.	4	CO6	Remember
	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%.	6	CO6	Apply

(OR)

			Marks	CO	Blooms Level
12.	a)	Explain about cavitation and precaution against cavitation.	4	CO6	Remember
	b)	A three-stage centrifugal pump has impellers 45 cm in diameter and 3 cm wide at outlet. The vanes are curved back at the outlet at 400 and reduce the circumferential area by 10%. The manometric efficiency is 90% and the overall efficiency is 80%. Determine the head generated by the pump when running at 1000 rpm and delivering 50 litres per second. What should be the shaft power?	6	CO6	Apply

AR20

CODE: 20EET205 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

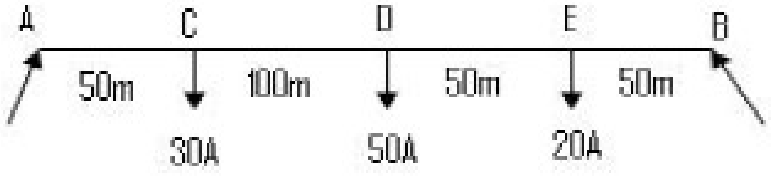
ELECTRICAL POWER GENERATION & DISTRIBUTION

(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

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Distinguish between super-heater and economizer?	(5M)	CO1	L2
	b)	What is feed water? What are the problems due to impurities in fuel water?	(5M)	CO1	L1
		(OR)			
2.	a)	Explain in detail various components and function of a hydroelectric generation system?	(5M)	CO1	L2
	b)	List the factors to be considered for the selection of site of Thermal power plant?	(5M)	CO1	L1
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Describe with help of neat sketch, the construction and working of pressurized water reactor (PWR).What are its advantages and disadvantages?	(5M)	CO2	L1
	b)	What is meant by nuclear fission and chain reaction?	(5M)	CO2	L2
		(OR)			
4.	a)	.With neat diagram explain the operation of BWR .	(5M)	CO2	L2
	b)	Explain the Principle operation of Gas Power Generation with block diagram	(5M)	CO2	L2
		UNIT-III	Marks	CO	Blooms Level
5.		2- wire DC distributor AB 300 m long and is fed from both ends and supplies a uniformly distributed load of 0.15amps per meter length together with the following concentrated loads: 50A at C; 60A at D and 40A at E, distances AC, CD and DE being 75, 100 and 50 meters respectively. If the supply voltages at A and B are 205 and 200 volts respectively and the resistance of each conductor is 0.00015 ohms per meter, calculate the current supplied at each end and the point of minimum potential.	(10M)	CO3	L3
		(OR)			
6.		A distributor AB is fed from both the ends, as shown in Fig. the loop resistance of the distributor is 0.5 Ohm/km. Calculate the minimum voltage and its location and currents in various sections if (a) Voltage at A and B are equal to 230V. (b)Voltage at point A is 230V and at B it is 234V.	(10M)	CO3	L3



			Marks	CO	Blooms Level
		UNIT-IV			
7.	a)	Give the comparison of outdoor and indoor sub-stations	(5M)	CO4	L1
	b)	Compare gas insulated substations with air insulated sub stations?	(5M)	CO4	L1
		(OR)			
8.		Write a short notes on substation equipment	(10M)		L1
		UNIT-V	Marks	CO	Blooms Level
9.		The yearly load duration curve of a power plant is a straight line. The maximum load is 500MW and the minimum load is 400MW. The capacity of the plant is 750MW. Find (i) Plant Capacity Factor (ii) Load Factor (iii) Utilization Factor (iv) Reserve Capacity.	(10M)	CO5	L3
		(OR)			
10.		Briefly explain about load curve and load duration curves with neat diagram	(10M)	CO5	L2
		UNIT-VI	Marks	CO	Blooms Level
11		Explain with examples: (i) flat rate tariff (iii) two part tariff (ii) block rate tariff (iv) power factor tariff v) flat rate tariff	(10M)	CO6	L2
		(OR)			
12.		Explain the desirable characteristics of a Tariff Methods.	(10M)	CO6	L2

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CODE: 20MET204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

APPLIED THERMO FLUIDS - I

(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

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	What is meant by TDC and BDC? In a suitable sketch mark the two dead centres.	5M	CO1	Understand
	b)	Discuss in details the application of various types of internal combustion engines.	5M	CO1	Understand
		(OR)			
2.	a)	What is meant by cylinder row and cylinder bank?	5M	CO1	Understand
	b)	Classify the internal combustion engine with respect to method of charging the cylinder.	5M	CO1	Understand
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Explain primary fuels with examples.	5M	CO2	Understand
	b)	Discuss about gaseous fuels with examples.	5M	CO2	Understand
		(OR)			
4.		Define the following efficiencies. (i). Indicated thermal efficiency (ii). Brake thermal efficiency (iii). Mechanical efficiency (iv). Relative efficiency (v). Volumetric efficiency	10M	CO2	Apply
		UNIT-III			
5.	a)	What are the various factors that affect the flame speed?	5M	CO3	Apply
	b)	Define abnormal combustion and its consequences?	5M	CO3	Understand
		(OR)			
6.	a)	What are the stages of combustion in C.I engine?	5M	CO3	Understand
	b)	Explain the effect of quality of fuel factor on the delay period?	5M	CO3	Understand
		UNIT-IV			
7.	a)	Write a short notes on (i) Impact of jets (ii)Jet propulsion	5M	CO4	Apply
	b)	Derive an expression for force of jet of water exerted on a inclined vertical plate in the direction of the plate.	5M	CO4	Apply
		(OR)			

			Marks	CO	Blooms Level
8.	a)	Differentiate between the turbines and pumps.	5M	CO4	Understand
	b)	What are unit quantities? Define the unit quantities for a turbine.	5M	CO4	Apply
		UNIT-V	Marks	CO	Blooms Level
9.	a)	Define centrifugal pump. Explain the working of single stage centrifugal pump.	5M	CO5	Understand
	b)	Explain what do you understand by static head and friction head?	5M	CO5	Understand
		(OR)			
10.	a)	How does the pump performance vary with impeller diameter?	5M	CO5	Understand
	b)	What is NPSH of a pump and effects of inadequate NPSH?	5M	CO5	Understand
		UNIT-VI	Marks	CO	Blooms Level
11.	a)	Differentiate between a single acting and double acting reciprocating pump	5M	CO6	Understand
	b)	A single-acting reciprocating pump is running at 30 rpm, delivers 0.012 m^3/s of water. The diameter of the piston is 250 mm and stroke length 500 mm. Determine: (a) theoretical discharge, (b) coefficient of discharge.	5M	CO6	Apply
		(OR)			
12.	a)	Distinguish between Reciprocating and Rotary compressors.	5M	CO6	Understand
	b)	A double acting reciprocating pump, running at 50 rpm is discharging 900 liters of water per minute. The pump has s stroke of 400 mm. The diameter of the piston is 250 mm. The delivery and suction head are 25 m and 4 m respectively. Find the slip of the pump and power required to drive the pump.	5M	CO6	Apply

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AR20

CODE: 20ECT204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

DIGITAL ELECTRONICS

(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)	Convert the following numbers. i) $(100111.0011)_2$ to Base 10. ii) $(23.225)_{10}$ to base 8. iii) $(1110101101101)_2$ to base 8	5M	CO1	Apply
	b)	Discuss the subtraction of two numbers using radix complement and diminished radix complement forms.	5M	CO1	Understand
		(OR)			
2.	a)	Perform XS-3 Subtraction of $(255)_{10}$ and $(163)_{10}$	5M	CO1	Apply
	b)	What is gray code? Develop 3 bit gray codes for 0 to 7	5M	CO1	Apply
			Marks	CO	Blooms Level
		UNIT-II			
3.	a)	Simplify each of the following expressions i) ab +a'bc' +bc ii)(ab' +c) (a +b')c iii)ab' +c +(a'+b)	5M	CO2	Apply
	b)	Write the postulates and prove any two theorems of Boolean algebra.	5M	CO2	Evaluate
		(OR)			
4.	a)	Simplify the following Boolean function using K-Map method F(A, B, C, D)= Σ(0, 6, 8, 13, 14); d(A, B, C, D)=Σ (2, 4,10)	5M	CO2	Apply
	b)	Draw the multiple-level NOR circuit for the following expression: (AB'+CD')E + BC(A+B)	5M	CO2	Design
			Marks	CO	Blooms Level
		UNIT-III			
5.	a)	Design a full adder by using two half adders.	5M	CO3	Design
	b)	Design a XS-3 adder.	5M	CO3	Apply
		(OR)			
6.	a)	Design 4-bit Binary parallel adder/ subtractor circuit?	5M	CO3	Apply
	b)	Design a circuit for conversion of binary code to gray code	5M	CO3	Apply
			Marks	CO	Blooms Level
		UNIT-IV			
7.	a)	Design 4x16 decoder circuit using two 3x8 decoders.	5M	CO4	Design
	b)	Design 2 bit comparator?	5M	CO4	Apply
		(OR)			
8.	a)	Design a decoder for LED seven segment display	10M	CO4	Apply
			Marks	CO	Blooms Level
		UNIT-V			
9.	a)	Convert SR flip flop to T flip flop	5M	CO5	Apply
	b)	Design a mod 8 ripple counter using JK flipflops	5M	CO5	Apply
		(OR)			
10.	a)	Design universal shift register?	5M	CO5	Apply
	b)	Write the differences between synchronous and Asynchronous Counters.	5M	CO5	Apply
			Marks	CO	Blooms Level
		UNIT-VI			
11.	a)	Explain structural modelling	5M	CO6	Understand
	b)	VHDL code for 16*1 Multiplexer	5M	CO6	Apply
		(OR)			
12.	a)	Write in brief about the history of VHDL	5M	CO6	Remember
	b)	Write VHL code for Full Adders in three different models.	5M	CO6	Apply

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AR20

CODE: 20CST204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June, 2022

OBJECT ORIENTED PROGRAMMING

(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

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Explain in detail the most significant features of JAVA programming.	5M	CO1	2
	b)	Give the naming conventions in Java.	5M	CO1	2
		(OR)			
2.	a)	Demonstrate precedence rules and associativity with an example Java program.	5M	CO1	2
	b)	Explain the concepts of arrays. Write a program to find maximum element of an array.	5M	CO1	4
		UNIT-II	Marks	CO	Blooms Level
3.	a)	What is a Constructor? Explain the different types of constructors with an example.	5M	CO2	2
	b)	Differentiate between a class and object.	5M	CO2	4
		(OR)			
4.	a)	Explain about static and this keyword with example programs.	7M	CO3	2
	b)	Write about garbage collection in Java with suitable example.	3M	CO2	3
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Explain various forms of inheritance with suitable code segments.	5M	CO3	3
	b)	Differentiate between interface and abstract class.	5M	CO3	4
		(OR)			
6.	a)	What is an Interface? Give the general form of an Interface and also discuss the implementation details of Interfaces.	5M	CO3	2
	b)	Explain final keyword and illustrate uses of 'final' keyword with inheritance with suitable code segments.	5M	CO3	3
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	What is the importance of Exception Handling in Java? Define and distinguish between checked and unchecked exceptions.	5M	CO5	4
	b)	What is java package? What is the significance of the CLASSPATH environment variable in creating or using a package?	5M	CO4	3
		(OR)			
8.	a)	How to handle multiple catch blocks for a nested try block? With a program illustrate user defined exception handling	5M	CO5	5
	b)	Explain the various access specifiers are used in java.	5M	CO4	3
		UNIT-V	Marks	CO	Blooms Level
9.	a)	Discuss Inter thread communication with examples.	5M	CO6	4
	b)	Write a program that demonstrate the priority setting in threads.	5M	CO6	5
		(OR)			
10.	a)	What is the difference between a thread and a process?	5M	CO6	4
	b)	Explain the synchronization methods in java.	5M	CO6	2
		UNIT-VI	Marks	CO	Blooms Level
11.	a)	Write a java code to create applet and customize it based on input parameters	5M	CO6	5
	b)	What is an applet? Write about attributes of applet tags.	5M	CO6	1
		(OR)			
12.	a)	Discuss various states in the life cycle of an applet in detail.	5M	CO6	4
	b)	State and explain the simple Applet display methods with example.	5M	CO6	2

AR18

CODE: 18CET202 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

FLUID MECHANICS-I

(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)	Demonstrate Pascal's law with a neat diagram	6M
	b)	Define hydro static law. Explain with a neat sketch	6M
		(OR)	
2.	a)	State the law of Viscosity and explain the classification fluids.	6M
	b)	Explain with the help of a neat diagram the construction and working of a manometer.	6M

UNIT-II

3.	a)	Derive the equation for hydro static force on vertical plane.	6M
	b)	Define streamline, streak line and stream tube with a neat sketch.	6M
		(OR)	
4.	a)	Deduce the equation of force on a curved surface.	6M
	b)	Explain about buoyancy of force.	6M

UNIT-III

5.	a)	Derive the discharge through venture meter.	6M
	b)	Deduce the Euler equation for three dimensional fluid flow.	6M
		(OR)	
6.	a)	Explain rotational flow and irrotational flow.	6M
	b)	Explain flow net analysis.	6M

UNIT-IV

7.	a)	Briefly explain Reynold's experiment	6M
	b)	Explain the characteristics of Laminar & turbulent flow.	6M
		(OR)	
8.	a)	Explain about surface and body forces.	6M
	b)	Explain different forces on pipe bend.	6M

UNIT-V

9.	a)	Deduce Darcy's equation.	6M
	b)	Mention the various losses in a pipe line flow.	6M
		(OR)	
10.	a)	Explain venture meter and orifice meter.	6M
	b)	Explain about broad crested weirs.	6M

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AR18

CODE: 18EET206 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

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)	Explain various types of losses occurring in DC generator.	6M
	b)	In a 110V DC compound generator, the resistance of the armature shunt field series field resistances are 0.06 ohm, 25 ohms and 0.04 ohm respectively. The load consists of 200 lamps each rated at 55W, 110V. Find the total emf generated and the armature current when the machine is connected in (a) long-shunt and (b) short shunt.	6M

(OR)

2.	a)	Explain different methods to neutralize the effect of armature reaction.	6M
	b)	A shunt generator delivers 195A at terminal p.d of 250 V. The armature resistance and shunt field resistance are 0.02 ohm and 50 ohm respectively. The iron and frictional losses 950 W. Find (a) E.M.F. generated (b) Cu losses (c) output of the prime motor (d) commercial, mechanical and electrical efficiencies.	6M

UNIT-II

3.	a)	What is the significance of residual magnetism? Explain the experimental determination of OCC in laboratory?	6M
	b)	The hysteresis and eddy-current losses of a DC machine running at 1000rpm are 250 W and 100 W respectively. If the flux remains constant, at what speed will be total losses be halved	6M

(OR)

4.	a)	Explain the principle of operation of a DC motor. Derive the equation of back EMF of a DC 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-III

5.	a)	Draw and explain the characteristic of DC series motor.	6M
	b)	A 240 V DC shunt motor has a field resistance of 400 ohm and an armature resistance of 0.1 ohm. The armature current is 50 A and the speed is 1000 rpm Calculate the additional resistance in the field to increase the speed to 1200 rpm Assume that armature current remains the same and the magnetisation curve to be a straight line.	6M

(OR)

6.	a)	Explain the Hopkinson's test conducted on DC motor with neat sketch.	6M
	b)	In a brake test the effective load on the branch pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 720 rpm. The motor took 49 A at 220 V. Calculate the output power and the efficiency at this load.	6M

UNIT-IV

7. a) Derive E.M.F equation of single phase transformer from the fundamentals. 6M
   b) A 30 KVA, 2400/120-V,50 Hz transformer a high voltage winding resistance of 0.1 ohm and leakage reactance of 0.22 ohm. The low voltage winding resistance of 0.035 ohm and leakage reactance of 0.012 ohm. Find the equivalent winding resistance, reactance and impedance referred to (i) high voltage side (ii) low voltage side. 6M

(OR)

8. a) Derive condition for maximum efficiency and also KVA corresponding to maximum efficiency. 6M
   b) Define voltage regulation and derive the voltage regulation of a lagging load with phasor diagram. 6M

UNIT-V

9. a) What is Sumpner's test? Explain the procedure for determining efficiency with neat circuit diagram. 6M
   b) What is the necessity of parallel operation of transformers and what are the necessary and sufficient conditions. 6M

(OR)

10. a) Explain the phase conversion from three phase to two phase using Scott connection. 6M
    b) A 50 MVA, 60 Hz single-phase transformer indicates that it has a voltage rating of 8 kV: 78 kV. Open circuit test and short circuit test gave the following results: 6M
    Open Circuit Test: 8 kV, 61.9 A and 136 kW
    Short Circuit Test: 650 V, 6.25 kA and 103 kW.
    Determine the efficiency and voltage regulation if the transformer is operating at rated voltage and a load of 0.9 p.f. lagging.

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CODE: 18MET201 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

THERMODYNAMICS

(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)	What is the zeroth law of thermodynamics? State the first law for closed system undergoing a cycle	6M
	b)	A stationary mass of gas is compressed without friction from an initial state of $0.3m^3$, and 0.105 MPa to a final state of $0.15m^3$ and 0.105 MPa, the pressure remaining constant during the process. There is a transfer of 37.6 KJ of heat from the gas during the process. How much does the internal energy of the gas change?	6M

(OR)

2.	a)	Differentiate intensive, extensive and specific properties with examples	6M
	b)	A mass of 1.5 kg of air is compressed in a quasi-static process from 0.1 MPa to 0.7 MPa for which pv = constant. The initial density of air is1.16 kg/m^3 . Find the work done by the piston to compress the air.	6M

UNIT-II

3.	a)	Discuss the equivalence of Kelvin-Planck and Clausius statements.	5M
	b)	A reversible heat engine operates between two reservoirs at temperatures of 600°C and 40°C. The engine drives a reversible refrigerator which operates in between reservoirs at temperatures of 40°C and -20°C. The heat transfer to the heat engine is 200 kJ and the net work output of the combined heat engine refrigerator plant is 360 kJ. (i) Evaluate the heat transfer to the refrigerant and the net heat transfer to the reservoir at 40°C. (ii) reconsider given that the efficiency of the heat engine and the COP of the refrigerator are each 40% of their maximum possible values.	7M

(OR)

4.	a)	What is Perpetual motion machine of the first kind and second kind	6M
	b)	A heat engine is used to drive a heat pump. The heat transfers from the heat engine and from the heat pump are used to heat the water circulating through the radiators of a building. The efficiency of the heat engine is 27% and the COP of the heat pump is 4. Evaluate the ratio of the heat transfer to the circulating water to the heat transfer to the heat engine.	6M

UNIT-III

5.	a)	What is triple point? Show the triple point of water on P-T diagram	6M
	b)	Water at 40^oC is continuously sprayed into a pipeline carrying 5 tonnes of steam at 5 bar, 300^oC per hour. At a section downstream where the pressure is 3 bar, the quality is to be 95%. Find the rate of water spray in kg/h.	6M

(OR)

6. a) Describe Available energy for thermodynamic cycle. 4M
   b) Calculate the entropy change of the universe as a result of the following processes: 8M
(i) A copper block of 600 g mass and with Cp of 150 J/K at 100°C is placed in a lake at 8°C. ii) The same block, at 8°C, is dropped from a height of 100 m into the lake. iii) Two such blocks, at 100 and 0°C, are joined together.

UNIT-IV

7. a) Write the Vander Waals equation of state. How does it differ from the ideal gas equation of state 6M
   b) A fluid having a temperature of 150°C and the specific volume of 0.96 m^3/kg at its initial state expands at constant pressure, without friction, until the volume is 1.55 m^3/kg. Find, for 1 kg of fluid, the work the heat transferred and final temperature if a) the fluid is air b) the fluid is steam 6M

(OR)

8. a) Derive the equation to estimate the change in entropy of gas undergoing a process with change of state. 6M
   b) A certain gas has Cp = 1.968 and Cv = 1.507 KJ/Kg K. Find its molecular weight and the gas constant. 6M
A constant volume chamber of 0.3 m^3 capacity contains 2 Kg of this gas at 5°C. Heat is transferred to the gas until the temperature is 100°C. Find the work done, the heat transferred and the changes in internal energy, enthalpy and entropy.

UNIT-V

9. a) Illustrate the working of Otto cycle with help of P-V and T-S diagrams. 5M
   b) An engine working on the Otto cycle has an air standard cycle efficiency of 56 % and rejects 544 kJ/kg of air. The pressure and temperature of air at the beginning of compression are 0.1 MPa and 60^0C respectively. Compute (i) compression ratio of the engine (ii) work done 0.2 per kg of air (iii) pressure and temperature at the end of compression. 7M

(OR)

10. a) Establish the relation for air standard efficiency of Atkinson cycle 6M
    b) Air enters the compressor of a gas turbine plant working on the Brayton cycle at 27°C, 1 bar. The pressure ratio in the cycle is 6. If Wt = 2.5 Wc, Wt and Wc are the turbine and compressor work respectively, Calculate the maximum temperature and the cycle efficiency 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, June-2022

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)	Establish the condition for frequency of oscillation in an RC phase shift oscillator.	6M
	b)	In a Hartley oscillator, if L_1=20μH, L_2=2mH and variable capacitance. Determine the range of capacitance values if the frequency is varied between 950 kHz and 2050 kHz.	6M

(OR)

2.	a)	Derive the frequency of oscillation of Hartley oscillator.	6M
	b)	What is the equivalent circuit of a crystal? Derive the expressions for series and parallel resonances. A crystal oscillator has the following parameters: L=0.33H, C=0.065pF, Cm=1.0pF and R=5.5 k ohm. i) Find the series resonant frequency. ii) Find the Q of the crystal.	6M

UNIT-II

3.	a)	Draw the JFET small signal model. Derive the expression for voltage gain in common source amplifier	6M
	b)	A CE amplifier is drawn by a voltage source of internal resistance R_S = 800 Ω and load impedance is a resistance RL = 1000 ohms. The h-parameters are h_{ie} = 1.0 K Ω, h_{re} = 2 ×10-4, h_{fe} = 50 and h_{oe} = 25 μ A/V. compute A_I, R_I, A_V, R_o using exact analysis.	6M

(OR)

4.	a)	Draw the CE amplifier with un bypassed emitter resistance and derive the expression for its Ri and Av.	6M
	b)	A transistor in CB circuit has the following h parameters h_{ib}=15, h_{fb}=0.95, h_{rb}=3X10^{-4}, hob=0.5X10^{-6}. Find Ri, Ai, Yo, Av, if Rs=350 Ω and R_L=1k Ω.	6M

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.	6M
	b)	A CE-CC Amplifier uses R_S=500Ω, R_{C1}= 5KΩ, R_{E2}=10KΩ.The h-parameters h_{ie}=1.1KΩ, h_{fe}=50 and negligible h_{re}, h_{oe}. Compute individual & overall A_I & A_V, R_i & R_o.	6M

(OR)

6.	a)	What is the use of transformer coupling in the output of multistage amplifier?	6M
	b)	With the help of a neat circuit diagram, describe the working of a cascode amplifier.	6M

UNIT-IV

7. a) Derive the expression for CE short-circuit current gain with resistive load. 6M
   b) Discuss in detail about the Validity of hybrid- π model. Also give typical values of hybrid- π conductances and capacitances. 6M

(OR)

8. a) Derive the expressions for f_T and f_{β}. 6M
   b) Draw the Hybrid- π model for a common emitter transistor. At room temperature (300K) at I_C=10mA and V_{CE}=8V. h_{ie}=500, hoe=$2*10^{-4}$ μs, h_{fe}=100 and $h_{re}=10^{-4}$. At the same operating point f_T=50MHz and C_{ob}=3PF.Calculate the values of hybrid-π parameters. 6M

UNIT-V

9. a) Draw the complimentary-symmetry class-B power amplifier and explain its operation. 6M
   b) A transformer coupled class A large signal amplifier has maximum and minimum values of collector-to-emitter voltage of 25V and 2.5V. Determine its collector efficiency. 6M

(OR)

10. a) Compare single tuned inductively coupled amplifier with capacitive coupled single tuned amplifier? Highlight their merits. 6M
    b) How is the bandwidth of tuned amplifier improved? Draw such a circuit and explain its working. 6M

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AR18

CODE: 18CST203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

OBJECT ORIENTED PROGRAMMING

(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)	What is an object oriented programming? Explain principals of OOPs?	6M
	b)	Write a java program to illustrate the usage of conditional statements and looping Statements.	6M

(OR)

2.	a)	Write the significance of Java Virtual Machine.	6M
	b)	Describe the structure of a typical Java program with an example.	6M

UNIT-II

3.	a)	How to share the data among the functions with the help of static keyword? Explain the same with an example.	6M
	b)	Design a class that represents a bank account and construct the methods to i) Assign initial values ii) Deposit an amount iii) Withdraw amount after checking balance iv) Display the name and balance.	6M

(OR)

4.	a)	Explain the usage of constructor and types of constructors in Java.	6M
	b)	Write a program that shows an Employee class which contains various methods for accessing employee's personal information and methods for paying an employee.	6M

UNIT-III

5.	a)	What is method overriding? Illustrate the concepts of method overriding with an example. Is constructor overriding is possible in Java?	6M
	b)	Write a program which specify that there are two classes Rectangle and Circle which implements the interface and find the area of rectangle and circle	6M

(OR)

6.		Write different types of inheritances in Java and give an example for each.	12M

UNIT-IV

7.	a)	Demonstrate nested try and final statements in exceptional handling.	6M
	b)	Describe the process of importing and accessing a package with suitable examples.	6M

(OR)

8.	a)	Differentiate between Checked and UnChecked Exceptions with examples.	6M
	b)	List the mostly used java API packages and explain how to add more classes to a package.	6M

UNIT-V

9.	a)	Explain various states in the life cycle of an applet. And also give the syntax of each state.	6M
	b)	Explain thread synchronization with respect to multithreading. Why is it important?	6M

(OR)

10.	a)	What is the difference between init( ) and start ( ) methods in an Applet? When will each be executed?	6M
	b)	What do you mean by multithreading? Develop a simple application program to illustrate the use of multithreading.	6M

AR16

CODE: 16EE2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June, 2022

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 the principle of working of a DC generator and derive its EMF equation from it.	7M
	b)	An 8-pole dc shunt generator with 778 wave connected armature conductors and running at 500rpm supplies a load of 12.5Ω resistance at a terminal voltage of 250V. The armature resistance is 0.24Ω and field resistance is 250Ω. Find the armature current, the induced emf and the flux per pole.	7M
		(OR)	
2.	a)	Brief about various methods of Excitation of DC machines with necessary diagrams	7M
	b)	Discuss about Compensating windings and interpoles in a DC machine.	7M

UNIT-II

3.	a)	Brief about various characteristics of DC Generator.	7M
	b)	Explain the significance of back emf in DC motor.	7M
		(OR)	
4.	a)	Derive the expression for torque developed by a DC motor.	7M
	b)	A 6-pole dc machine armature has 36 slots, 2 coil-sides/slot, 8 turns/coil and is wave wound. The pole-shoe is 18 cm long and the mean air-gap diameter is 25 cm. The average flux density over one/ pole pitch is 0.8 T. Find the gross torque and mechanical power output when the machine is operating as a motor at 1200 rpm with an armature input current of 10 A	7M

UNIT-III

5.	a)	Brief the need of starter in a DC motor. With neat sketch explain 3 point starter.	7M
	b)	Explain the various speed control methods of DC motor.	7M
		(OR)	
6.	a)	Explain Hopkinson's test on pair of DC machines	7M
	b)	In a break test, the effective load on a branch pulley was 38.1kg, the effective diameter of pulley is 63.5cm and speed 12rps. The motor took 49A at 220V. Calculate the output power and the efficiency at this load.	7M

UNIT-IV

7.	a)	Differentiate core type and shell type transformer with neat diagrams.	7M
	b)	Draw and explain the phasor diagram of ideal transformer on load.	7M
		(OR)	

8. a) Discuss the equivalent circuit of a practical transformer. 7M

b) A transformer is rated 10 kVA, 50 Hz 2300/230 V. Its equivalent resistance and reactance on the HV sides are 7.92 Ω and 3.16 Ω respectively. It has a core loss of 75 W at rated voltage of 2300 V. It is supplying a load of 10 kvA at 0.8 pf lagging at rated voltage 230 V. For this, the supply voltage on the HV side is 2410 V. Compute its efficiency of operation. Assume the core loss to be proportional to the square of the applied voltage. 7M

UNIT-V

9. a) With neat circuit diagram, explain the procedure for obtaining core losses in a transformer. 7M

b) A 500-kVA, 3-phase, 50 Hz transformer has a voltage ratio (line voltages) of 33/11 kV and is delta/star connected. The resistances per phase are: high voltage 35 Ω, low voltage 0.876 Ω and the iron loss is 3050 W. Calculate the value of efficiency at full-load and one-half of full-load respectively 0.8 pf. 7M

(OR)

10. a) Discuss any two three phase transformer connections along with their applications. 7M

b) Two transformers are required for a Scott connection operating from a 440-V, 3-phase supply for supplying two single-phase furnaces at 200 V on the two-phase side. If the total output is 150 kVA, calculate the secondary to primary turn ratio and the winding currents of each transformer. 7M

AR13

CODE: 13EE2005 **SET-2**

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

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.