

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
<u>UNIT-I</u>				
1.	a) Write the importance of geology in civil engineering.	5m	01	2
	b) What are the main and allied branches of geology?	5m	01	2
(OR)				
2.	a) Write the difference between mineral and crystal.	5m	01	2
	b) Explain the physical properties of the Quartz group, Feldspar group, and Gypsum.	5m	01	2
<u>UNIT-II</u>				
3.	a) Explain how igneous rocks have been classified based on silica percentage.	5m	02	2
	b) Write the difference between Dykes and sills	5m	02	2
(OR)				
4.	a) Explain the petrographic characteristics of limestone and marble.	5m	02	2
	b) Explain the common structures of Igneous Rocks.	5m	02	2
<u>UNIT-III</u>				
5.	a) Discuss briefly about Strike and Dip.	5m	03	2
	b) Define the term Faults and explain its types.	5m	03	2
(OR)				
6.	a) Define the term Rock weathering and write the classifications.	5m	03	2
	b) Explain the Geological classifications of soils?	5m	03	2
<u>UNIT-IV</u>				
7.	a) Briefly explain the Geological controls of Groundwater movement.	5m	04	2
	b) Explain briefly about the cone of depression.	5m	04	2
(OR)				
8.	a) Explain briefly the surface geophysical methods to explore the Groundwater.	5m	04	2
	b) Discuss the Groundwater exploration techniques.	5m	04	2
<u>UNIT-V</u>				
9.	a) Explain with neat sketches about Arch & Buttress Dams	5m	05	2
	b) Explain the Purpose, effects, and lining of tunnels.	5m	05	2
(OR)				
10.	a) Discuss the influence of geology for successful tunnelling.	5m	05	2
	b) Explain the geological considerations in the selection of a tunnel site.	5m	05	2
<u>UNIT-VI</u>				
11.	a) Explain the precautions while constructing engineering structures.	5m	06	2
	b) Explain the Seismic belts of India.	5m	06	2
(OR)				
12.	a) Briefly explain the causes of Landslides.	5m	06	2
	b) Explain the methods of mitigating measures of landslides.	5m	06	2

ELECTRICAL MEASUREMENTS

(Electrical and Electronics Engineering)

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

Answer ONE Question from each Unit

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All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Derive the torque equation of PMMC instrument and explain the nature of scale.	5M	CO1	L3
	b) Illustrate the different methods for producing the Controlling torque in a measuring instrument.	5M	CO1	L2
(OR)				
2.	a) Describe briefly the working principle of a Attraction type Moving iron instrument	5M	CO1	L1
	b) Explain the different methods for compensating the errors in a measuring instrument.	5M	CO1	L2
<u>UNIT-II</u>				
3.	a) Draw the possible methods of connections of the pressure coil of a wattmeter	5M	CO2	L2
	b) Write the differences between CT and PT.	5M	CO2	L1
(OR)				
4.	a) Derive the expression for the measurement of power factor by two wattmeter method.	10M	CO2	L3
<u>UNIT-III</u>				
5.	a) Illustrate the working principle of a single phase induction type energy meter.	5M	CO3	L2
	b) Explain briefly about phantom loading using RSS metetr.	5M	CO3	L1
(OR)				
6.	a) Explain the various methods for compensating the errors in a energy meter.	5M	CO3	L1
	b) A 240 volt, 5 ampere, single phase energy meter has a constant of 1200 revolutions per kilo watt hour (KWh). When tested by applying 240 volts, the meter took 99.8 seconds to complete 40 revolutions. Find the percentage error. Is it running fast or slow ?	5M	CO3	L2
<u>UNIT-IV</u>				
7.	a) Describe the working of Kelvin's double bridge for measurement of low resistance. Derive the equations for balance condition	10M	CO4	L3
(OR)				
8.	a) Describe the working of Anderson bridge for measurement of inductance. Derive the equations for balance condition	5M	CO4	L2
	b) Explain briefly about loss of charge method.	5M	CO4	L2
<u>UNIT-V</u>				
9.	a) Explain the working principle of a ballistic galvanometer.	5M	CO5	L1
	b) Describe the procedure of standardization for a DC potentiometer.	5M	CO5	L3
(OR)				
10.	a) Explain briefly the construction and working principle of Gall-Tinsley A.C potentiometer.	10M	CO5	L2
<u>UNIT-VI</u>				
11.	a) Illustrate the working principle of a digital multimeter.	5M	CO6	L1
	b) Explain briefly the working principle of a Piezo-Electric Transducers.	5M	CO6	L2
(OR)				
12.	a) Explain briefly the working principle of a LVDT?	5M	CO6	L1
	b) Illustrate the working principle of a Thermistors.	5M	CO6	L2

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UNIT-I

- | | | Marks | CO | Blooms Level |
|-------|--|-------|----|---------------|
| 1. a) | Define i) surface tension ii) specific gravity iii) capillarity | 5M | 1 | Remembering |
| b) | State Newton's law of viscosity and derive the equation for shear stress | 5M | 1 | Understanding |

(OR)

- | | | | | |
|----|--|-----|---|----------|
| 2. | A U-Tube manometer is used to measure the pressure of water in a pipe line, which is in excess of atmospheric pressure. The right limb of the manometer contains mercury and is open to atmosphere. The contact between water and mercury is in the left limb. Determine the pressure of water in the main line, if the difference in level of mercury in the limbs of U-tube is 10 cm and the free surface of mercury is in level with the centre of the pipe. If the pressure of water in pipe line is reduced to 9810 N/m ² , calculate the new difference in the level of mercury. Sketch the arrangements in both cases. | 10M | 1 | Applying |
|----|--|-----|---|----------|

UNIT-II

- | | | | | |
|----|--|-----|---|----------|
| 3. | A circular opening, 3 m diameter, in a vertical side of a tank is closed by a disc of 3 m diameter which can rotate about a horizontal diameter. Calculate (i) the force on the disc, and (ii) the torque required to maintain the disc in equilibrium in the vertical position when the head of water above the horizontal diameter is 5 m. | 10M | 2 | Applying |
|----|--|-----|---|----------|

(OR)

- | | | | | |
|-------|---|----|---|-------------|
| 4. a) | Define the following i) Meta centre ii) Meta- centric height iii) Centre of Buoyancy | 5M | 2 | Remembering |
| b) | A wooden block of width 2 m, depth 1.5 m and length 4 m floats horizontally in water. Find the volume of water displaced and position of centre of buoyancy. The specific gravity of the wooden block is 0.7. | 5M | 2 | Applying |

UNIT-III

- | | | | | |
|----|--|-----|---|---------------|
| 5. | Derive the equation for continuity for three dimensions in cartesian coordinates | 10M | 3 | Understanding |
|----|--|-----|---|---------------|

(OR)

6. In a 45° bend a rectangular air duct of 1 m^2 cross-sectional area is gradually reduced to 0.5 m^2 area. Find the magnitude and direction of the force required to hold the duct in position if the velocity of flow at the 1 m^2 section is 10 m/s , and pressure is 2.943 N/cm^2 . Take density of air as 1.16 kg/m^3 .

UNIT-IV

7. Derive an equation for determining the discharge through a orifice meter

(OR)

8. a) Define i) Hydraulic gradient line ii) Total Energy line
- b) Determine the difference in the elevations between the water surfaces in the two tanks which are connected by a horizontal pipe of diameter 300 mm and length 400 m . The rate of flow of water through the pipe is 300 litres/s . Consider all losses and take the value of $f = .008$.

UNIT-V

9. a) Describe the Rayleigh's method for dimensional analysis
- b) What are repeating variables in dimensional analysis and how are the repeating variables selected for dimensional analysis.

(OR)

10. Find an expression for the drag force on smooth sphere of diameter D , moving with a uniform velocity (V) in a fluid of density (ρ) and dynamic viscosity (μ)

UNIT-VI

11. a) State the boundary conditions that must be satisfied by a given velocity profile in laminar boundary layer flow
- b) Describe the effect of pressure gradient on boundary layer separation

(OR)

12. Obtain an expression for Von-karman momentum integral equation

Time: 3 Hours

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UNIT-I

- | | Marks | CO | Blooms Level |
|---|-------|----|--------------|
| 1. a) Approximate $f(t) = \sin t$ such that the error will be minimum over a period 0 to 2π .
Given $f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ 0 & \text{elsewhere} \end{cases}$ | (4M) | 1 | Evaluate |
| b) Define Signal and explain the classification of signals,
(OR) | (6M) | 1 | Remember |
| 2. a) Derive the Even and Odd components of a signal? | (5M) | 1 | Apply |
| b) Find odd and even components of the following signals :
i) $x(t) = e^{j4t}$, ii) $X(t) = \cos t + \sin t + \cos t \sin t$ | (5M) | 1 | Apply |

UNIT-II

- | | | | |
|---|------|---|------------|
| 3. a) Find the Fourier series expansion of half wave rectified sine wave | (5M) | 2 | Apply |
| b) Derive the exponential Fourier series coefficients?
(OR) | (5M) | 2 | Apply |
| 4. a) Determine the Fourier transform for signum and unit step functions. | (6M) | 2 | Apply |
| b) Explain about Dirichlet conditions? | (4M) | 2 | Understand |

UNIT-III

- | | | | |
|--|------|---|------------|
| 5. a) Explain about LTI system by taking an example. | (5M) | 3 | Understand |
| b) Explain the difference between the following systems with the help of an example:
i) Linear and non-linear systems.
ii) Time variant and time invariant systems
(OR) | (5M) | 3 | Understand |
| 6. a) Obtain conditions for the distortion less transmission through a system. | (5M) | 3 | Remember |
| b) A causal discrete LTI system is described by
$y[n] - \frac{3}{4}y[n-1] + \frac{1}{8}y[n-2] = x[n]$, where $x[n]$ is the input to the system $h[n]$ is the impulse response of the system. Find System function $H(z)$ and Impulse response $h(n)$. | (5M) | 3 | Apply |

UNIT-IV

7. a) Prove that auto correlation function and energy spectral density function forms Fourier Transform pair. (5M) 4 Remember
b) Determine the convolution of the following functions graphically. $x_1(t) = e^{-at}u(t)$ and $x_2(t) = u(t)$. (5M) 4 Remember
(OR)
8. a) State and explain properties of auto and cross correlation? (5M) 4 Apply
b) Obtain the relationship between convolution and correlation? (5M) 4 Apply

UNIT-V

9. a) Find the Laplace transform of the signal (5M) 5 Apply
 $X(t) = e^{-at}u(t) + e^{-bt}u(-t)$
b) Explain the Linearity and time shifting properties of Laplace transform. (5M) 5 Understand
(OR)
10. a) State and prove Initial and Final value theorems of Laplace transform. (5M) 5 Understand
b) Find the inverse Laplace transform of (5M) 5 Apply

$$X(s) = \frac{2}{s(s+1)(s+2)}, \text{Re}(s) > -3$$

UNIT-VI

11. a) Explain natural and flat-top sampling methods. (5M) 6 Apply
b) State and prove the sampling theorem? (5M) 6 Remember
(OR)
12. a) Find the Z transform of $x[n] = \left(\frac{1}{2}\right)^n u[n]$ (5M) 6 Apply
b) Explain about the methods to find the inverse Z transform with the help of an example? (5M) 6 Apply

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

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	Explain instruction set Architecture with a neat diagram.	5	1	2
b)	Explain input-output subsystems in detail.	5	1	2
	(OR)			
2. a)	Explain Direct Addressing mode and Register Direct Addressing mode with examples.	5	1	1
b)	Discuss about Register Transfer Language.	5	1	2
	<u>UNIT-II</u>			
3. a)	Demonstrate four bit adder with a neat sketch.	5	2	2
b)	List and explain the steps of division restoring algorithm.	5	2	2
	(OR)			
4. a)	Discuss signed multiplier with a neat diagram	5	2	3
b)	Explain floating point arithmetic with an example.	5	2	3
	<u>UNIT-III</u>			
5. a)	Discuss the different mapping techniques used in cache memories and their relative merits and demerits.	5	3	2
b)	Discuss about memory hierarchy.	5	3	2
	(OR)			
6. a)	What do you mean by virtual memory? Discuss how paging helps in implementing virtual memory.	5	3	3
b)	Explain the Set Associative mapping technique in associative memory.	5	3	2
	<u>UNIT-IV</u>			
7. a)	Demonstrate how communication proceeds between CPU and IOP.	5	4	2
b)	Explain in detail various I/O modes of transfer.	5	4	2
	(OR)			
8. a)	Define Interrupts? Explain about Interrupt Hardware.	5	4	3
b)	What are the functions of the standard I/O interface? Explain.	5	4	2
	<u>UNIT-V</u>			
9. a)	Discuss the basic concepts of pipelining.	5	5	1
b)	Explain briefly about arithmetic pipeline with neat diagram.	5	5	2
	(OR)			
10. a)	List and explain various types of pipelining hazards.	5	5	1
b)	Discuss the concept of vector processing.	5	5	1
	<u>UNIT-VI</u>			
11. a)	List various characteristics of multiprocessors and explain.	5	6	2
b)	Write short notes on interconnection structures.	5	6	2
	(OR)			
12. a)	What is cache coherence problem? Discuss about different cache coherence approaches.	10	6	3

**ELECTRONIC DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

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UNIT-I

1. a) Explain about the operation of a PN Junction diode in Forward Bias condition with help of V-I Characteristic graph 6
- b) Briefly explain Diode working as a switch 6

(OR)

2. a) Explain Zener diode operation with help of V-I characteristics. 6
- b) Explain how a Zener diode works as a voltage regulator? 6

UNIT-II

3. a) Derive the expression for ripple factor of a full wave rectifier. 6
- b) Explain the operation of a halfwave rectifier with help of a figure. 6

(OR)

4. a) Derive the expression for ripple factor of a half wave rectifier with L-section filter. 6
- b) Mention the advantages of full wave rectifier over Half Wave rectifier. 6

UNIT-III

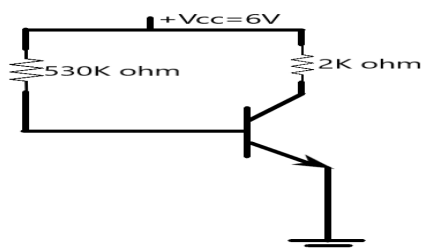
5. a) Explain principle of the operation of UJT with the help of its V-I characteristics. 6
- b) Explain the operation of N- channel JFET 6

(OR)

6. a) Explain the input and output characteristics of transistor in common base configuration. 6
- b) Explain about N-channel Depletion Mode MOSFET 6

UNIT-IV

7. a) 6



Determine the operating point and draw the DC load line for the fixed biasing circuit shown in the figure. Given that the β of the germanium transistor used for the biasing is 150.

- b) Explain Thermal run away and thermal stability 6

(OR)

8. a) Derive Stabilisation factor S and mention the value of S for fixed bias 6
- b) Derive Stabilisation factor S^1 and mention the value of S^1 for fixed bias 6

UNIT-V

9. a) Explain how a transistor works as an amplifier. 6
- b) Explain the working of Hartley oscillator with suitable figure 6

(OR)

10. a) Explain CE amplifier with suitable diagram. 6
- b) Explain the working of Collpitt's oscillator with suitable figure 6

Answer ONE Question from each Unit

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UNIT-I

1. a) What are the modes of measuring pressure? 6
- b) Define viscosity? what are the types of viscosity? Write units of viscosity? 6

(OR)

2. Calculate the capillary rise in a glass tube of 2.5mm diameter when immersed vertically in a) water and b) mercury .Take surface tensions $\sigma=0.0725\text{N/m}$ for water and $\sigma=0.52\text{N/m}$ for mercury in contact with air.The specific gravity for mercury is given as 13.6 and angle of contact 130° 12

UNIT-II

3. a) Define path line, stream line , Velocity potential function, stream function, 6
- b) Define steady flow, non-steady flow, uniform flow, non-uniform flow, compressible flow, incompressible flow, rotational flow and irrotational flow 6

(OR)

4. State the assumptions and derive Bernoulli's equation 12

UNIT-III

5. Explain different types of frictional losses in pipes? Derive Darcy Weisbach equation for frictional losses in pipes? 12

(OR)

6. a) Define the terms: (i) Impact of jets, and (ii) Jet propulsion. 6
- b) A jet of water of 2.5 cm diameter, moving with a velocity of 10 m/s, strikes a hinged square plate of weight 98.1 N at the centre of the plate. The plate is of uniform thickness. Find the angle through which the plate will swing. 6

UNIT-IV

7. a) What is a draft tube? Why is it used in a reaction turbine? 6
Describe with neat sketch two different types of draft tubes
b) A Francis turbine working under a head of 5 m at a speed of 210 rpm develops 75 KW when the rate of flow of water is $1.8 \text{ m}^3/\text{sec}$. If the head is increased to 16 m, determine the speed, discharge and power. 6
(OR)

8. a) How will you classify the turbines? 6
b) Obtain an expression for the work done per second by water on the runner of a Pelton wheel. Hence derive an expression for maximum efficiency of the Pelton wheel giving the relationship between the jet speed and bucket speed. Also draw inlet and outlet velocity triangles for a Pelton turbine and indicate the direction of various velocities. 6

UNIT-V

9. a) State the advantages of a centrifugal pump over a displacement (reciprocating) pump 6
b) A centrifugal pump delivers water against a net head of 14.5 meters and a design speed of 1000 rpm. The vanes are curved back to an angle of 30° 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
(OR)
10. a) Describe principle and working of a reciprocating pump. 6
b) A single-acting reciprocating pump, running at 50 rpm, delivers $0.01 \text{ m}^3/\text{s}$ of water. The diameter of the piston is 200 mm and stroke length 400 mm. Determine 6
i. The theoretical discharge of the pump.
ii. Co-efficient of discharge,
iii. Slip and the percentage of slip of the pump

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

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UNIT-I

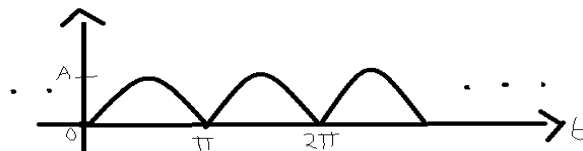
1. a) Define and derive the expression for evaluating mean square error. [6M]
- b) Define and sketch the following signals: [6M]
 - i) Signum Function ii) Unit step function

(OR)

2. a) Determine whether the following function is periodic or not. If so find the period. [6M]
 $x(t) = 3\sin 200\pi t + 4\cos 100t$.
- b) Check whether the following signals are periodic, causal and energy. [6M]
 - i) $x(t) = 2\cos\left(\frac{\pi}{4}t\right) + \sin\left(\frac{\pi}{8}t\right)$
 - ii) $x(n) = \sum_{k=-\infty}^{\infty} [\delta(n-4k) - \delta(n-1-4k)]$

UNIT-II

3. a) Represent the following signal $x(t)$ using exponential Fourier series. [6M]



- b) State and prove Parseval's theorem. [6M]

(OR)

4. a) Find the Fourier transform of signum function. [6M]
- b) State and prove the time-scaling property of Fourier transform. [6M]

UNIT-III

5. a) Explain the difference between the following systems: [6M]
 - i) Linear and non-linear systems.
 - ii) Time variant and time invariant systems.
- b) Obtain the conditions for the distortion less transmission through a system [6M]

(OR)

6. a) Explain about LPF, HPF, BPF filters. [6M]
- b) Explain causality and poly wiener criterion for physical realization. [6M]

UNIT-IV

7. a) Explain about properties of Correlation. [6M]
- b) Graphically convolve the signals $x_1(t) = 1$ for $-T \leq t \leq T$ and [6M]

$$= 0 \text{ else where}$$

$$x_2(t) = 2 \text{ for } -2T \leq t \leq 2T \text{ and}$$

$$= 0 \text{ elsewhere}$$

(OR)

8. a) State and prove sampling theorem. [6M]
- b) Compare natural sampling and flat top sampling. [6M]

UNIT-V

9. State and prove initial and final value theorems with suitable examples. [12M]
- (OR)
10. a) Find the inverse z- transform of $X(z) = z/(z+2)(z-3)$ when the ROC is [6M]
 - i) ROC: $|z| < 2$ ii) ROC: $2 < |z| < 3$
 - b) Explain the properties of the region of convergence of $X(z)$. [6M]

AR18

CODE: 18CST204

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

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

**FREE OPEN SOURCE SOFTWARE
(Common to CSE & IT)**

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

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UNIT-I

1. a) How many different ways are there to run Python? Which one is preferable one? 6 M
- b) What do you mean by Free and Open Source Software? Explain the necessity of FOSS. 6 M

(OR)

2. a) Explain about arithmetic and comparison operators. 6 M
- b) Explain the rules of precedence used by python to evaluate an expression. 6 M

UNIT-II

3. a) Mention the advantages of continue statement. Write a program to compute odd numbers sum within the given natural number using continue statement. 4 M
- b) List and give syntax of all python supported conditional statements along with its usage with an example program whether a given number is positive or negative or zero. 8 M

(OR)

4. a) List and explain any six built in string handling functions supported by python. 8 M
- b) What is numeric coercion? Explain the rules of numeric coercion. 4 M

UNIT-III

5. a) With an example explain the following built in functions of python. 8 M
i) filter() ii)map() iii) reduce()
- b) How tuples are created in python? Explain different ways of creating and accessing them. 4 M

(OR)

6. a) Prompt for file name and display the number of words in that text file. 4 M
- b) Explain fundamental file operations in Python with code examples. 8 M

UNIT-IV

7. a) Write a perl program to find sum of all even numbers from 1 to n. 4 M
- b) List and Explain the features of perl. 8 M

(OR)

8. a) Write a perl program to read a number from standard input device and check if it is even number. Display appropriate message. 6 M
- b) List and explain different control structures supported by perl. 6 M

UNIT-V

9. a) Briefly explain about i) tell ii) seek iii) sysseek. 6 M
- b) Write a perl program to copy content of one file to another. 6 M

(OR)

10. a) Explain about operators in perl. 6 M
- b) Explain about different attributes of a subroutine 6 M

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) With the help of Diode current equation, explain V-I Characteristics of Diode. (7M)
b) Justify , why a zener diode can be used as a voltage regulator (7M)
(OR)
2. a) What is the need of a voltage rectifier? Explain the working of a full wave rectifier. (7M)
b) Determine the peak and rms voltages on the secondary of a transformer connected across a full wave rectifier to provide no-load dc voltages of 9V. If the secondary winding source resistance is 3Ω , and dynamic resistance of each diode is 1Ω , determine the dc output across a load resistance of 100Ω and $1K\Omega$. Also determine the percentage of regulation. (7M)

UNIT-II

3. a) Explain the current gains of a transistor in 3 configurations and give the relation among them. (7M)
b) Explain the Drain and Transfer Characteristics of a JFET (7M)
(OR)
4. a) Explain the working of a MOSFET in enhancement mode with the help of schematic diagram and also explain how it is different from Depletion mode MOSFET. (7M)
b) Derive the characteristics of UJT as a relaxation oscillator. (7M)

UNIT-III

5. a) What is biasing a transistor? What is the need of a stabilization circuit? State and draw any 3 biasing circuits of a transistor? (7M)
b) Find Q point for the self bias circuit if $V_{cc}=20V$, $\beta=49$, $R_E=100\Omega$, $R_B=5K\Omega$. (7M)

(OR)

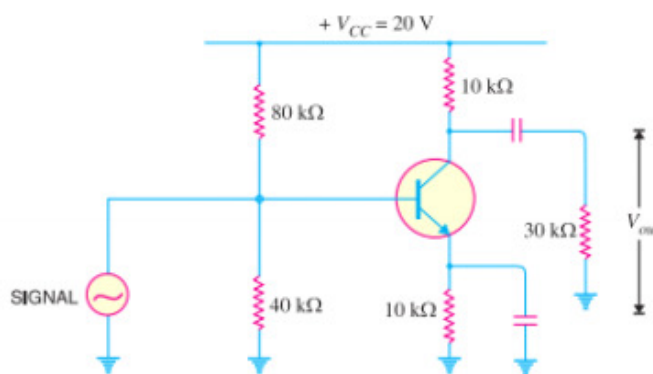
6. a) What is thermal run away and thermal stability? What are various methods of selection of operating point for a.c input signal? (7M)
- b) Derive the equation for stability factor in a voltage divider circuit (7M)

UNIT-IV

7. a) Derive the expressions for A_V , A_I , R_i , R_o in terms of h-parameters of a CE amplifier. (7M)
- b) Obtain the h-parameter conversion formulae for CB and CC configuration in terms of CE configuration. (7M)

(OR)

8. a) (7M)



$$h_{ie}=1500, h_{fe}=50, h_{re}=4 \times 10^{-4}, h_{oe}=5 \times 10^{-5}$$

Find (i) ac input impedance of the amplifier (ii) voltage gain (iii) output impedance (iv) output impedance of entire amplifier.

- b) Draw the h parameter model of CB, CC and CE configurations and compare the h parameter values of CE, CB and CC model. (7M)

UNIT-V

9. a) What is the effect of negative feedback on input and output Resistances? (7M)
- b) Explain the working of RC Phase shift oscillator with Transistor (7M)

(OR)

10. a) Draw the circuit diagram and derive the expression for frequency of oscillations of a Colpitts oscillator. (7M)
- b) Compare the positive and negative feedback in amplifiers. (7M)

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 hexagonal prism, with the side of the hexagon 30 mm and height of 70 mm is resting on the H.P. on one of the edges of its hexagonal base in such a way that, the edge is at 60° to the V.P. and the base is at 30° to the H.P. Draw the view from the front and the view from the top by using Auxiliary projection method 14M

(OR)

2. A square pyramid of 50 mm side of base and 50 mm length of axis is resting on one of its triangular faces on the H.P. having a slant edge containing that face parallel to the V.P. Draw the projections of the pyramid by using Auxiliary projection method 14M

UNIT-II

3. A cube of 35 mm long edges is resting on the H.P. on one of its faces with a vertical face inclined at 30° to the V.P. The cube is cut by a section plane, inclined at 60° to the V.P. and perpendicular to the H.P. so that the face which makes 60° angle with the V.P. is cut in two equal halves. Draw the sectional front view, top view and true shape of the section. 14M

(OR)

4. A hexagonal pyramid, base 30 mm side and axis 65 mm long, is resting on its base on the H.P. with two edges parallel to the V.P. It is cut by a section plane, perpendicular to the V.P. inclined at 45° to the H.P. and intersecting the axis at a point 25 mm above the base. Draw the front view, sectional top view, sectional side view and true shape of the section. 14M

UNIT-III

5. A cylinder of 40 mm diameter, 60 mm height and having its axis vertical, is cut by a section plane, perpendicular to the V.P., inclined at 45° to the H.P. and intersecting the axis 32 mm above the base. Draw its front view, sectional top view, sectional side view and true shape of the section. 14M

(OR)

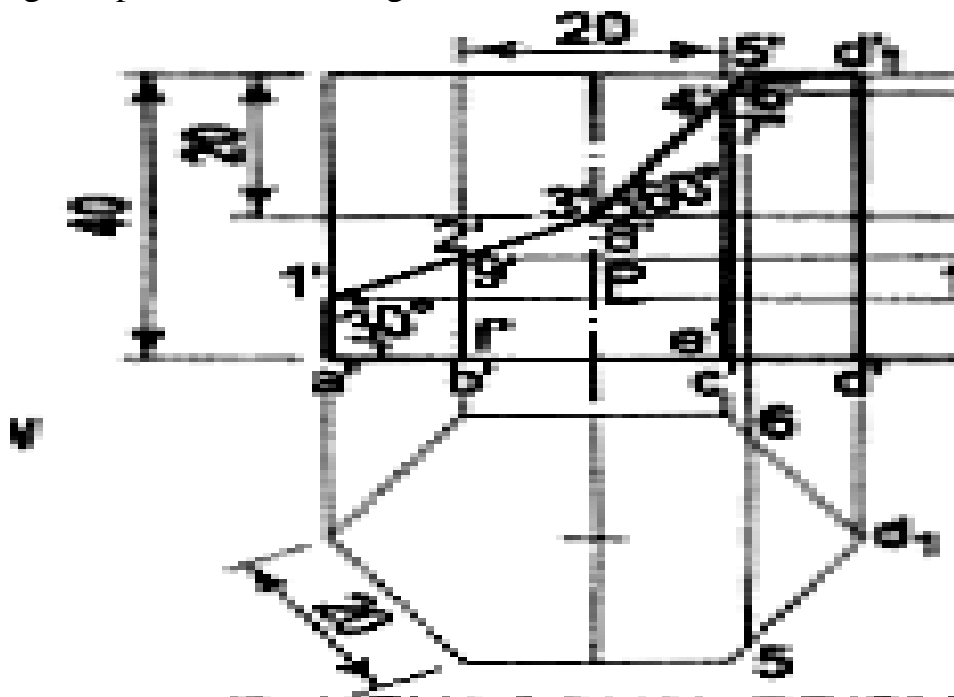
6. A cone, base 75 mm diameter and axis 80 mm long is resting on its base on the H.P. It is cut by a section plane perpendicular to the V.P. and parallel to and 12 mm away from one of its end generators. Draw its front view, sectional top view and true shape of the section. 14M

UNIT-IV

7. A hexagonal pyramid, base 30 mm side and axis 75 mm long, resting on its base on the H.P. with two of its edges parallel to the V.P. is cut by two section planes, both perpendicular to the V.P. The horizontal section plane cuts the axis at a point 35 mm from the apex. The other plane which makes an angle of 45° with the H.P., also intersects the axis at the same point. Draw the development of the surface of the remaining part of the pyramid. 14M

(OR)

8. Draw the development of the lateral surface of the part 'P' of the hexagonal prism shown in Fig. below



14M

UNIT-V

9. A Vertical cylinder of 80 mm diameter is completely penetrated by another cylinder of 60 mm diameter, their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of the penetrating cylinder to be parallel to the V.P. 14M

(OR)

10. A vertical square prism having its faces equally inclined to the V.P. is completely penetrated by a horizontal cylinder, the axis of which is parallel to the V.P. and 6 mm away from that of the prism. Draw the projections of the solids showing curves of intersection. The length of the sides of the base of the prism is 50 mm and the diameter of the cylinder is 40 mm. 14M

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) Derive the expression for mean square error when a function is approximated by a set of orthogonal signals. [7M]

- b) Find the even and odd components of the signal $x(t) = \cos(\omega_0 t + \pi/3)$ [7M]

(OR)

2. a) sketch the following signals [7M]

(i) $r(t+1)+r(t-1)+r(t-4)+r(t-6)-4r(t-8)$

(ii) $u(t)+e^{-2t}u(t)$.

- b) Determine whether each of the following continuous time signals is periodic or not. [7M]
If the signal is periodic, determine its fundamental period.

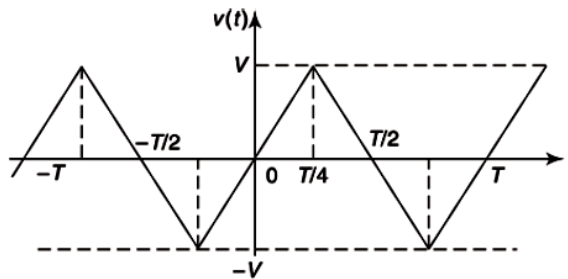
(i) $[\cos(2t + \frac{\pi}{6})]^2$

(ii) $e^{j(\pi t - 3)}$

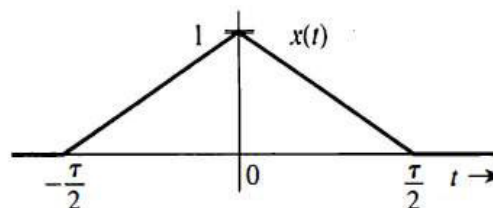
(iii) $3 \sin(3t + \frac{\pi}{4})$

UNIT-II

3. a) Find the trigonometric Fourier series of the triangular waveform shown in the following figure. [7M]

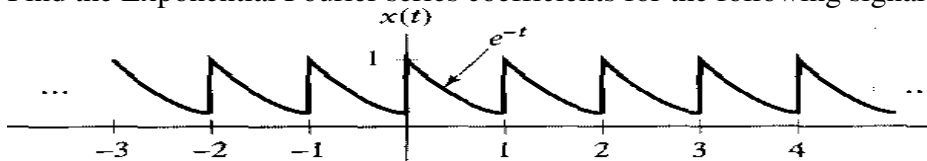


- b) Compute the Fourier transform of the signal $x(t)$ applying differentiation in time property of Fourier transform. [7M]



(OR)

4. a) Find the Exponential Fourier series coefficients for the following signal [7M]



- b) Compute the Fourier transform of the signals [7M]

(i) $x(t) = e^{-3t} \cos \pi t u(t)$ (ii) $x(t) = e^{1+t} u(-t+2)$

UNIT-III

5. a) For each of the following impulse responses, determine whether the corresponding system is memory less, causal and stable [7M]
i) $h(t) = u(t) - 2u(t-1)$
ii) $h(t) = \exp(-2|t|)$
iii) $h(n) = 2^n u(-n)$
- b) A system is given by $y(t) = \frac{d}{dt} x(t-1)$ [7M]
i) Check whether the system is BIBO stable. (Let $x(t)$ be a square wave.)
ii) Is the system causal? Justify your answer

(OR)

6. a) Explain causality and poly wiener criterion for physical realization. [7M]
b) Discuss the conditions for distortion less transmission. [7M]

UNIT-IV

7. a) Write the properties of autocorrelation function and prove two of them. [7M]
b) Derive the relationship between autocorrelation function and energy spectral density of an energy signal. [7M]
- (OR)
8. a) Explain flat top sampling with relevant expressions and waveforms. [7M]
b) What is Nyquist rate of sampling? A signal $x(t) = 10\text{sinc}(500t)$, find its Nyquist rate [7M]

UNIT-V

9. a) Given $h(t)$, find $H(s)$ and its region of convergence (ROC). [7M]
 $h(t) = 2e^{-3t} u(t) + 5e^{-4t} u(t)$
- b) Determine the z-transform and region of convergence for the following sequence: [7M]

$$x(n) = \begin{cases} 2^n & n \geq 0 \\ 3^{-n} & n < 0 \end{cases}$$

(OR)

10. a) Determine the inverse Laplace Transform of the following functions. [7M]
i) $1/s(s+1)(s+3)$ ii) $3s^2 + 8s + 6 / (s+8)(s^2+6s+1)$
- b) Find the inverse Z- transform of [7M]

$$X(Z) = \frac{1+3z^{-1}}{1+3z^{-1}+2z^{-2}}$$

AR16

CODE: 16CS2005

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

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

**FREE OPEN SOURCE SOFTWARE
(Common to CSE & IT)**

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) What is Foss? How it differs from open source software. 6M
b) Describe the advantages and disadvantages of Foss. 8M
- (OR)
2. a) Discuss about variables and assignments. 6M
b) What are Python assignment operators? Explain. 8M

UNIT-II

3. a) What are 4 built-in numeric data types in Python? Explain. 6M
b) Describe Python jump statements with examples. 8M
- (OR)
4. a) Explain about iteration statements with examples. 8M
b) Explain the rules used for writing statements in Python . 6M

UNIT-III

5. a) What are built-in dictionary functions? Explain. 6M
b) Write a Python program that interchanges the first and last characters of a given string. 8M
- (OR)
6. a) Explain about built-in functions of tuple. 7M
b) Discuss about list and dictionary comprehensions. 7M

UNIT-IV

7. a) Explain loop constructs in Perl 7M
b) Explain Perl parsing rules. 7M
- (OR)
8. a) Explain the variable types in Perl with a suitable example 6M
b) Explain different control statements in Perl 8M

UNIT-V

9. a) Explain how subroutines can be created, called and how arguments can be passed with a suitable example. 8M
b) What is the difference between "Use" and "Require". 6M
- (OR)
10. a) Write a Perl program to display the contents of a file. 8M
b) What is the difference between packages and module 6M