

AR18

CODE: 18CET204

SET-2

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

II II B.Tech I Semester Regular & Supplementary Examinations, March-2021

SURVEYING AND GEOMATICS (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) Define surveying? Write about principles of surveying. (4M)
(b) Below are the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected? (8M)

Line	Fore Bearing	Back Baring
PQ	$124^{\circ}30^1$	$304^{\circ}30^1$
QR	$68^{\circ}15^1$	$246^{\circ}00^1$
RS	$310^{\circ}30^1$	$138^{\circ}15^1$
SP	$200^{\circ}15^1$	$17^{\circ}45^1$

At what stations do you suspect local attraction? Find the corrected bearings of the lines.

(OR)

- 2 (a) Explain the differences in surveying based on equipment with suitable example (4M)
(b) Below are the bearings observed in a traverse survey conducted with a prismatic compass at a place where local attraction was suspected (8M)

Line	For Bearing	Back Baring
AB	$139^{\circ}25^1$	$319^{\circ}45^1$
BC	$154^{\circ}45^1$	$334^{\circ}45^1$
CD	$295^{\circ}40^1$	$115^{\circ}20^1$
DA	$353^{\circ}30^1$	$175^{\circ}0^1$

Calculate the included angles of the closed traverse and find the corrected angles

UNIT-II

- 3 (a) Write the characteristics of contour with neat sketch. (6M)
(b) The following consecutive readings were taken with a dumpy level, the instrument having been moved after the 3rd, 6th, 8th readings: 1.005, 1.315, 1.865, 0.965, 1.405, 1.555, 0.865, 1.345, 1.110, 0.965, 1.175. The first reading was taken with the staff held upon a benchmark of elevation 302.540. Tabulate the page of field book and Calculate the levels of the points using any method. (6M)
(OR)
- 4 (a) Describe in detail about the difficulties in leveling (6M)
(b) Describe the procedure for preparation of contour maps (6M)

UNIT-III

- 5 (a) Discuss the principle of theodolite survey and principle of tacheometry (6M)
(b) Describe briefly about the equipment's used in total station surveying and various components of total station (6M)
(OR)
- 6 (a) Explain the methods of setting out a curve (6M)
(b) Describe the adjustments of theodolite by repetition method. (6M)

UNIT-IV

- 7 (a) Write down the advantages of photogrammetric surveying. (6M)
(b) Explain about flight planning with neat sketches? (6M)
(OR)
- 8 (a) Explain the terrestrial photogrammetric surveying? (6M)
(b) Fundamental principle of Photogrammetry and how is it used in the field of mapping surveying? (6M)

UNIT-V

- 9 (a) Describe remote sensing data acquisition? (6M)
(b) Describe about electromagnetic spectrum with neat sketch. (6M)
(OR)
- 10 (a) Discuss the features are used to identify satellite images through visual image interpretation? (6M)
(b) Explain about 5 components of GIS? (6M)

AR18

CODE: 18EET205

SET-2

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

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

**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. Derive the current equation of pn junction diode 12M
- (OR)
2. a) Explain how Zener diode act as voltage regulator. 6M
- b) Discuss the V-I characteristics of zener diode 6M

UNIT-II

3. a) Derive Expressions for Rectification Efficiency, Ripple factor and transformer utility factor (TUF) for a Half-wave Rectifier? 8M
- b) Brief out various types of filters (L-Type, RC-Type, C-Type) 4M
- (OR)
4. a) Explain the operation of FWR with and without Capacitor filter. 6M
- b) A 15-0-15 V ideal transformer is used with a FWR circuit with diodes having forward drop of 1V. The load is resistance of 100Ω and a capacitor of $10000\mu\text{F}$ is used as a filter across the load resistance. Calculate DC load current, DC load voltage and Ripple factor. 6M

UNIT-III

5. a) With neat sketches explain the input and output characteristics of transistor in CB mode. 8M
- b) Derive the relation for β , α , γ and relate them 4M
- (OR)
6. a) With neat sketches describe the characteristics of n-channel enhancement MOS FET 8M
- b) Compare CE, CB and CC in terms of voltage gain, current gain, input resistance and output resistance 4M

UNIT-IV

7. Define stability factors S, S', S'' and explain about self bias circuit with neat sketch. 12M
- (OR)
8. a) In a self-bias circuit, if $V_{CC} = 12\text{V}$, $R_C = 1\text{K}\Omega$, $R_E = 1\text{K}\Omega$, $R_1 = 8\text{K}\Omega$, $R_2 = 4\text{K}\Omega$, $R_L = 1.5\text{K}\Omega$ and $V_{BE} = 0.7\text{V}$. Draw the d.c. load line and determine the operating point. 6M
- b) Discuss about AC and DC load line concept 6M

UNIT-V

9. a) Explain how transistor acts as a switch 6M
- b) Explain Colpitts oscillators. 6M
- (OR)
10. Draw and explain the RC phase shift oscillator. Derive the relation for frequency of oscillations 12M

AR18

CODE: 18MET202

SET-1

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

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

**MATERIALS ENGINEERING
(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) Explain the reasons to study the crystal structure of metals. 6M
b) What is the effect of grain boundary on properties of metals or alloys ? 6M
(OR)
2. a) Define atomic packing factor and calculate APF for BCC and FCC. 6M
b) Differentiate between amorphous solids and crystalline solids. 6M

UNIT-II

3. Draw iron carbide diagram and explain its phases or reactions. 12M
(OR)
4. a) Describe Phase diagram and Explain Isomorphs system with a suitable alloy system. 6M
b) How is the solid solution different from intermetallic compounds? Explain. 6M

UNIT-III

5. a) Which stainless steel is best suited for surgical instruments? Explain. 6M
b) Explain any two properties and applications of following 6M
i) Tool steels ii) Die steels iii)Stainless steels
(OR)
6. a) Distinguish the properties and applications of White Cast Iron and Gray Cast Iron. 6M
b) What is an alloy steel? How are alloy steels classified? Explain them. 6M

UNIT-IV

7. a) Draw TTT diagram for steel and write down the construction procedure. 6M
b) Define Tempering. List out various types of Tempering processes and explain them briefly. 6M
(OR)
8. a) Distinguish between Carburizing and Nitriding. 6M
b) Write about characteristics of metal powders. Explain the applications and advantages of Powder metallurgy. 6M

UNIT-V

9. a) Explain the composition, properties, and typical applications for any two types of aluminium alloys. 6M
b) Define the following properties with examples: 6M
i) Stiffness ii) Malleability and iii) Hardness
(OR)
10. a) Define the following properties with examples: 6M
i) Creep ii) Toughness and iii) Ductility
b) Write a short note on Fatigue Testing. 6M

AR18

CODE: 18ECT204

SET-2

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

II B.Tech I Semester Regular & Supplementary Examinations, March-2021

SIGNALS & SYSTEMS

(Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

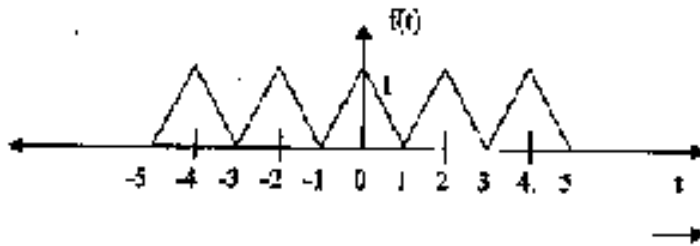
All parts of the Question must be answered at one place

UNIT-I

1. a) Discuss the analogy between vectors and signals and hence explain orthogonal vector space and orthogonal signal spaces. Explain the condition of orthogonality between two signal $f_1(t)$ & $f_2(t)$. [8M]
b) Differentiate energy and power signals. Give two examples of each. [4M]
(OR)
2. a) A rectangular function $f(t)$ is defined by $f(t)=1$ for $(0 < t < \pi)$ [8M]
 $= -1$ for $(\pi < t < 2\pi)$
approximate the above function by a finite series of sinusoidal functions.
b) State and prove properties of unit impulse function. [4M]

UNIT-II

3. a) Find the Fourier transform of the following and sketch the magnitude and phase spectrum. (i) $x(t)=e^{2t}u(t)$ (ii) $x(t)=\delta(t)$. [6M]
b) Find the exponential Fourier series and plot the magnitude and phase spectrum of the following triangular wave form. [6M]



(OR)

4. a) State and prove any four properties of Fourier transform. [8M]
b) Find the Fourier transform of i) Signum function [4M]
ii) Unit step signal

UNIT-III

5. a) The output $y(t)$ of a causal LTI system is related to the input $x(t)$ by the equation [8M]
$$\frac{dy(t)}{dt} + 2y(t) = x(t)$$

(i) Determine the frequency response $H(j\omega) = \frac{Y(j\omega)}{X(j\omega)}$ of the system
(ii) If $x(t) = e^{-t} u(t)$ determine $Y(j\omega)$
- b) Define Linearity and Time-Invariant properties of a system [4M]
(OR)
6. a) Explain causality and Poly-wiener criterion for physical realization. [8M]
b) Explain the characteristics of LPF, HPF and BPF. [4M]

UNIT-IV

7. a) Find the convolution of $x(t) = e^{-at} u(t)$ and $y(t) = e^{-bt} u(t)$ [8M]
b) What is correlation and explain the types of correlation [4M]
(OR)
8. a) State and prove Sampling theorem. [8M]
b) Define convolution and correlation. Give the relation between correlation and convolution. [4M]

UNIT-V

9. a) Find the Z-transform and ROC of the following [8M]
(i) $x_1(n) = (1, 2, -1, 3, 2, 1)$ (ii) $x(n) = (\sin \omega_0 n) u(n)$ (iii) $x(n) = a^n u(n)$
b) State and prove any two properties of Z-transform [4M]
(OR)
10. a) Find the inverse Laplace transform of [6M]
 $X(s) = (s+4) / (s+3)(s+2)$ when ROC is $-3 < \text{Re}(s) < -2$.
b) State and prove initial and final value theorems of Z transform. [6M]

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) Discuss about the need of FOSS. 4M
- b) What is the difference between 'Free' and 'Open' source software's? List any 4 FOSS software's. 8M

(OR)

2. a) Explain the features of Python. 8M
- b) Discuss about the membership and identity operators in python with examples. 4M

UNIT-II

3. a) Discuss about various conditional statements in python with examples. 8M
- b) What is the difference between 'While' and 'For' loops in python? Explain with example. 4M

(OR)

4. a) What is mutability? Explain the mutable data types in python with examples. 8M
- b) Explain about string slicing in python with examples. 4M

UNIT-III

5. a) Explain 'Dictionary' data type with at least 4 in-built functions. 8M
- b) Explain the syntax of a function in python. Also list various parameter passing mechanisms. 4M

(OR)

6. a) Write a python script to copy the contents of one file into another file. 6M
- b) Explain 'List' data type with at least 6 in-built functions 6M

UNIT-IV

7. a) Discuss about the features of PERL. 4M
- b) Explain about variables and statements in PERL with examples. 8M

(OR)

8. a) Discuss about syntax and parsing in PERL with an example. 6M
- b) Explain about control structures in PERL with an example. 6M

UNIT-V

9. a) Discuss about arithmetic and assignment operators in PERL with examples. 6M
- b) List various file handling functions in PERL along with their syntax. 6M

(OR)

10. a) Explain about sub routines in PERL with an example. 6M
- b) Discuss about 'Quote Like' and 'Bitwise' operators in PERL with examples.. 6M

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 Surveying? What are the principles of surveying? 7M
 b) Discuss briefly about the errors in chaining. 7M

(OR)

2. The bearings of the lines of traverse are given below. Find the included angles and correct the bearings for local attraction, if any. 14M

Line	F.B	B.B
AB	73°40'	252°30'
BC	113°50'	295°20'
CD	164°20'	344°20'
DE	223°40'	43°00'
EA	303°50'	123°45'

UNIT-II

3. a) Define i) Mean sea level ii) Horizontal Plane iii) Level Surface iv) Bench Mark 8M
 b) Explain the methods of levelling. 6M

(OR)

4. The following staff readings were observed successfully with level, the instrument having been moved forward after the second, fourth and eighth readings: 0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, and 3.765. The first reading was taken with the staff held upon a BM of elevation 132.135m. Enter the readings in level book form and reduce the levels. Apply the usual checks. Find also the difference in levels between the first and last points. 14M

UNIT-III

5. a) Explain briefly the temporary adjustments of theodolite. 10M
 b) What are the advantages of total station 4M

(OR)

6. A line was levelled tacheometrically with tacheometer fitted with an anallactic lens, the value of the multiplying constant being 100. The following observations were made, the staff having been held vertically. 14M
 RL of BM=583.66m. Compute the RL's of P, Q and R.

Instrument station	Height of instrument axis(m)	Staff held at	Vertical angle	Staff reading(m)		
				Bottom	Centre	Top
P	1.40	BM	-1° 35'	1.120	2.330	3.540
P	1.40	Q	+2° 54'	1.210	2.380	3.550
Q	1.38	R	+3° 12'	0.865	2.425	3.985

UNIT-IV

7. Explain briefly the various methods of traversing with diagrams. 14M

(OR)

8. Calculate latitudes, departures and closing error for the following traverse and adjust using Bowditch's rule. 14M

Line	Length (m)	Whole circle bearing
AB	89.31	$45^{\circ}10'$
BC	219.76	$72^{\circ}05'$
CD	151.18	$161^{\circ}52'$
DE	159.10	$228^{\circ}43'$
EA	232.26	$300^{\circ}42'$

UNIT-V

9. The top (Q) of a chimney was sighted from two stations P and R at very different levels, the stations P and R being in the line with the top of the chimney. The angle of elevation from P to the top of the chimney was $38^{\circ}21'$ and that from R to the top of the chimney was $21^{\circ}18'$. The angle of elevation from R to a vane 2m above the foot of the staff held at P was $15^{\circ}11'$. The heights of the instrument at P and R were 1.87m and 1.64m respectively. The horizontal distance between P and R was 127m and the reduced level of R was 112.78m. Find the R.L of the top of the chimney and the horizontal distance from P to the chimney. 14M

(OR)

10. Define the various types of curves with neat sketches and write short notes on 14M
- i. Tangent distance
 - ii. Length of the curve
 - iii. Chainages of point of curvature and point of tangency
 - iv. Length of long chord
 - v. Degree of curve
 - vi. Apex distance and
 - vii. mid-ordinate.

**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) Describe the operation of PN junction diode under forward biased and reversed biased conditions with neat diagram. 7M

- b) Draw the V-I Characteristics of PN junction diode and explain its operation. 7M

(OR)

2. a) Explain the working and operation of full wave rectifier with neat diagrams 7M

- b) Mention the purpose of filters in the rectifier circuits 7M

UNIT-II

3. Draw and explain the circuit diagram of common emitter (CE) configuration and explain the input and output characteristics in detail. 14M

(OR)

4. a) Draw the basic construction of p-channel JFET and explain its operation. 7M

- b) With appropriate diagrams, discuss about various switching times of a transistor 7M

UNIT-III

5. a) What is the necessity of compensation techniques? Also explain the method of diode compensation technique against the variation of I_{co} . 7M

- b) Explain how the self bias scheme improves stability in a common emitter BJT circuit and derive an expression for the stability factor. 7M

(OR)

6. a) Explain in detail about self biasing used for BJT operation. 7M

- b) Explain the terms thermal runaway and thermal stability. 7M

UNIT-IV

7. a) Draw the hybrid equivalent circuit of an N P N Transistor in CE configuration and derive the expressions for A_v , A_i , R_{in} , R_o . 7M

- b) Design a single stage d.c. coupled CE amplifier for the given specifications: $V_{cc} = 24\text{ V}$, $I_c = 1\text{ mA}$ and $R_L = 120\text{ K}\Omega$ 7M

(OR)

8. a) Derive the equations for voltage gain and current gain for a BJT approximate h-parameter model for CE configuration. 7M

- b) Justify the validity of approximate hybrid model applicable in low frequency region. 7M

UNIT-V

9. a) What are all the advantages of negative feedback? 4M

- b) Explain with neat diagram the working of RC-phase shift oscillator. Also mention its applications 10M

(OR)

10. a) Derive the Transfer gain of the negative feedback amplifier 7M

- b) Explain with neat diagram the working of Wein bridge oscillator. Also mention its applications 7M

AR16

CODE: 16ME2009

SET-2

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

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

**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 square pyramid of side of base 40 mm and height 60 mm is resting on a corner of its base in the HP such that highest point of the base is 40 mm above xy line and the top view of the axis is inclined at 30^0 to the VP. Draw the auxiliary top view and auxiliary front view. 14 M

(OR)

2. A pentagonal prism having a base with a 30 mm side and a 70 mm long axis is resting on an edge of its base in the HP and the axis is inclined at angle of 30^0 to the HP. Draw the auxiliary top view and auxiliary front view, if the edge on which it is resting is inclined at 45^0 to the VP. 14 M

UNIT-II

3. A square prism, side of base 40 mm and axis 60 mm long, rests with its base on the HP with a side perpendicular to the VP. It is cut by an AIP making 30^0 to the VP and contains the axis of the prism. Draw its top view, sectional front view and true shape of the section. 14 M

(OR)

4. A pentagonal pyramid having base with a 30 mm side and 70 mm length, is resting on its base in the HP with an edge of the base parallel to the VP. It is cut by a section plane perpendicular to the VP inclined at 60^0 to the HP and bisecting the axis. Draw its front view, sectional top view and true shape of the section. 14 M

UNIT-III

5. A cylinder with a 50 mm diameter and a 60 mm long axis, is resting on its base on the HP. It is cut by a section plane, inclined at 45^0 to the HP and perpendicular to the VP and cuts the axis at a point distant 40 mm from the bottom face. Draw its front view, sectional top view, and true shape of the section. 14 M

(OR)

6. A cone with a 60 mm base diameter and a 70 mm long axis is resting on its base on the HP. It is cut by an AIP making 45^0 with the HP and passing through a point on the axis, 20 mm above the base. Draw its front view, sectional side view and true shape of the section. 14 M

UNIT-IV

7. A pentagonal prism, having base with a 30 mm side and a 70 mm axis, is resting on its base on HP such that one of the rectangular faces is parallel to the VP. It is cut by a section plane, perpendicular to VP and inclined at 45° to HP and passes through the mid-point of the axis. Draw the development of the lateral surface of the cut prism. 14 M

(OR)

8. A cylinder with a 50 mm base diameter and a 80 mm long axis, is resting on ground with its axis vertical. A sectional plane inclined at 45° to HP cuts the cylinder such that the plane passes through the top of the generators and cuts all the generators. Draw the development of its lateral surface. 14 M

UNIT-V

9. A cylinder with a 40 mm base diameter is resting on its base on the HP. It is penetrated by another cylinder of 60 mm base diameter, such that their axes intersect each other at right angles. Draw the projections of the combination and show the curves of intersection. 14 M

(OR)

10. A cone with an 60 mm base diameter and a 100 mm long axis, is resting on its base on the HP. It is completely penetrated by a cylinder with a 50 mm base diameter. The axes of the solids intersect each other at right angles, 30 mm above the base of the cone. Draw the projections of the combination and show curves of intersection. 14 M

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 condition for orthogonality of two signals $x_1(t)$ and $x_2(t)$ [7M]
- b) State and derive the properties of impulse function $\delta(t)$. [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.

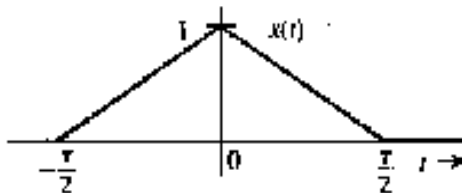
(i) $[\cos(2t + \frac{\pi}{6})]^2$

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

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

UNIT-II

3. a) Derive the relation between the trigonometric and exponential Fourier series coefficients. [7M]
- b) Compute the Fourier transform of the signal $x(t)$ [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) What is meant by distortion less transmission? Explain about distortion less transmission through a system. [7M]
- b) For a linear time invariant system, find the relation between the input signal $x(t)$, output signal $y(t)$ and impulse response $h(t)$. [7M]

(OR)

6. a) A causal LTI system having frequency response $H(j\Omega) = 1/(j\Omega+3)$ is producing an output $y(t) = e^{-3t} u(t) - e^{-4t} u(t)$ for a particular input $x(t)$. find $x(t)$. [7M]
 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

UNIT-IV

7. a) Write the properties of cross correlation 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) State and prove Sampling theorem [10M]
 b) What is Nyquist rate of sampling? A signal $x(t) = 10\text{sinc}(500t)$, find its Nyquist rate [4M]

UNIT-V

9. a) Given $x(t)$, find $X(s)$ and its region of convergence (ROC). [7M]

$$x(t) = 2e^{-3t} u(t) + 5e^{-4t} u(t)$$

 b) List all the properties of ROC of Laplace transform and prove any two of them. [7M]
 (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-1

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

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

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

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) | Distinguish free and open source software with suitable examples? | 6M |
| b) | Write the features and applications of python? | 8M |
| (OR) | | |
| 2. a) | List and explain different operators supported by Python. | 8M |
| b) | Discuss about operator precedence and associativity? | 6M |

UNIT-II

- | | | |
|-------------|--|----|
| 3. a) | Describe Python jumping statements with examples. | 9M |
| b) | Write a Python program to find the given year is leap year or not. | 5M |
| (OR) | | |
| 4. a) | Explain about conditional statements with suitable examples. | 7M |
| b) | Write a Python program to print all prime numbers less than 256. | 7M |

UNIT-III

- | | | |
|-------------|---|----|
| 5. a) | Differentiate between lists and tuples with suitable examples? | 7M |
| b) | Discuss the String built-in methods in Python? | 7M |
| (OR) | | |
| 6. a) | What are the built-in methods available for Lists. Explain with suitable example. | 9M |
| b) | Write a Python program that interchanges the first and last characters of a given string. | 5M |

UNIT-IV

- | | | |
|-------------|--|----|
| 7. a) | Discuss the features of Perl programming? | 5M |
| b) | Differentiate between the following control statements of Perl.
i) If and unless ii) While and until iii) for and foreach | 9M |
| (OR) | | |
| 8. a) | List out and explain available operators in PERL? | 5M |
| b) | Explain looping techniques available in PERL with suitable examples? | 9M |

UNIT-V

- | | | |
|-------------|--|----|
| 9. a) | Write a PERL program to find the factorial of a given number using sub routines. | 7M |
| b) | What is the difference between packages and module in perl? | 7M |
| (OR) | | |
| 10. a) | Write a Perl program to print number of words and lines in a given file. | 7M |
| b) | Explain USE and REQUIREMENT statements in perl? | 7M |

**SURVEYING
(Civil Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Define Surveying
- b) Define magnetic declination
- c) List types of levels
- d) Define contour
- e) Give the formula for calculation horizontal distance in tacheometric survey
- f) What is meant by K and C in tacheometric surveying
- g) List the methods used for computation of irregular area
- h) List the methods used for computation of Cross-sectional area
- i) List types of Curves
- j) Differentiate Simple and Compound Curve

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) Explain in detail about classification of Surveying 6
- b) Explain in detail about Principles of Surveying. 6

(OR)

3. The following are bearings taken on a closed compass traverse: 12

Line	Fore bearing	Back bearing
AB	80°10	259°00
BC	120°20	301°50
CD	170°50	350°50
DE	230°10	49°30
EA	310°20	130°15'

Compute the interior angles and correct them for observational errors

UNIT-II

4. The following consecutive readings were taken along AB with a 4 m levelling staff 12
on continuously sloping ground at intervals of 15 m 0.415, 1.025, 2.085, 2.925,
3.620, 4.595, 0.715, 2.115, 3.090, 4.405. The elevation A was 185.275 M. Enter
the above readings in a level book and work out RL by rise and fall method and
also find the gradient of the line AB

(OR)

5. a) Explain in detail about methods of contouring 6
- b) Explain in detail about uses of contour maps 6

UNIT-III

6. Two observations are taken by a transit theodolite from station O one to B.M with R.L of 515.6 m and the other to station P. The observations are recorded as follows. 12

Inst Station	Staff Station	Target	Angle	Staff Reading	Remarks
0	B.M	Lower	$-12^{\circ}30'$	0.560	515.60 M
		Upper	$-8^{\circ}20'$	2.055	
0	P	Lower	$-5^{\circ}30'$	1.350	
		Upper	$3^{\circ}30'$	3.250	

(OR)

7. Explain in detail about various terminology used in theodolite and list the essential components of a theodolite 12

UNIT-IV

8. a) A railway embankment of 400 m long is 18 m wide at the formation level and has the side slope 3 to 1. The ground levels at every 100 m along the center line are as follows 6

Distance	0	100	200	300	400
R.L	204.8	206.2	207.5	207.2	208.3

The formation level at zero chainage is 207.000 and the embankment has a rising gradient of 1 in 100. The ground is level across the center line. Calculate the volume of the earthwork.

- b) Area enclosed by a contour of a hill and a lake situated side by side are as under .If the lake is to be filled up to 100 m level with the excavated earth from the hill ascertain whether the excavated earth is sufficient or in excess. If excess up to what level the excavation is done to just fill up the lake. 6

HILL	Contour(m)	100	110	120	130	140	150
	Area (m ²)	5500	4000	2750	1500	500	0
LAKE	Contour(m)	100	90	80	70	60	50
	Area (m ²)	5000	3750	2500	1750	550	0

(OR)

9. a) List the formula for different levels of cross section 6
b) A railway embankment is 20 m wide with a side slope of 2:1. Assuming the ground to be level in a direction traverse to the center line, calculate the volume contained in a length of 120 meters, the center height at 20 m interval being in meters 2.2, 3.7, 3.8, 4.0, 3.8, 2.8, 2.5 6

UNIT-V

10. a) Define the various types of curves with neat sketches 6
b) Explain in detail about setting out method of simple curve by Two theodolite and Rankine's method 6

(OR)

11. a) Two Straight lines PQ and QR on the centre line of a proposed road on a rocky headland are to be connected by a circular curve of 700 ft radius. From the traverse notes it is found that if the bearing of PQ is assumed to be N $0^{\circ}0'$ E the bearing of QR will be N $48^{\circ}20'$ E while, if P be taken as the origin of coordinates, the latitude and departure of R will be 725 ft and 400 ft respectively. Determine the distance of the tangent points of the curve from the station P and R 6
b) Explain in detail out elements of compound curve 6

AR13

CODE: 13EC2007

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech. I Semester Supplementary Examinations, March, 2021

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 Drift Current
b) Define Mass Action Law
c) Define Zener breakdown.
d) Reproduce the circuit of FWR with π -section filter
e) Define Punch Through in a transistor
f) Show the relation between β and α
g) State the need for biasing of transistor
h) Define h_{re}
i) Identify the basic amplifier used in voltage shunt feedback amplifier
j) Show the circuit of wien-bridge oscillator

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Explain formation of N-Type and P-Type semiconductor 6M
b) Derive the expression for Diffusion Capacitance formed in PN Diode 6M

(OR)

3. a) Explain the operation of PN diode with the under forward bias and reverse bias conditions. 6M
b) Draw and Explain the V – I characteristic of PN diode 6M

UNIT-II

4. a) Explain the operation of Tunnel diode with help of energy band diagrams 6M
b) Explain the operation FWR and derive the expression for ripple factor. 6M

(OR)

5. a) Determine (i) I_m , I_{dc} , I_{rms} (ii) a.c. power input and d.c. power output (iii) d.c. output voltage of a crystal diode having internal resistance $r_f = 20\Omega$ is used for half-wave rectification. The applied voltage $v = 50 \sin \omega t$ and load resistance $R_L = 800\Omega$ 8M
- b) Explain the operation of Varactor diode 4M

UNIT-III

6. Draw and explain the circuit diagram of common emitter (CE) configuration and explain the input and output characteristics in detail. 12M
- (OR)**
7. a) Justify the transistor operation as an amplifier. 6M
- b) Explain the operation of enhancement mode MOSFET and draw its characteristics 6M

UNIT-IV

8. a) Explain the procedure to determine the h-parameters from CE characteristics. 6M
- b) Derive the expression for stability factor of a Collector to Base Bias circuit. 6M
- (OR)**
9. a) Explain how stabilization is achieved against variations in V_{BE} , and β 6M
- b) Convert CC parameters in terms of CE parameters. 6M

UNIT-V

10. a) Explain the operation of RC phase shift oscillator. 6M
- b) Show the block diagram of Negative feedback amplifier and explain the function of each block. 6M
- (OR)**
11. a) Compare the four negative feedback amplifiers w.r.t. input impedance, output impedance. 6M
- b) Show the block diagram of a current series feedback amplifier and explain the function of each block. 6M

AR13

CODE: 13ME2006

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

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

ENGINEERING METALLURGY & MATERIAL SCIENCE

(Mechanical Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is crystallography?
b) What are voids in crystals?
c) What is a phase diagram?
d) What is a eutectoid reaction?
e) Name any one alloy steel with composition.
f) Give the composition of any one copper base alloy.
g) Define “hardness” property of a material.
h) Define “toughness” property of a material
i) Define powder metallurgy.
j) What is cold compaction?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Write about Miller indices for directions and planes. 6M
b) Differentiate between ionic and covalent bonds. 6M

(OR)

3. a) What are Point defects? Explain 6M
b) What are Dislocations? Explain 6M

UNIT-II

4. a) Draw the Iron carbon phase diagram. 6M
b) Explain the solidification of pure metals. 6M

(OR)

5. a) Explain any three types of phase reactions in Iron carbon system. 6M
b) Explain the solidification of alloys. 6M

UNIT-III

6. a) Explain about Pearlitic transformation in steel during heat treatment. 6M
b) Draw the TTT diagram for steels during heat treatment. 6M

(OR)

7. a) Classify Tool Steels. 6M
b) Write about composition, applications and classifications of Stainless steel 6M

UNIT-IV

8. a) What is creep property in any material? 6M
b) What are the properties evaluated by tensile testing procedure? Explain 6M

(OR)

9. a) What is fatigue in a material? 6M
b) Differentiate between Engineering stress-strain curve vs. true stress strain curve taking any ferrous material as an example. 6M

UNIT-V

10. a) Enlist the methods of production of metal powder in powder metallurgy and describe any one in detail. 6M
b) Write about Hot compaction with reference to powder metallurgy. 6M

(OR)

11. a) Write about design consideration in powder metallurgy. 6M
b) Describe the steps involved in powder metallurgy through a flow chart. 6M

AR13

CODE: 13EC2004 **SET-1**
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech. I Sem. Supplementary Examinations, March, 2021
SIGNALS AND SYSTEMS
(Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Sketch the signal $x(t)=\delta(t-4)$
- b) Define signal and system
- c) What is Gibb's Phenomenon
- d) State time shifting property of Fourier Transform
- e) Define condition of stability in a LTI system
- f) Define causal system
- g) Define Nyquist rate
- h) What is Aliasing
- i) State convolution property in Laplace Transform
- j) What are the applications of Laplace Transform

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a)

6

$$f(t) = \begin{cases} A & \text{for } 0 \leq t \leq \frac{\pi}{2} \\ A & \text{for } \frac{\pi}{2} \leq t \leq \frac{3\pi}{2} \\ A & \text{for } \frac{3\pi}{2} < t \leq 2\pi \end{cases}$$

A rectangular function is defined as

Approximate above function by cost between the intervals $(0, 2\pi)$ such that mean square error is minimum. and evaluate mean square error

- b) Bring out the relation between unit step function and signum function.

6

(OR)

3. a) show that $\int_{-\infty}^{\infty} f_1(t)f_2(t)dt = 0$ when $f_1(t)$ and $f_2(t)$ are orthogonal to each other
- b) Define mean square error and derive the expression for MSE (Mean square error)

6

6

UNIT-II

4. a) Find the complex exponential Fourier series for half wave rectified sine wave 6
b) State and prove convolution property of Fourier transform 6
(OR)
5. a) Find the Fourier transform of impulse train 6
b) Find the complex exponential Fourier series for full wave rectified sine wave 6

UNIT-III

6. a) Explain about distortion less transmission 4
b) Explain causality and poly-wiener criterion for physical realization. 8
(OR)
7. a) Explain stability and causality in an LTI system 6
b) Derive the relationship between the bandwidth and rise time of ideal low pass filter 6

UNIT-IV

8. a) List all the properties of LTI system 6
b) Define under sampling. Explain the effect of under sampling and how to overcome it. 6
(OR)
9. a) Define convolution and correlation 4
b) State and prove sampling theorem 8

UNIT-V

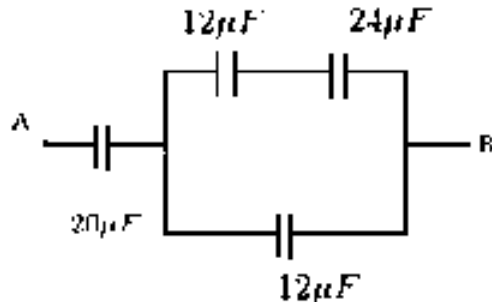
10. a) Find out the Laplace transform $x(t)=\text{sign}(t)$ 6
b) Find the inverse Laplace transform of $X(s) = \frac{1}{s^2+s+1}$ 6
(OR)
11. a) Define the properties of ROC for Z-transform 4
b) State and prove initial and final value theorems 8

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech I Semester Supplementary Examinations, March-2021****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 current.
- b) Define power.
- c) What is Faraday's 1st law?
- d) Applications of DC shunt motor.
- e) Transformer working principle.
- f) Applications of alternator.
- g) What are the different types of instruments?
- h) Torque equation of PMMC instrument.
- i) What is rectifier?
- j) SCR applications.

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) State and explain the Kirchhoff's laws. 6M
 - b) Define i) Resistance ii) Inductance iii) Capacitance 6M
- (OR)**
3. a) Two resistors 6Ω , 12Ω are connected in parallel and the combination is connected in series with 25Ω and battery. Battery has internal resistance of 0.25Ω . Determine the voltage supplied by battery if voltage across 6Ω resistor is 6V. 6M
 - b) Determine the equivalent capacitance across A and B terminals. 6M



UNIT-II

4. a) Briefly explain the construction of DC machine with neat sketch. 6M
b) Derive the EMF equation of DC generator. 6M
(OR)
5. a) A 6 pole wave wound armature has 840 conductors and flux/pole of 0.018 wb. 6M
Calculate EMF generated by the machine when it is running at 1200 rpm.
b) List out the applications of various DC motors. 6M

UNIT-III

6. a) Explain the working principle of single phase transformer. 6M
b) Derive the EMF equation of single phase transformer. 6M
(OR)
7. a) Explain working principle and operation of an alternator. 6M
b) Compare Salient pole and cylindrical pole alternators. 6M

UNIT-IV

8. What are the basic requirements of measuring instruments? Briefly discuss them. 12M
(OR)
9. Explain the principle and operation of PMMC instrument. 12M

UNIT-V

10. a) Describe the forward bias and reverse bias conditions of a diode 6M
b) Explain the principle and operation of half wave rectifier. 6M
(OR)
11. Illustrate how a transistor acts as an amplifier? List out applications of transistor. 12M