AR20

CODE: 20CET204 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ENGINEERING GEOLOGY

(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

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Explain different branches of Geology	7	1	
	b)	What is the difference between colour and streak	3	1	
		(OR)			
2.	a)	What is mineral and how it is different from crystal	3	1	
	b)	Explain the properties of quartz and feldspar	7	1	
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Explain different structures of igneous rocks with neat sketches	10	2	
		(OR)			
4.	a)	Explain the properties of granite, gneiss, and sandstone	10	2	
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Explain the classification weathering	10	3	
		(OR)			
6.	a)	What is unconformity and types	5	3	
	b)	What is fault and different types of fault	5	3	
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	Describe any one geological exploration technique for groundwater exploration	5	4	
	b)	Explain the term aquifer, aquifuge, aquitard, aquiclude	5	4	
		(OR)			
8.	a)	What are the different zones of groundwater	5	4	
	b)	Explain any one geological consideration for ground water	5	4	
		UNIT-V	Marks	CO	Blooms Level
9.	a)	Explain different types of dams	5	5	
	b)	Explain the necessity of tunnelling	5	5	
		(OR)			
10.	a)	Explain the geological considerations for the successful Tunnelling	10	5	
		UNIT-VI	Marks	CO	Blooms Level
11.	a)	What is Richter scale	4	6	
	b)	Explain the seismic zones of India	6	6	
		(OR)			
12.	a)	What are causes and effects of earthquake	5	6	
	b)	What are precautions to be considered for constructions in seismic areas	5	6	

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CODE: 20EET204 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ELECTRICAL MEASUREMENTS

(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)	Outline the importance of damping mechanism in an instrument and how are they classified.	(5M)	CO1	Understand
	b)	Derive an expression for the force of attraction between the plates in MI instrument.	(5M)	CO1	Understand
		(OR)			
2.	a)	Demonstrate the construction and working principle of the PMMC instrument.	(5M)	CO1	Understand
	b)	A 15 V moving iron voltmeter has a resistance of 500 ohms and inductance of 0.14 H. Assuming that the instrument reads correctly on D.C. What will be its reading on A.C. at 15 V when the frequency is i) 25 Hz and ii) 100 Hz.	(5M)	CO1	Understand
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Demonstrate the working of a Single phase dynamometer wattmeter with a neat connection diagram	(5M)	CO2	Understand
	b)	A three phase motor draws a line current of 50 A from 220V source while starting. The power factor is 0.4. Find the readings of two wattmeters connected to measure power.	(5M)	CO2	Understand
		(OR)			
4.	a)	Discuss the various types of errors and their methods of compensation in the dynamometer type wattmeters.	(5M)	CO2	Understand
	b)	Demonstrate how the range of wattmeter is Extended using instrument transformers.	(5M)	CO2	Understand
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Explain about Single phase induction type energy meter, driving its torque equation?	(5M)	CO3	Understand
	b)	Explain the working of tri vector meter.	(5M)	CO3	Understand
		(OR)			

			Marks	CO	Blooms Level
6.	a)	Demonstrate the working of Three phase energy meter.	(5M)	CO3	Understand
	b)	The disc of an energy meter makes 100 revolutions per unit of energy. When a 1000 watt load is connected, the disc rotates at 12 rpm. If the load is on for 10 hours, how many units are recorded as error?	(5M)	CO3	Understand

UNIT-IV

			Marks	CO	Blooms Level
7.	a)	What are the difficulties encountered in the measurement of High resistances.	(5M)	CO4	Understand
	b)	Explain the procedure for measuring a low resistance with the help of kelvin's double bridge. Derive the relation for finding the unknown resistance.	(5M)	CO4	Understand
		(OR)			
8.	a)	Explain Wien bridge for measurement of frequency and derive the necessary relation	(5M)	CO4	Understand
	b)	Describe the working of hay's bridge for measurement of inductance. Derive the equations for balance condition	(5M)	CO4	Understand

UNIT-V

			Marks	CO	Blooms Level
9.	a)	Explain the procedure for measurement of Flux/flux density in a ring specimen with a neat connection diagram	(5M)	CO5	Understand
	b)	Explain the working of DC Crompton potentiometer with a neat circuit diagram	(5M)	CO5	Understand
		(OR)			
10.	a)	Distinguish between a Flux meter and ballistic galvanometer	(5M)	CO5	Understand
	b)	Explain how hysteresis loop is determined by method of reversals with a neat connection diagram	(5M)	CO5	Understand

UNIT-VI

			Marks	CO	Blooms Level
11.	a)	Explain the working of Digital Frequency meter with a neat block diagram	(5M)	CO6	Understand
	b)	What is Transducer, and explain the working of Peizo-Electric transducers.	(5M)	CO6	Understand
		(OR)			
12.	a)	Discuss how Thermocouples and Strain Gauges works.	(5M)	CO6	Understand
	b)	Describe the construction and working of Electronic energy meter.	(5M)	CO6	Understand

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CODE: 20MET203 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

FLUID MECHANICS

(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 Pascal's law? Explain.	4M	CO1	Remembering
	b)	What is the difference between dynamic viscosity and kinematic viscosity. State their units of measurements.	6M	CO1	Remembering
		(OR)			
2.	a)	Calculate the capillary effect in millimetres in a glass tube of 4 mm diameter, when immersed in (i) water and (ii) mercury. The temperature of the liquid is 20°C and the values of surface tension of water and mercury at 20°C in contact with air are 0.0735 N/m and 0.51 N/m respectively. The contact angle for water θ = 0° and for mercury θ = 130°. Take specific weight of water at 20°C as equal to 9790 N/m^3 .	10M	CO1	Applying
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Define i)Total Pressure ii) Centre of Pressure	4M	CO2	Remembering
	b)	Derive an expression for the depth of centre of pressure from free surface of liquid of an inclined plane surface submerged in the liquid.	6M	CO2	Applying
		(OR)			
4.	a)	A rectangular pontoon is 5 m long, 3 m wide and 1.20 m high. The depth of immersion of the pontoon is 0.80 m in sea water. If the centre of gravity is 0.6 m above the bottom of the pontoon, determine the meta-centric height. The density for sea water = 1025 kg/m^3	10M	CO2	Applying
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Differentiate between laminar flow and turbulent flows	4M	CO3	Understanding
	b)	List out the forces acting in a moving fluid .Explain any two in detail.	6M	CO3	Understanding
		(OR)			
6.	a)	A pipe line 300 m long has a slope of 1 in 100 and tapers from 1.2m diameter at the high end to 0.6m at the low end. The discharge through the pipe is 5.4 m^3 /minute. If the pressure at the high end is 70 kpa, find the pressure at the low end.	10M	CO3	Applying
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	Derive an expression for head loss due to friction	10M	CO4	Applying
		(OR)			
8.	a)	A horizontal venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and the throat is 20 cm of mercury. Determine the rate of flow. Take $C_d = 0.98$	10M	CO4	Applying
		UNIT-V	Marks	CO	Blooms Level
9.	a)	What are the methods of dimensional analysis ? Describe the Rayleigh's method for dimensional analysis.	10M	CO5	Applying
		(OR)			
10.	a)	The pressure difference Δp in a pipe of diameter D and length l due to viscous flow depends on the velocity V, viscosity μ and density ρ. Using Buckingham's π theorem, obtain an expression for Δp	10M	CO5	Applying
		UNIT-VI	Marks	CO	Blooms Level
11.	a)	Define displacement thickness. Derive an expression for the displacement thickness.	10M	CO6	Understanding
		(OR)			
12.	a)	Explain how a boundary layer separates from boundary.	4M	CO6	Understanding
	b)	What are the characteristics of boundary layer formation over a flat plate ?	6M	CO6	Applying

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CODE: 20ECT203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

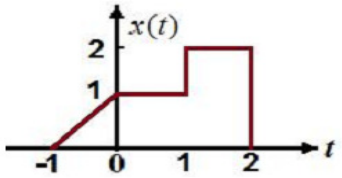
II B.Tech I Semester Supplementary Examinations, June-2022

SIGNALS & SYSTEMS

(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)	A Continuous time signal is shown in figure. Sketch and label each of the following signals. (i) $y_1(t) = x(t).u(1-t)$ (ii) $y_2(t) = x(t)\{u(t) - u(t-1)\}$ 	5	1	Apply
	b)	Prove that $\cos n(\omega_0 t)$ and $\cos m(\omega_0 t)$ are orthogonal to each other for all integers m,n	5	1	Understand
		(OR)			
2.	a)	Consider two DT sequences $x_1[n] = \{3 \;\; 0 \;\; -1 \;\; \underset{\uparrow}{1} \;\; 0 \;\; -2 \;\; 3 \;\; -2 \;\; 5\}$ and $x_2[n] = \{1 \;\; -2 \;\; 0 \;\; 1 \;\; 3 \;\; \underset{\uparrow}{0} \;\; 1 \;\; -1\}$. Perform the following operations and plot them. (i) Addition (ii) Subtraction, and (iii) Multiplication	5	1	Apply
	b)	Discuss the orthogonal signal space and obtain the expression for mean signal error.	5	1	Understand
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Explain the Dirchlet's conditions and its significance to obtain Fourier series representation of any signal	5	2	Understand
	b)	Find the Fourier transform of the signal $x(t) = e^{-at}u(t), a > 0$	5	2	Apply
		(OR)			
4.	a)	Derive the expression for Fourier Transform from Fourier Series.	5	2	Understand
	b)	The given rectangular pulse is $x(t) = \begin{cases} 1, & \lvert t \rvert < T_1 \\ 0, & \lvert t \rvert > T_1 \end{cases}$. Find the Fourier transform	5	2	Apply
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Explain the concept of Paley-Wiener criterion for physical realizability using relevant expressions.	6	3	Apply
	b)	Discuss about the Causality and physical reliability of a system.	4	3	Understand

(OR)

			Marks	CO	Blooms Level
6.	a)	Validate that the system with excitation $x(t)$ and response $y(t)$ described by the following equation are linear, time variant, static, and causal. $y(t) = x(\sin(t))$	6	3	Apply
	b)	What are the characteristics of ideal LPF and HPF	4	3	Remember

UNIT-IV

			Marks	CO	Blooms Level
7.	a)	What is convolution of a signal in time and frequency domain. Explain briefly.	5	4	Understand
	b)	Prove that auto correlation function and energy/power spectral density function forms Fourier Transform pair	5	4	Understand
		(OR)			
8.	a)	Give four steps to compute the convolution integral.	5	4	Remember
	b)	Prove that the correlation and convolution functions are identical for even signals.	5	4	Understand

UNIT-V

			Marks	CO	Blooms Level
9.	a)	Find the Laplace transform and ROC of the unit step signal	4	5	Apply
	b)	Find the inverse Laplace transform of the $X(s) = \frac{s+4}{s^2+5s+6}$	6	5	Apply
		(OR)			
10.	a)	Find the Laplace transform of the signal $x(t) = e^{-2t}\sin(\Omega t)u(t)$	6	5	Apply
	b)	Let X(s)=L{X(t)}.Determine the initial value, X(0) and the final value, X(∞), for the following signal using initial value and final value theorems .X(s)=$\frac{s+1}{s^2+2s+2}$	4	5	Apply

UNIT-VI

			Marks	CO	Blooms Level
11.	a)	State and prove sampling theorem.	5	6	Apply
	b)	Discuss the types of Sampling with neat sketches.	5	6	Apply
		(OR)			
12.	a)	A multi tone signal consists of 200 Hz, 350Hz and 500 Hz frequency components respectively. (i) Find Nyquist rate. (ii) If 350 Hz frequency signal is removed, find the Nyquist rate? Is there any change in Nyquist rate? (iii) A 1000 Hz tone is added to the signal. Find the Nyquist rate for this new signal. Is there any change in Nyquist rate?	5	6	Understand
	b)	Find the inverse Z-Transform of X(Z)= $\frac{z}{(z-1)(z-2)(z-3)}$, $\lvert Z\rvert > 3$	5	6	Apply

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CODE: 20CST203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

COMPUTER ORGANIZATION & ARCHITECTURE

(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)	Design a circuit transferring data from a 4 bit register uses multiplexer's to another register? And use selection circuit to select any of four 4-bit registers content as to bus. Give full explanation?	5M	1	4
	b)	Explain the life cycle of an instruction exhibition.	5M	1	2
		(OR)			
2.	a)	Explain about Register Transfer Language (RTL).	5M	1	2
	b)	Explain how various registers and memory are connected using a common bus with diagram.	5M	1	2
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Apply Booth's algorithm to multiply the numbers 23 and 19 for no. of bits n=6 in each number.	5M	2	3
	b)	Explain addition/subtraction operations of fixed point representation with the help of a flowchart.	5M	2	2
		(OR)			
4.	a)	Construct the flowchart for division operation for signed magnitude data.	5M	2	3
	b)	Perform the following Arithmetic operations using Signed Magnitude representation and verify whether there is Overflow or not? i. (+13) + (+9) ii. (+9) + (–13) iii. (+10) + (+18)	5M	2	3
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Differentiate Cache Memory Vs Virtual Memory.	5M	3	2
	b)	Illustrate how the performance of the computer system is improved by memory hierarchy.	5M	3	2
		(OR)			
6.		Explain different types of mapping techniques in cache memory.	10M	3	2
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	Differentiate programmed I/O and interrupt driven I/O.	5M	4	2
	b)	Explain DMA in detail with a neat sketch?	5M	4	2
		(OR)			
8.	a)	Describe Asynchronous data transfer using Strobe Control.	5M	4	1
	b)	Explain the following i) I/O bus & interface – modules ii) Isolated I/O & Memory mapped I/O	5M	4	2
		UNIT-V	Marks	CO	Blooms Level
9.		Discuss in detail about pipeline hazards and give various solutions to handle hazards	10M	5	4
		(OR)			
10.	a)	Illustrate the timing diagram of instruction pipeline.	5M	5	2
	b)	Examine the conflicts in executing instruction pipeline	5M	5	4
		UNIT-VI	Marks	CO	Blooms Level
11.		Describe Cache Coherence problem. Propose a way to avoid the problem.	10M	6	2
		(OR)			
12.	a)	Describe the characteristics of multiprocessors.	5M	6	1
	b)	Explain the system bus structure for multiprocessors.	5M	6	2

AR18

CODE: 18EET205 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ELECTRONIC DEVICES AND CIRCUITS

(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)	Derive expression for forward bias current in a PN diode	6M
	b)	Explain the formation of depletion layer in PN diode under zero bias and its variation of depletion layer with forward bias and reverse bias	6M
		(OR)	
2.	a)	Illustrate the characteristics of Zener diode in both forward reverse bias	6M
	b)	Explain the operation of Tunnel diode	6M

UNIT-II

3.	a)	Derive the expression for ripple factor and efficiency of a Full Wave Rectifier	6M
	b)	Explain operation of half wave rectifier with C filter	6M
		(OR)	
4.	a)	Derive the expression for ripple factor and efficiency of a Half Wave Rectifier	6M
	b)	Compare HWR with FWR based on the following: PIV, ripple factor, efficiency, TUF , frequency and components used	6M

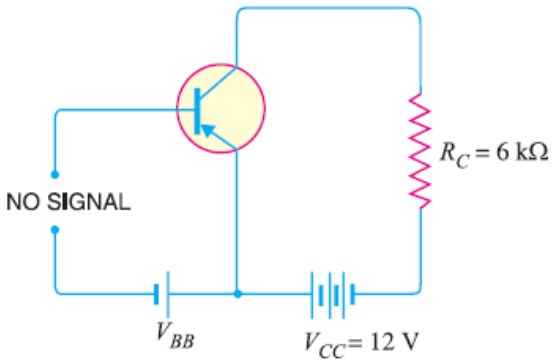
UNIT-III

5.	a)	In a common base connection i. If I_E = 1mA, I_C = 0.95mA. Calculate the value of I_B. ii. If the emitter current is 1mA and current amplification factor is 0.9. determine the value of base current. iii. If I_C = 0.95 mA and I_B = 0.05 mA. Find the value of α.	6M
	b)	Illustrate the characteristics of JFET	6M
		(OR)	
6.	a)	Illustrate the input and output characteristics of Transistor in CB configuration	6M
	b)	Explain the operation of UJT and draw its characteristics	6M

UNIT-IV

7.	a)	State the need for biasing in Transistor and draw the AC and DC load line of CE fixed bias transistor amplifier.	6M
	b)	Explain any one circuit which provides bias stabilization in transistor amplifier	6M
		(OR)	

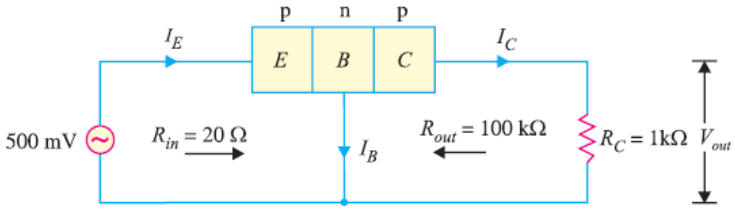
8. a) In the circuit diagram shown in Fig, if V_{CC} = 12V and R_C = 6 kΩ, draw the DC load line. What will be the Q point if zero signal base current is 20μA and β = 50? 6M



b) Define Thermal Runaway and derive the expression to avoid thermal runaway in CE amplifier 6M

UNIT-V

9 a) Compute voltage amplification of the circuit shown below. Assume α_{ac} =1. 6M



b) Explain the concept of transistor as a switch. 6M

(OR)

10. a) State and explain the Barkhausan condition. 6M

b) Explain the operation of RC phase shift oscillator and reproduce the expressions for frequency of oscillations. 6M

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CODE: 18MET203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

FLUID MECHANICS AND HYDRAULIC MACHINES

(Mechanical Engineering)

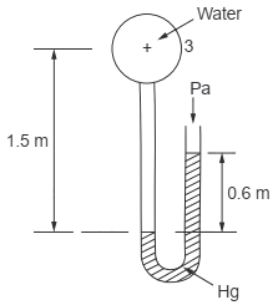
Time: 3 Hours **Max Marks: 60**

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) Determine the volumetric strain and bulk modulus of elasticity of a liquid if the pressure of the liquid increased from 70 N/cm^2 to 130N/cm^2. The volume of the liquid decreases by 0.15 percent. 6M

   b) The left limb of a simple U- tube mercury manometer is connected to a water pipe line and the right limb is kept open to the atmosphere as shown in the figure. Determine the pressure at point-3 in the pipe. Take density of water = 1000 kg/m^3, density of mercury = 13600 kg/m^3. 6M



(OR)

2. a) Explain the following i) specific weight. ii) Specific volume. iii) Capillarity. 6M

   b) The dynamic viscosity of an oil, used for lubrication between a shaft and sleeve is 6 poise (0.6 Ns/m^2). The shaft is rotating at 190 rpm. Calculate the power lost in the bearing for a sleeve length of 90 mm. the thickness of oil film is 1.5 mm. 6M

UNIT-II

3 Write the Bernoulli's equations and its assumptions. Derive the expression for Bernoulli's equation. 12M

(OR)

4. a) List the various forces acting on a moving fluid element. Write the Navier stokes equations. 4M

   b) The water is flowing through a pipe having diameters 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 liters/s. The section 1 is 6 m above datum and section 2 is 4 m above datum. If the pressure at section 1 is 39.24 N/cm^2, find the intensity of pressure at section 2. 8M

UNIT-III

5. a) Derive the expression for theoretical discharge through a venture meter. 8M

   b) Water flows through a 100 mm diameter pipe with a velocity of 0.015 m/sec. If the kinematic viscosity of water is 1.13×10^{-6} m^2/sec, calculate the Reynold's number and hence the friction factor of the pipe material. 4M

(OR)

6. a) Two pipes each 300m long are available for connecting to be a reservoir from which a flow of 0.085m^3/s is required. If the diameter of the two pipes are 0.30m and 0.15m respectively, determine the ratio of the head lost when the pipes are connected in series to the head lost when they are connected in parallel. Neglect minor losses. 6M

b) A jet of water of diameter 50 mm, having a velocity of 30 m/s strikes a curved vane which is moving with a velocity of 15 m/s in the direction of jet. The jet leaves the vane at an angle of 60^0 to the direction of motion of vanes at outlet. Determine 6M

i. The mass flow rate of water
ii. The force exerted by the jet on the vane in the direction of motion
iii. Work done per second by the jet

UNIT-IV

7. a) Explain the working of a Kaplan turbine with a neat sketch. 6M

b) In a hydroelectric station, water is available at the rate of 175 m^3/s under a head of 18 m. The turbines run at speed of 150 rpm with overall efficiency of 82%. Find the number of turbines required if they have the maximum specific speed of 460 r.p.m. 6M

(OR)

8. a) A Pelton wheel is to be designed for a head of 60 m when running at 200 r.p.m. The Pelton wheel develops 95.6475 KW shaft power. The velocity of the buckets = 0.45 times the velocity of the jet, overall efficiency = 0.85 and coefficient of the velocity is equal to 0.98. 12M

UNIT-V

9. a) A centrifugal pump is running at 1000r.p.m. The outlet vane angle of the impeller is 45^0 and velocity of flow at outlet is 2.5m/s. The discharge through the pump is 200 lit/s when the pump is working against a total head of 20m. If the manometric efficiency of the pump is 80%. Determine: 6M

i. The diameter of the impeller.
ii. The width of the impeller at outlet.

b) Explain the concept of pumps in series and pumps in parallel with applications. 6M

(OR)

10. A double acting reciprocating pump, running at 40 rpm is discharging 1.0 m^3 of water per minute. The pump has a stroke length 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. 12M

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AR18

CODE: 18ECT204 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

SIGNALS & SYSTEMS

(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

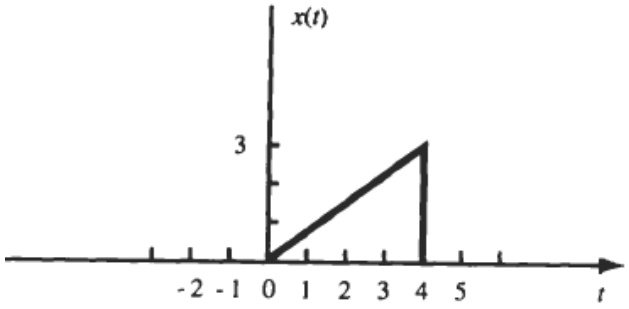
UNIT-I

1. a) Determine the RMS value of the following 6M
   i. $x(t) = C \cos(\omega t)$
   ii. $x(t) = C_1 \cos(\omega_1 t) + C_2 \cos(\omega_2 t)$

   b) If *x(t)* and *y(t)* are orthogonal, then show that the energy of the signal *x(t)* + *y(t)* is identical to the energy of the signal *x(t)* − *y(t)* and is given by $E_x + E_y$. Explain this result by using the vector analogy. 6M

(OR)

2. a) A continuous-time signal ***x (t)*** is shown in Fig. 6M



Sketch and label each of the following signals.

i. x(t - 2);
ii. x(2t);
iii. x(t/2)
iv. x (- t)

   b) Describe the approximation of square wave in terms of sine wave. 6M

UNIT-II

3. a) State and prove following properties of Fourier series 6M
   i. Differentiation
   ii. Conjugate symmetry

   b) Let x(t) be periodic signal with fundamental period T and Fourier series coefficients X_n. Derive the Fourier series coefficients of the following signals in terms of X_n. 6M

(OR)

4. a) Find the Fourier Transform of the signum function 6M

$$\text{sgn}(t) = \begin{cases} 1, & t > 0 \\ 0, & t = 0 \\ -1, & t < 0 \end{cases}$$

   b) Find the Fourier transform of the signal 6M

$$g(t) = \frac{1}{1+t^2}$$

UNIT-III

5. a) What is an LTI system? Explain its properties. Derive an expression for the transfer function of an LTI system. 6M

   b) Find the convolution of the two continuous time signals 6M

$x(t) = e^{|-t|}, \forall t \text{ and } h(t) = \begin{cases} e^{-2t} & t \geq 1 \\ 0 & t < 1 \end{cases}$

(OR)

6. a) What are the requirements of a system to allow the distortionless transmission of a signal? Give proper examples. 6M

   b) Discuss about the Causality and physical reliability of a system. 6M

UNIT-IV

7. a) State and prove sampling theorem for band pass signal. 6M

   b) Derive the relation between correlation and convolution of continuous signals. 6M

(OR)

8. a) Determine and sketch the autocorrelation function of the signal $x(t) = e^{-at}\ u(t)$. 6M

   b) Discuss any three properties of power spectral density. 6M

UNIT-V

9. a) State ROC properties of Z Transform. 4M

   b) State and prove initial and final value theorem properties of Z-transform. 8M

(OR)

10. Find the inverse Z transform for the following 12M

    i. $X(Z) = \log\left(\frac{1}{1-az^{-1}}\right), |z| > |a|$

    ii. $X(z) = \frac{1}{2z^2 - 3z + 1} \quad |z| < \frac{1}{2}$

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AR18

CODE: 18CST204 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

FREE OPEN SOURCE SOFTWARE

(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 open source software and how it is differ from licensed software	6M
	b)	Why to use open source software? What are the dis advantages of FOSS	6M
		(OR)	
2.	a)	Can multiple variable assignment is possible in single statement? Explain with an example.	4M
	b)	Explain the various operators supported by Python with examples	8M

UNIT-II

3.	a)	Explain the following looping structures in Pythons i) For ii) while	6M
	b)	List different conditional statements in python with examples.	6M
		(OR)	
4.	a)	Explain split(),isalpha(), isdigit() methods of Python with examples.	6M
	b)	List and explain immutable data types supported by Python	6M

UNIT-III

5.	a)	List and explain any 4 built-in functions of tuples with suitable examples	8M
	b)	List and explain any 4 built-in functions of strings with suitable examples	4M
		(OR)	
6.	a)	Write a python code snippet to find a given number is odd or even using functions	6M
	b)	Explain the following with respect to files i)open ii) read() iii) readlines()	6M

UNIT-IV

7.	a)	Explain how to define a Perl variable with examples	4M
	b)	Explain about control statements in perl.	8M
		(OR)	
8.	a)	Explain " switch" and "unless" statements with suitable examples.	6M
	b)	Explain the "continue", "next" statements of perl scripting with examples	6M

UNIT-V

9.	a)	Explain about Subroutines with example.	6M
	b)	Illustrate about Working with Files with example?	6M
		(OR)	
10.	a)	Write a Perl script to copy the content from one file to another file.	6M
	b)	Explain the "state " and "my" operators of Perl Scripting	6M

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AR16

CODE: 16ME2009 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ADVANCED ENGINEERING DRAWING

(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 pentagonal prism is resting on a corner of its base on the ground with a longer edge containing that corner inclined at 45° to the H.P. and the vertical plane containing that edge and the axis inclined at 30° to the V.P. Draw its projections. Base 40 mm side; height 65 mm. 14 M

(OR)

2. A 60° set-square of 125 mm longest side is so kept that the longest side is in the H.P. making an angle of 30° with the V.P. and the set-square itself inclined at 45° to the H.P. Draw the projections of the set-square. 14 M

UNIT-II

3. A pentagonal prism, base 28 mm side and height 65 mm has an edge of its base on the H.P. and the axis parallel to the V.P. and inclined at 60° to the H.P. A section plane, having its H. T. perpendicular to xy, and the V. T. inclined at 60° to xy and passing through the highest corner, cuts the prism. Draw the sectional top view and true shape of the section. 14 M

(OR)

4. A triangular pyramid, having base 40 mm side and axis 50 mm long, is lying on the H.P. on one of its faces, with the axis parallel to the V.P. A section parallel to the V.P. cuts the pyramid at a distance of 6 mm from the axis. Draw its sectional front view and the top view. 14 M

UNIT-III

5. A cylinder 50 mm diameter and 60 mm long, is resting on its base on the ground. It is cut by a section plane perpendicular to the V.P., the V.T. of which cuts the axis at a point 40 mm from the base and makes an angle of 45° with the H.P. Draw its front view, sectional top view and another sectional top view on an A.I.P. parallel to the section plane. 14 M

(OR)

6. A cone, diameter of base 50 mm and axis 50 mm long is resting on its base on the H.P. It is cut by a section plane perpendicular to the V.P., inclined at 75° to the H.P. and passing through the apex. Draw its front view, sectional top view and true shape of the section. 14 M

UNIT-IV

7. A cone of base 50 mm and axis 60 mm long, is resting on its base on H.P. It is cut by a section plane perpendicular to V.P. and parallel to an extreme generator and passing through the point on the axis at a distance of 20 from the apex. Draw the development of the retained solid 14 M

(OR)

8. An air-conditioning duct of a square cross-section 70 mm x 70 mm connects a circular pipe of 40 mm diameter through the transition piece. Draw the projections and develop the lateral surface of the transition piece. 14 M

UNIT-V

9. A vertical square prism, base 50 mm side and height 90 mm has a face inclined at 30° to the V.P. It is completely penetrated by another square prism, base 38 mm side and axis mo mm Jong, faces of which are equally inclined to the V.P. The axes of the two prisms are parallel to the V.P. and bisect each other at right angles. Draw the projections showing lines of intersection. 14 M

(OR)

10. A cylindrical pipe of 30 mm diameter has a similar branch of the same size. The axis of the main pipe is vertical and is intersected by that of the branch at right-angles. Draw the projections of the pipes, assuming suitable lengths, when the two axes lie in a plane parallel to the V.P. Develop the surfaces of the two pipes. 14 M

AR16

CODE: 16EC2003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

SIGNALS AND SYSTEMS

(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) Compare Energy and power signals with few examples. 8M
   b) Explain how a function can be approximated by a set of orthogonal functions. 6M

(OR)

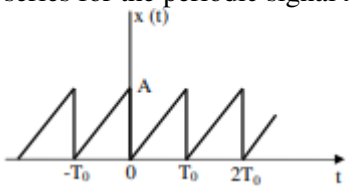
2. a) Define and sketch the following elementary signals i). Exponential signal ii) unit step signal iii) signum function. 8M
   b) Derive the expression for Mean square Error in approximating a function f(t) by a set of n orthogonal functions. 6M

UNIT-II

3. Find the Fourier Transform of the following signals. 14M
   (i) x(t) = A $\sin(2\pi\phi_c t)$u(t) (ii) x(t) = f(t) $\cos(2\pi\phi_c t + \varphi)$u(t)

(OR)

4. a) Find the trigonometric Fourier series for the periodic signal x(t) shown below 8M



   b) State and prove time convolution and time differentiation properties of Fourier Transform. 6M

UNIT-III

5. a) Determine whether the given systems is linear, time invariant or both 7M
   $y(t)=t^2x(t-1)$
   b) Explain the filter characteristics of ideal LPF,HPF and BPF using their magnate and phase responses 7M

(OR)

6. a) Explain the concept of Paley-Wiener criterion for physical realizability using relevant expressions. 7M
   b) Discuss about the Causality and physical reliability of a system. 7M

UNIT-IV

7. a) Find the convolution of $x(t) = e^{-2t}u(t)$ and $y(t) = e^{-4t}u(t)$ 7M
   b) Discuss aboutrelationship between autocorrelation and power spectral density of a power signal. 7M

(OR)

8. a) Give the relation between correlation and Convolution. 4M
   b) State and prove sampling theorem for band limited signals. 10M

UNIT-V

9. a) Find the inverse Laplace transform of $X[s] = \frac{1}{(s+5)(s+3)}$ for the following ROC's 6M

   i) $-5 < Re\{s\} < 3$ ii) $Re\{s\} > 3$

   b) State and prove initial and final value theorem properties of Z-transform. 8M

(OR)

10. a) Find the Laplace transform of the functions (i) x(t)=u(t) (ii) x(t)=sin ωt u(t) and indicate the ROC. 7M
    b) Find the Inverse Z transform of 7M

$$X(z)=\frac{z^2-0.8z+0.3}{z^3} \quad |Z|>0$$

AR16

CODE: 16EC2005 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

ELECTRONIC DEVICES AND CIRCUITS

(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 formation of depletion region in a PN junction.	7M
	b)	Explain the principle operation of Tunnel diode with V–I characteristics	7M

(OR)

2.	a)	Derive an expression for ripple factor for a full-wave rectifier with capacitor filter	7M
	b)	Draw the circuit diagram of Half-wave rectifier and derive the expressions for average value, R.M.S value and voltage drop across diode.	7M

UNIT-II

3.	a)	Compare CB, CC, CE configuration of a Bipolar transistor with respect to the current gain, voltage gain, input resistance and output resistance.	8M
	b)	Calculate the α_{dc} and β_{dc} for the given transistor for which I_C=5mA, I_B=50μA and I_{CO} = 1μA.	6M

(OR)

4.	a)	For a give BJT α_{dc} = 0.92, I_{CEO} = 10 μA, I_B = 30 μA Determine the values of I_E and I_C.	7M
	b)	Sketch the output characteristics of CE configuration for different values of input current and mention various regions of operation. From these characteristics, obtain I_B Vs I_C characteristic for fixed V_{CE}.	7M

UNIT-III

5.	a)	Derive an expression for the stability factor of a self bias circuit	7M
	b)	i) Explain about Thermal stability ii) What are the factors affecting the Q-point or operating point?	7M

(OR)

6.	a)	Give the comparison between fixed bias, collector to base bias and self-bias circuits.	6 M
	b)	Design a collector to base bias circuit for the given specifications: VCC = 15V, VCE = 5V, ICE = 5mA and β=100.	8M

UNIT-IV

7.	a)	Explain how to calculate CE h-parameters from the input and output characteristics.	7M
	b)	Describe the operation of common drain FET amplifier and derive the equation for voltage gain.	7M

(OR)

8.		Derive the general expressions for current gain, input impedance, voltage gain and output impedance of transistor amplifier using h-parameters.	14M

UNIT-V

9.	a)	Explain Wien bridge oscillator and derive its frequency of oscillation	8M
	b)	Discuss the concept of Barkhausan criterian and derive the conditions of oscillators.	6M

(OR)

10.		What are the different feedback amplifier topologies and explain them in detail?	14M

AR16

CODE: 16CS2005 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

FREE OPEN SOURCE SOFTWARE

(Computer Science 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 features of python	**7M**
	b)	Illustrate the steps to Running Python	**7M**
		(OR)	
2.	a)	Explain about variables with Example?	**7M**
	b)	Discuss about Identifiers with Example?	**7M**

UNIT-II

3.	a)	List different Conditional statements in python with appropriate examples	**7M**
	b)	Explain about statements and syntax with Example?	**7M**
		(OR)	
4.	a)	Explain about numbers with Example?	**7M**
	b)	Write a program with **for** loop that implements break and else statements.	**7M**

UNIT-III

5.	a)	Define lists and dictionary? How they are different from each other? Discuss in detail about them in Python Programming.	**7M**
	b)	Explain Files –Input/output in python	**7M**
		(OR)	
6.	a)	Explain about Strings in PYTHON programming	**7M**
	b)	Discuss about Tuple with Example?	**7M**

UNIT-IV

7.	a)	What do you mean by control structures? How it will be implemented in Perl? Explain.	**7M**
	b)	Discuss about Parsing Rules in Perl?	**7M**
		(OR)	
8.	a)	Explain about control statements in Perl?	**8M**
	b)	Describe about Variables in Perl	**6M**

UNIT-V

9.	a)	Explain about Subroutines with example?	**7M**
	b)	Illustrate about Working with Files with example?	**7M**
		(OR)	
10.	a)	Discuss about packages with example?	**7M**
	b)	Write a Perl program to display the contents of a file.	**7M**

AR13

CODE: 13CE2003 **SET-1**

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

ENGINEERING GEOLOGY
(Civil Engineering)

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

PART-A

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

1 a) Define the term Structural Geology.
b) What is meant by Cleavage?
c) Define the term Polymorphism.
d) What is meant by Geological agent?
e) What is the difference between "Strike and Dip"?
f) Define the term Angular Unconformity.
g) What is the difference between Joint and Fault?
h) Define the term Unconformity.
i) What is meant by rock cycle?
j) Name the different Electrical methods?

PART-B

ANSWER ALL THE QUESTIONS **[5X12=60]**

UNIT-I

1. (a) Explain briefly about the scope of Geology and its importance in the field of Civil Engineering? **[6M]**
(b) Discuss the reasons for the failure of St.Francis Dam. **[6M]**

(OR)

2 Write the importance of the following.
(a). Structural Geology. (b). Mining Geology. **[12M]**

UNIT-II

3 (a) Discuss the methods adopted in the identification of minerals in the Laboratories. **[6M]**
(b) Write down any six physical properties of the following minerals
i). Feldspar
ii). Calcite
iii). Galena
iv). Magnesite **[6M]**

4

(OR)

(a). Write a short note upon the formation of secondary minerals and its importance. **[6M]**
(b). Discuss the terms cleavage,Fracture, Hardness and Lustre. **[6M]**

AR13

CODE: 13CE2003 **SET-1**

UNIT-III

5. (a). Discuss the Engineering properties of Igneous and Sedimentary rocks. **[6M]**
   (b). Discuss the composition, texture, characteristic occurrence and uses of Sandstone and Laterite . **[6M]**

(OR)

6 (a). Discuss the common structures and textures of Sedimentary rocks. **[6M]**
   (b). Discuss the forms of extrusive Igneous rocks. **[6M]**

UNIT-IV

7. (a). Discuss the various types of Faults and its Engineering applications. **[6M]**
   (b). Explain the various types of joints found in common rocks. **[6M]**

(OR)

8 (a). Explain briefly about the different types of Unconformities with neat Sketches? **[6M]**
   (b). Discuss about the bedding joints and oblique joints. **[6M]**

UNIT-V

9. (a). Discuss the importance of Geophysical studies. **[6M]**
   (b). Explain the principle behind Seismic refraction method and also Mention its uses. **[6M]**

(OR)

10 (a). Discuss in brief about the Electric and Seismic methods in Geophysical investigation. **[6M]**
   (b). What are the Geological factors that are to be considered in a Tunnelling project? **[6M]**

AR13

CODE: 13EE2003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, June-2022
ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CSE & IT Branches)

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

PART-A

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

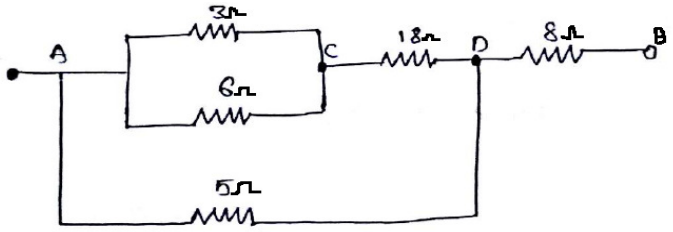
1. a) Define Voltage.
   b) Define circuit.
   c) What is the Faraday's 2nd law?
   d) Applications of DC series generator.
   e) What are the applications of transformer?
   f) EMF equation of 1-phase transformer.
   g) Torque equation of PMMI instrument.
   h) What are the different types of torques involved in operation of any instrument?
   i) Diode applications.
   j) Symbol of PNP transistor.

PART-B

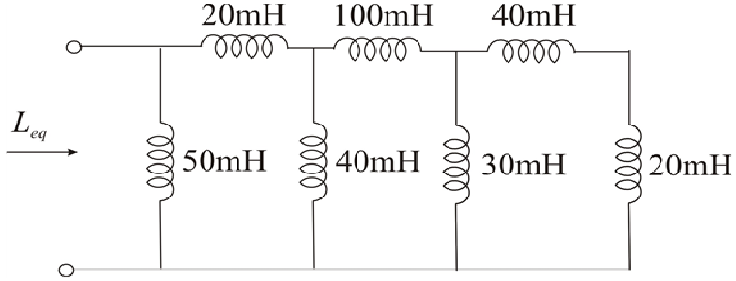
Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Find the equivalent resistance across the terminals A and B shown in figure. Also determine the voltage across each resistor if 60V is applied across A and B terminals. 6M



   b) Find the equivalent inductance. 6M



(OR)

3. a) Explain the different types of elements in an electrical circuit. 8M
   b) State the limitations of Ohm's law. 4M

AR13

CODE: 13EE2003 SET-2

UNIT-II

4.	a)	Derive the torque equation of DC motor.	6M
	b)	A DC shunt machine develops an EMF of 250V at 1500rpm. Find the torque and mechanical power developed if it draws an armature current of 50A.	6M
		(OR)	
5.	a)	Derive the EMF equation of DC generator.	6M
	b)	Draw and write the necessary equations of shunt, long shunt and short shunt compound DC generators.	6M

UNIT-III

6.	a)	Derive the EMF equation of 1-phase transformer.	6M
	b)	Explain working principle of single phase transformer.	6M
		(OR)	
7.	a)	Explain why 3-phase induction motor is a self-starting machine?	6M
	b)	Determine the slip and rotor speed of a 3-phase, 4 pole and 50 Hz induction motor running at 1400 rpm.	6M

UNIT-IV

8.	a)	List out the classification of measuring instruments.	6M
	b)	Explain different mechanisms of damping torque.	6M
		(OR)	
9.		Explain the working principle of PMMC instrument and write down the advantages and disadvantages.	12M

UNIT-V

10.		Describe the operation of bridge type rectifier with neat sketch. And derive equations of average voltage and RMS voltage.	12M
		(OR)	
11.		Explain the ON-time and OFF-time characteristics SCR.	12M

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AR13

CODE: 13EC2007 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, June-2022
ELECTRONIC DEVICES AND CIRCUITS
(Electrical & Electronics Engineering)

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

PART-A

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

1. a) Define Diffusion Current
   b) Define Hall effect
   c) Define Avalanche breakdown.
   d) Draw the circuit of FWR with L-section filter
   e) Define Reach Through in a transistor
   f) Short notes on base width modulation or early effect.
   g) State thermal Runaway
   h) Define h_{fe}
   i) Draw the block diagram of voltage series amplifier.
   j) Draw the circuit diagram of Hartley oscillator

PART-B

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

UNIT-I

2. a) Define Mobility, Conductivity and Intrinsic Semiconductors & Extrinsic Semi-Conductor. 6M
   b) Explain the operation of PN diode with the help of diode equitation and characteristic. 6M

(OR)

3. a) Explain the operation of PN diode under Forward Bias and Reverse Bias 6M
   b) Define Law of Junction, Fermi Level and Draw the energy band diagram of n-type and p-type semiconductors indicating fermi level. 6M

UNIT-II

4. a) Explain the operation of Zener diode mentioning the speciality of Zener diode when compared to PN diode. 6M
   b) Explain the operation HWR and derive the expression for efficiency 6M

(OR)

5. a) Determine (i) d.c. output voltage (ii) peak inverse voltage (iii) rectification efficiency of a centre tapped FWR circuit. Assume the diodes are assumed to be ideal, turns ration is 5:1 and RL=100Ω. 8M
   b) Explain the operation of LED. 4M

UNIT-III

6. a) Explain the operation of depletion mode MOSFET and draw its characteristics 6M
   b) Draw and explain the CE input and output characteristics of a transistor. 6M

(OR)

7. a) Explain the operation of CB configuration and draw its input and output characteristics. 6M
   b) Explain the operation of UJT and draw its characteristics 6M

UNIT-IV

8.	a)	Compare CE ,CB and CC Amplifier configurations w.r.t voltage gain, current gain, Input resistance and output resistance	8M
	b)	Derive the expression for stability factor of a fixed Bias circuit.	4M
		(OR)	
9.	a)	Explain H parameters of BJT two-port networks.	6M
	b)	Define stability factors S, S', S''	6M

UNIT-V

10.	a)	Explain the operation of Colpitts oscillator.	6M
	b)	List any five advantages and one disadvantage of negative feedback amplifier.	6M
		(OR)	
11.	a)	Derive the expression gain of an amplifier with negative feedback and find the gain and bandwidth of an amplifier with feedback. Assume the gain of an amplifier and bandwidth without feedback are 100 and 1500Hz, $1+A\beta=20$	6M
	b)	Show the block diagram of a current shunt feedback amplifier and explain the function of each block.	6M

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