

AR18

CODE: 18CET204

SET-1

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

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

**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) What are basic principles of surveying? What are primary division of surveying? 6M
b) What are different types of error? Give one example of each. 6M
(OR)
2. a) What are the various accessories required in linear measurements? Describe briefly 6M
b) What is local attraction? How would you detect it at a place? 6M

UNIT-II

3. a) What is bench mark? Describe different types of bench marks. 4M
b) The following readings were observed successively with a levelling instrument. The 8M
instrument was shifted after fifth and eleventh readings.
0.585, 1.010, 1.735, 3.295, 3.775, 0.350, 1.300, 1.795, 2.575, 3.375, 3.895, 1.735, 0.635, 1.605
Draw up a page of level book and determine the R.L of various points if the R.L of
the point on which the first reading was taken is 136.440. Use the rise and fall method
(OR)
4. a) What is profile levelling? Describe the procedure for conducting profile levelling of a 6M
proposed highway
b) Discuss various uses of contour maps. 6M

UNIT-III

5. a) How would you measure a horizontal angle by repetition? What are its advantages? 6M
b) In order to ascertain the elevation of top (Q) of the signal on a hill, observations were 6M
made from two instrument stations P and R at a horizontal distance of 60m apart. P, R
being in line with Q. the angles of elevations of Q at P and R were $25^{\circ}45'$ and 20°
respectively. The staff readings upon the bench mark of elevation 250.28m were
respectively 2.850 and 3.050 m when the instrument was at P and R. the telescope being
horizontal determine the elevation of foot of the signal if the height of the signal above
its base is 2m.
(OR)
6. a) Derive expression for horizontal distance and vertical intercept when the staff is held 6M
normal to line of sight.
b) Explain components in simple curve with sketch 6M

UNIT-IV

7. a) What is meant by photogrammetric survey? What are the uses of photogrammetric survey 6M
b) What is the classification of photogrammetric survey and explain any one 6M
(OR)
8. a) Describe briefly about relief and tilt displacements? 6M
b) Explain procedure for estimation of a height of flight 6M

UNIT-V

9. a) Describe about advantages of remote sensing over photogrammetric surveying. 6M
b) Explain about electromagnetic spectrum with neat sketches? 6M
(OR)
10. a) Write about visual image interpretation? 6M
b) Explain about platforms and sensors? 6M

AR18

CODE: 18EET205

SET-1

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

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

**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) | Explain the V-I characteristics of a P-N junction diode with necessary diagrams. | 8M |
| b) | Compare LED and pn junction diode | 4M |
| (OR) | | |
| 2. a) | Describe how a zener diode used as a voltage regulator | 6M |
| b) | Discuss the IV characteristics of tunnel diode | 6M |

UNIT-II

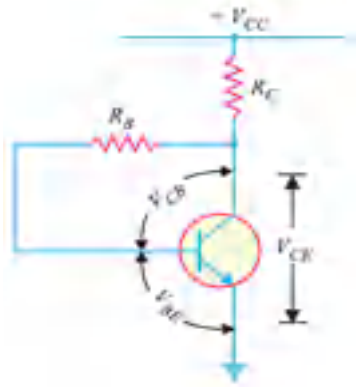
- | | | |
|-------------|---|----|
| 3. a) | Explain the operation of full wave rectifier with LC filter with necessary diagrams | 6M |
| b) | A 40-0-40V (rms) transformer is used with a full-wave rectifier with each diode having an internal resistance of 1Ω . If the load resistance is 19Ω , determine a) d.c load current b) d.c load power c) rectifier efficiency d) ripple frequency and e) PIV of each diode. | 6M |
| (OR) | | |
| 4. a) | With circuit and necessary waveforms explain the operation of center tapped Full Wave Rectifier. | 8M |
| b) | A full - wave single phase rectifier employs a π - section filter consisting of two $4\mu\text{F}$ capacitors and a 20 H choke. The transformer voltage to the center tap is 300 Vrms . The load current is 500mA . Calculate the dc output voltage and the ripple voltage. The resistance of the choke is 200Ω . | 4M |

UNIT-III

- | | | |
|-------------|---|----|
| 5. a) | With neat sketches explain the static input and output characteristics of transistor in CE mode | 8M |
| b) | List various operating regions of BJT | 4M |
| (OR) | | |
| 6. a) | Describe the construction, operation and characteristics of UJT. | 8M |
| b) | Why are N-channel MOSFETs preferred over P-channel MOSFETs? | 4M |

UNIT-IV

7. a) What is the need for transistor biasing and describe various biasing schemes 6M
b) It is desired to set the operating point at 2V, 5mA by biasing a silicon transistor 6M
with collector feedback resistor R_B as shown in Fig. If $V_{CC} = 10V$, $\beta = 100$, find the
values of R_B and R_C .



(OR)

8. What is meant by thermal run away? Discuss the necessary conditions to avoid the thermal runaway 12M

UNIT-V

9. a) Explain with an example how transistor acts as an amplifier 6M
b) What are the conditions to obtain sustained oscillations? 6M

(OR)

10. Draw and explain the Wein bridge oscillator. Derive the relation for frequency of oscillations 12M

AR18

CODE: 18MET202

SET-2

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

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

**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) What are the three most common crystal structures of metals? Explain in detail with example 6M
- b) Summarize with an example how grain boundaries are stronger than grains at room temperature 6M

(OR)

2. a) What is a grain size? What is a fine grained and coarse-grained material? 6M
- b) Distinguish between single crystal and poly crystal. Explain their effect on Properties of materials. 6M

UNIT-II

3. a) What is Solid solution? With neat sketches explain different types of solid solutions. 4M
- b) Draw and explain the phase diagram where two components are completely soluble in both liquid and solid state with suitable examples 8M

(OR)

4. a) Distinguish between intermetallic compounds and intermetallic compounds with Examples. 6M
- b) Define and explain the structural phases. 6M
- i) Ferrite ii) Austenite iii) Cementite.

UNIT-III

5. a) What is cast iron? How does it differ from pig iron? 4M
- b) What are the properties of steels and their alloys? Explain. 8M

(OR)

6. a) Explain the properties and engineering applications of the following: 6M
- i) Low carbon ii) Medium carbon iii) High carbon Steels.
- b) Enumerate the various characteristic features of Grey cast iron. 6M

UNIT-IV

7. a) Describe any three principal methods of case hardening. 6M
- b) Write about Compacting metal powders. 6M

(OR)

8. a) Write short notes on: i) Age hardening and ii) Tempering 6M
- b) Describe different techniques used for preparation powders in powder metallurgy? 6M

UNIT-V

9. a) Explain about various Aluminium alloys and their applications 6M
- b) Explain the phenomena of fatigue in metal. How is it measured in practice? 6M

(OR)

10. a) Describe the Tensile test on UTM. 4M
- b) Draw the stress-strain diagram for Ductile materials indicating the salient points. 8M

AR18

CODE: 18ECT204

SET-2

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

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

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) Examine whether following system is static (or) dynamic, linear (or) non-linear, causal (or) non-causal and time-invariant (or) time-variant
 $Y(n) = 2x(n+2) - x(n-2)$ [8M]
b) Illustrate the following [4M]
i) Exponential signals ii) Sinusoidal signals
- (OR)
2. a) Discuss about signal approximation using orthogonal functions [6M]
b) Define the following signals and indicate graphically [6M]
i) Signum function $\text{sgn}(t)$ ii) Rectangular pulse $\text{rect}(t/\tau)$ iii) Sinc function

UNIT-II

3. a) State and prove the following properties of Fourier series [6M]
i) Linearity property ii) Time scaling property
iii) Time shifting property
b) Develop Exponential Fourier series from Trigonometric Fourier series [6M]
- (OR)
4. a) State and prove time shifting and differentiation in time domain properties of Fourier transform [6M]
b) Find the Fourier transform for the following signals [6M]
i) $x(t) = 1/4 + t^2$ ii) $x(t) = e^{-4t} u(t)$

UNIT-III

5. a) Define LTI system. Discuss the properties of LTI systems [8M]
b) What is signal bandwidth and system bandwidth? Explain [4M]
- (OR)
6. a) Sketch and explain about ideal characteristics of LPF, HPF and BPF [6M]
b) A system produces an output of $y(t) = e^{-2t} u(t)$ for an input of $x(t) = e^{-4t} u(t)$. Determine the transfer function and impulse response of the system [6M]

UNIT-IV

7. a) Find the autocorrelation of the signal $x(t) = A \sin(\omega_0 t + \theta)$ [6M]
b) Compare ideal sampling, natural sampling and flat-top sampling [6M]
- (OR)
8. a) Explain sampling theorem for band-limited signals [6M]
b) Find the convolution of the following signals [6M]
 $x(t) = e^{-3t} u(t)$ and $h(t) = e^{-2t} [u(t) - u(t-3)]$

UNIT-V

9. a) State and prove initial value theorem and final value theorem for Laplace transform [6M]
b) Find Laplace transform of the signal $x(t) = e^{-bt} u(t)$ and find its ROC [6M]
- (OR)
10. a) Explain about ROC in Z-transform. List the properties of ROC of Z-transform [6M]
b) Find the Inverse Laplace Transform of the following functions [6M]
i) $X(s) = (2s-1)/(s^2+2s+1)$ ii) $X(s) = 1/(s^2+2s+2)$

AR18

CODE: 18CST204

SET-1

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

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

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 do you mean by Free and Open Source Software? Explain the necessity of FOSS. 6 M
b) Describe the advantages and disadvantages of Foss. 6 M
- (OR)**
2. a) List and explain the features of python. 6 M
b) Explain about arithmetic and comparison operators with their precedence 6 M

UNIT-II

3. a) What are the different loop control statements available in Python? Explain with suitable examples. 8 M
b) Mention the advantages of continue statement. 4 M
- (OR)**
4. a) List and explain any four built in string handling functions supported by python. 8 M
b) What are the numeric types supported by Python. 4 M

UNIT-III

5. a) What are Lists. Lists are mutable Justify your answer. 3 M
b) With an example explain the following built in functions of python. 9 M
i) append() ii) sort() iii) length()
- (OR)**
6. a) Explain fundamental file operations in Python with code examples. 8 M
b) Prompt for file name and display the number of lines in that text file. 4 M

UNIT-IV

7. a) List and Explain the features of perl. 8 M
b) Write a perl program to check whether a year is leap year or not. 4 M
- (OR)**
8. a) Write a short note about 6 M
i) Basic naming rules ii) parsing rules of a perl
- b) Write a perl program to read a number from standard input device and check if it is prime number. Display appropriate message. 6 M

UNIT-V

9. a) Describe with examples, the various types of operators, in PERL. 6 M
b) Briefly explain about i) tell ii) seek. 6 M
- (OR)**
10. a) Explain about different attributes of a subroutine 6 M
b) Write a perl program to count occurrence of a given word in a given file. 6 M

AR16

CODE: 16CE2004

SET-2

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

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

SURVEYING (Civil Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Differentiate between gunter's chain and engineer's chain. 8M
A road actually 1330 m long was found to be 1326 m when measured with a defective 30 m chain. How much correction does the chain need?
 - b) Differentiate between 6M
Surveyors compass and prismatic compass.
- (OR)**
2. a) Distinguish between plain and geodetic surveying 6M
 - b) What do you understand by whole circle bearing and quadratic bearing of a line? 8M
The magnetic bearing of a line is S 28°30' E. calculate the true bearing if the magnetic declination are 5°38' East and 5038' west

UNIT-II

3. a) What is levelling and explain types of levelling? describe any four of them briefly 6M
 - b) The following consecutive readings were taken with a level and 5 meter levelling 8M
staff on continuously sloping ground at a common interval of 20 m. 0.385;
1.030;1.925;2.825;3.730;4.685;0.625;2.005;3.110;4.485. The reduce level of the
first point was 208.125m. Rule out a page of a level field book and enter the above
readings. Calculate the reduced levels of the points by rise and fall method. Also
find the gradient of the line joining the first and last point.
- (OR)**
4. a) Enumerate the errors in levelling 6M
 - b) the following readings were observed with a levelling instrument, the instrument 8M
was shifted after 5th and 11th reading.
0.585, 1.010, 1.735, 3.295, 3.775(5th)
0.350, 1.300, 1.795, 2.575, 3.375
3.895 (11th), 1.735, 0.635, 1.605
Determine the RLs of various points if the reduced level (RL) of a point on which
the first reading was taken is 136.440 gives the height of collimation method and
applies the check.

UNIT-III

5. a) What is theodolite? Enumerate the applications of theodolite 7M
b) Explain about fixed hair method and movable hair method 7M
(OR)
6. a) Explain the reiteration method of measuring the horizontal angle. 7M
b) Write a note on advantages and disadvantages of total station 7M

UNIT-IV

7. a) What is meant by balancing of traverse? explain the Bowditch method of adjusting the traverse 8M
b) What is closed traverse? What are the two checks applicable in this case? 6M
(OR)
8. a) What are the different methods used to plot the traverse .Explain briefly any one of the method. 8M
b) Explain about closing error? 6M
Differentiate closed and open traverse?

UNIT-V

9. a) Derive formula for Determination of elevation of object when the base is accessible-the object is vertical 7M
b) Relation between radius and degree of curve 7M
(OR)
10. a) Derive formula for reduced level of an elevated object from the observations of two instrument stations lying in different vertical plane as the elevated object and the horizontal distance between two stations can be measured accurately. 6M
b) Two tangents intersect at the chainage 1190 m, the deflection angle being 36° . 8M
Calculate all the data necessary for setting out a circular curve with radius of 300 m by deflection angle method. The peg interval is 30 m.

AR16

CODE: 16EC2005

SET-1

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

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

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) Draw the equivalent circuit of a tunnel diode and explain the operation. 7M
b) Draw and explain the V-I characteristics of a PN junction diode. 7M
- (OR)
2. a) Derive an expression for ripple factor in a full-wave rectifier using inductor filter. 7M
b) Compare the performance of inductive, L-section and Π -section filter 7M

UNIT-II

3. a) Derive the relationship between α and β 7M
b) What is a MOSFET? List different types of MOSFETs with working procedure. 7M
- (OR)
4. a) Draw and explain the input and output characteristics of a transistor in CB configuration. 10M
b) Compare CB, CE and CC transistor configuration. 4M

UNIT-III

5. a) What is thermal runaway? How it can be avoided? 7M
b) Draw a fixed bias circuit and derive an expression for the stability factor 7M
- (OR)
6. a) What is the need for a biasing a transistor? Give different options. 7M
b) Draw a self-bias circuit and derive an expression for the stability factor 7M

UNIT-IV

7. a) Obtain hybrid parameters of CB configuration in terms of CE configuration. 7M
b) Justify the validity of approximate hybrid model applicable in low frequency region. 7M
- (OR)
8. a) Describe the comparison of transistor configurations in terms of A_v , A_i , R_i , R_o . 7M
b) Draw the hybrid equivalent model of CE, CB, CC configurations 7M

UNIT-V

9. With a neat circuit diagram explain the operation of transistor RC phase shift oscillator? 14M
Derive the expressions for the frequency of oscillations.
- (OR)
10. a) Explain with neat diagram the working of Hartley oscillator. Also mention its applications 7M
b) Derive the Transfer gain of the negative feedback amplifier 7M

AR16

CODE: 16ME2009

SET-1

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

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

**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 hexagonal prism of side of base 25 mm and height 50 mm rests on HP on one of the edges of its base such that the edge is at 30^0 to VP and the base is at 45^0 to HP. 14 M
Draw the auxiliary top view and auxiliary front view.

(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 14 M

UNIT-II

3. A square prism, side of base 30 mm and axis 60 mm long, rests with its base on the HP and one of its rectangular faces is inclined at 30^0 to the VP. A section plane perpendicular to VP and inclined at 60^0 to the HP cuts the axis of the prism at a point 20 mm from its top end. Draw sectional top view and true shape of the section. 14 M

(OR)

4. A pentagonal pyramid side of base 28 mm and height 56 mm, is resting on HP on its base with an edge of its base away from VP is parallel to VP. It is cut by an AIP bisecting the axis and inclined at 55^0 to the HP. Draw the 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 70 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 such that the plane bisects the axis. 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 passing through 25 mm below the apex and is parallel to one of the extreme generators. Draw its front view, sectional side view and true shape of the section. 14 M

UNIT-IV

7. A hexagonal prism, having base with a 30 mm side and a 70 mm axis, is resting on its base on the ground with a side of base inclined at 45^0 to the VP. It is cut by a section plane, perpendicular to VP and inclined at 45^0 to HP and passing through a point 15 mm below the top end of axis of the prism. Draw the development of the lateral surface of the cut prism. 14 M

(OR)

8. A cone with a 50 mm base diameter and a 80 mm long axis, rests on its base on the HP. Draw the development of its lateral surface when it is cut by an AIP bisecting the axis and inclined at 45^0 to the HP. 14 M

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 14 M

(OR)

10. A cone with an 80 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 40 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

AR16

CODE: 16EC2003

SET-1

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

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

**SIGNALS AND SYSTEMS
(Electronics and Communication Engineering)**

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

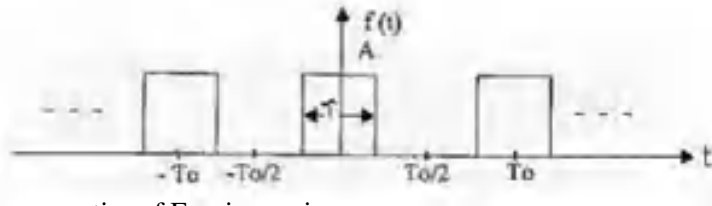
All parts of the Question must be answered at one place

UNIT-I

1. a Explain how a function can be approximated by a set of orthogonal functions. [8M]
b Show that whether $x(t) = A e^{-a(t)} u(t)$, $a > 0$ is an energy signal or not. [6 M]
- (OR)
2. a A rectangular function defined by $f(t) = 1$; $0 < t < -1$; $\pi < t < 2$ [8M]
approximate the above function by a single sinusoid $\sin t$, Evaluate mean square error in this approximation.
b Test Whether the signal $x(n) = (\frac{1}{2})^n u(n)$ energy or power signal [6 M]

UNIT-II

3. a Find out the exponential Fourier series and plot the magnitude and phase spectrum for the rectangular pulse train shown in the following figure: [10M]



- b State any four properties of Fourier series [4M]
- (OR)
4. a Obtain the Fourier transform of the following functions. [7M]
i) Impulse function ii) DC signal iii) Unit step function.
b Find the Fourier Transform of $f(t) = t \cos(2t)$. [7M]

UNIT-III

5. a a) What is an LTI system? Explain its properties. Derive an expression for the transfer function of an LTI system. [7M]
b Explain the characteristics of an ideal LPF. All ideal filters are physically not realizable: justify [7M]
- (OR)
6. a Obtain conditions for the distortion less transmission through a system [7M]
b Differentiate LTI system with LTV system. [7M]

UNIT-IV

7. a State the Sampling theorem and explain about various sampling techniques. [7M]
b Explain the relation between convolution and correlation. [7M]

(OR)

8. a What is aliasing? Explain its effect on sampling [7M]
b Prove that auto correlation function and energy/power spectral density function forms Fourier Transform pair [7M]

UNIT-V

9. a What are the methods by which inverse z-transform can be found out? [7M]
b Find the Z transform of $x[n] = a^{n+1} u[n+1]$ [7M]

(OR)

10. a Distinguish between one-sided and two-sided z-transforms function. [7M]
b Find the Laplace transform of $t u(t)$. List any 2 properties of ROC for Laplace transforms [7M]

AR16

CODE: 16CS2005

SET-2

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

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

**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 decision making (if) statements with examples. 8M
- (OR)**
4. a) Explain about loop 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

AR13

CODE: 13CE2002

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

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

SURVEYING
(Civil Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What are the different types of chains?
b) Define true bearing and magnetic bearing.
c) Name the different types of levelling.
d) Write any two uses of contour maps.
e) Define the terms: face left and face right observations.
f) What is substance bar?
g) What is latitude and departure?
h) Give expression of Simpson's rule.
i) Classify different types of horizontal curves.
j) Generally why do we go for compound curve?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) What are the broad divisions of surveying? Explain their objectives. 6 M
b) Write short note on the classification of errors. Discuss each giving suitable examples. 6 M

(OR)

3. a) The following bearings are taken in a closed compass survey. At what stations local attraction can be suspected. Determine corrected bearings. 6 M

Line	FB	BB
AB	74°00'	254°00'
BC	91°00'	271°00'
CD	166°00'	343°00'
DE	177°00'	0°00'
EA	189°00'	9°00'

- b) Write short notes on i) Whole circle bearing system ii) Dip of Magnetic Needle 6 M
iii) Magnetic Declination iv) Local attraction

UNIT-II

4. a) What is reciprocal levelling, explain briefly? 6 M
b) Explain the permanent adjustments of leveling? 6 M

(OR)

5. a) What are the methods of locating contours and explain briefly? 6 M
b) Discuss uses and characteristic of contours. 6 M

UNIT-III

6. a) Explain the procedure of reiteration method for measuring horizontal angle using theodolite? 6 M
b) Derive the expression for distance and elevation formula for staff held vertical and inclined sight for both the angle of elevation and depression cases. 6 M

(OR)

7. a) Describe the different systems of tachometric measurement with neat figures. 6 M
b) A tachometer is setup at an intermediate point on a traverse course PQ and the following observations are made on a staff held vertical. 6 M

Staff station	Vertical angle	Staff intercept	Axial hair readings
P	+ 9°30′	2.250	2.105
Q	+ 6°00′	2.055	1.975

The constants are 100 and 0. Compute the length PQ and the reduced level of Q. Reduce level of P = 350.50 m.

UNIT-IV

8. a) Describe the different methods of measurement of volume from cross-sections. 6 M
b) A railway embankment of length 500 m width at formation level 9 m, and side slopes 2:1 is to be constructed. The round levels every 100 m along the centerline are 6 M

Distance (m) : 0 100 200 300 400 500
Ground level (m) : 107.8 106.3 110.5 111.0 110.7 112.2

The embankment has a rising gradient of 1.2 m per 100 m and the formation level is 110.5 m at zero distance. Calculate the volume of earth work. Assuming the round to the level across the centre line.

(OR)

9. a) Explain the theory of planimeter in calculating the area? 6 M
b) The following perpendicular offsets were taken from a chain line to a hedge. Calculate area by coordinate method. 6 M

Contour (m): 0 5.50 12.7 25.5 40.5
offsets (m) : 5.25 6.50 4.75 5.20 4.20

UNIT-V

10. a) Explain in detail, the procedure of two theodolite method of deflection angle for setting out a circular curve in the field. 6 M
b) Define a curve. How are circular curves classified? 6 M

(OR)

11. a) Derive the expression for setting out the simple circular curve by the method of offsets from the tangents. 6 M
b) Two tangents intersect at chainage 1,250 m. The angle of intersection is 150°. Calculate all data necessary for setting out a simple curve of radius 250 m. by deflection angle method. The peg interval may be taken as 20 m. 6 M

AR13

CODE: 13EE2003

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2020
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 electric current | 1M |
| | b) | Draw the symbols of resistor and inductor | 1M |
| | c) | Draw circuit of DC series generator | 1M |
| | d) | What is the working principle of DC motor | 1M |
| | e) | Define regulation of transformer | 1M |
| | f) | Applications of three phase Induction motors | 1M |
| | g) | Name the type of instruments to measure AC quantities | 1M |
| | h) | How do one could identify MC or MI instrument | 1M |
| | i) | Symbol of Diode | 1M |
| | j) | Applications of SCR | 1M |

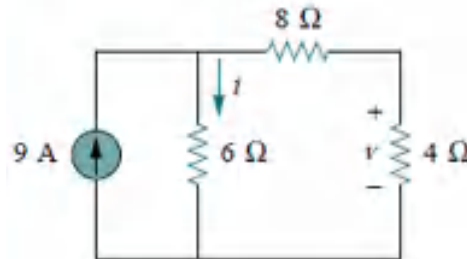
PART-B

Answer one question from each unit

[5x12=60M]

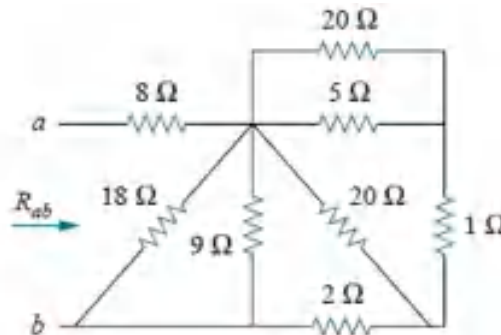
UNIT-I

- | | | | |
|----|---|--|----|
| 2. | a | Write a note on star-delta transformation | 6M |
| | b | Find i, v and power dissipated in 6 ohm resistor | 6M |



(OR)

- | | | | |
|----|---|--------------------------------|----|
| 3. | a | Find the equivalent resistance | 6M |
|----|---|--------------------------------|----|



- | | | |
|---|--|----|
| b | Derive expression for equivalent capacitance when connected in a) series
b)parallel | 6M |
|---|--|----|

UNIT-II

4. a Explain different types of losses in Dc machines in detail 6M
b Explain the principle of operation of DC motor 6M

(OR)

5. a Classify different types of dc generators and explain briefly 6M
b A 4.46 kw 220v DC shunt motor has an armature resistance of 0.03 ohm and field resistance of 150 ohm. Determine back EMF, efficiency is 85% 6M

UNIT-III

6. a Derive the expression for E.M.F generated in single phase transformer 6M
b A three phase, 6 pole, 50 Hz induction motor develops output of 4 KW including friction and windage losses at 950 rpm. Find the slip and rotor frequency of the induction motor 6M

(OR)

7. a Explain the principle of operation of alternator 6M
b A 50 KVA single phase transformer of 2300/230 v has primary and secondary winding resistances of 2 ohm and 0.02 ohm respectively. The iron losses equal to 412 w. Calculate efficiency at half load 0.8 pf 6M

UNIT-IV

8. a Write a note on types of measuring instruments 6M
b What are the advantages and disadvantages of MI instruments 6M

(OR)

9. Explain the construction and principle of operation of MC instrument, also mention advantages and disadvantages 12M

UNIT-V

10. a Explain Bridge rectifier circuit 6M
b Briefly explain SCR 6M

(OR)

11. a Briefly explain diodes 6M
b Explain full wave rectifier circuit 6M

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech I Semester Supplementary Examinations, January-2020****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 Metallic Bond?
b) What is Atomic packing factor?
c) Define burger vector.
d) What is an eutectoid reaction?
e) List any two properties of gray cast iron.
f) What are the constituents of the Hadfield Manganese steels?
g) What is meant by fatigue?
h) Define Toughness.
i) List out various steps involved in P/M process.
j) What is Impregnation ?

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

2. a) Explain the Hume Rothery rules for maximum solid solubility? 6M
b) Why are alloys produced? Explain why alloys find more applications than pure metals. 6M

(OR)

3. a) Distinguish between Edge and screw dislocations. 6M
b) What is the importance of Miller indices? How does it help in the study of crystallography? 6M

UNIT-II

4. With a neat sketch explain Iron-carbon equilibrium diagram showing all the salient features. Also explain various reactions and micro constituents present in it. 12M
- (OR)**
5. a) What is the importance of knowing lever rule. 6M
b) Briefly explain the classification of phase diagrams based on the solubility in liquid and solid states. 6M

UNIT-III

6. a) Normalized steels are stronger than annealed steels. Explain. 4M
b) Draw TTT diagram for a eutectoid steel and explain the effect of cooling rate on the transformation products obtained. 8M

(OR)

7. a) Write a short note on: (i) Hardening and ii) Tempering. 4M
b) Give manufacturing method, properties, microstructure, and applications of Grey cast iron. 8M

UNIT-IV

8. Explain stress strain curve of a mild steel and Explain different points ? 12M
Also differentiate between true stress and engineering stress with an example.

(OR)

9. Define the following properties with examples: i) 12M
Compressive strength ii)Malleability iii)Hardness and iv)Brittleness

UNIT-V

10. Explain any four methods of manufacturing methods of Metal Powders ? 12M

(OR)

11. a) Define powder metallurgy and explain design considerations and stages in powder metallurgical components preparation? 8M
b) Why is the particle size distribution important in the packing of powders? 4M

AR13

CODE: 13EC2004 SET-2
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2020

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) Write the Condition of orthogonality for signals
b) Write the expression for MSE
c) Write the condition for existence of Fourier series
d) Define Fourier transform
e) What is LTI system
f) What is Stable system
g) Write expression for PSD
h) What is Nyquist rate
i) Define ROC
j) Define Z- Transform for discrete signals

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Derive the condition of orthogonality between two signals 6
b) A Rectangular function $f(t)$ is defined as 6
$$f(t) = \begin{cases} 1 & \text{for } 0 < t < \pi \\ -1 & \text{for } \pi < t < 2\pi \end{cases}$$

approximate this function using $\sin(t)$ such that mean square error is minimum and find the mean square error.

(OR)

- 3. a) check whether the following signal is energy signal or power signal 6
$$x(n) = \frac{1}{5^n} u(n).$$

b) Define mean square error and derive the expression for MSE. 6

UNIT-II

4. Explain Trigonometric Fourier series representation of a signal. Derive the coefficients a_0 , a_n and b_n 12
- (OR)
5. a) Derive any four properties of Fourier Transform. 8
b) Find out the Fourier Transform of $x(t)=u(t)$ 4

UNIT-III

6. a) Derive the condition for distortion less transmission through a system 6
b) Explain signal bandwidth and system bandwidth. 6
(OR)
7. a) Derive the relation between bandwidth and rise time 6
b) Find out the response of the LTI system for which input is $x(t) = e^{-ht}u(t)$ 6
and impulse response is $h(t) = e^{-at}u(t)$.

UNIT-IV

8. a) Prove that auto correlation function and PSD forms Fourier Transform pair 6
b) Explain different sampling techniques 6
(OR)
9. Define sampling theorem and derive the condition for sampling. 12

UNIT-V

10. a) State any four properties of Laplace transform 6
b) Find the Z- Transform and ROC of $x[n] = a^n u[n]$ 6
(OR)
11. a) Find the Laplace transform of $x(t) = \cos(at)u(t)$ 6
b) Find out the inverse Laplace transform of $X(s) = \frac{5s+13}{s(s^2+4s+13)}$, $\text{Re}(s) > 0$. 6

AR13

CODE : 13EC2007

Set 02

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

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

**ELECTRONIC DEVICES AND CIRCUITS
(Electrical and Electronics Engineering)**

Time: 3hours

Max.Marks: 70

PART - A

Answer all questions

[10 X 1 = 10M]

- a) Define drift current in a semiconductor?
- b) Name the P-type and N-type impurities in a semiconductor?
- c) What is a rectifier? What are its types?
- d) Write the diode current equation relating the voltage V and current I ?
- e) Write the relation between I_{CBO} and I_{CEO} ?
- f) If $\eta = 0.8$, $V_{BB} = 15V$, and $V_D = 0.7V$, Find the value of V_P ?
- g) Write the condition for thermal stability?
- h) Write the h-parameter equations for transistor CC configuration?
- i) What are the disadvantages of negative feedback?
- j) Write the expression for frequency of oscillations of a Wein Bridge Oscillator?

PART - B

Answer one question from each unit

[5 X 12 = 60]

UNIT - I

- 1. a) Draw the circuit of a tunnel diode and explain the operation [6M]
- b) Draw and explain the $V-I$ characteristics of a PN junction diode [6M]

(OR)

- 2. a) Find the concentration of holes and electrons in n-type silicon at $300^\circ K$, if the conductivity is $300S/cm$.
Given $n_i = 1.5 \times 10^{10}/cm^3$, $\mu_n = 1300 cm^2/V\text{-sec}$, and $\mu_p = 500 cm^2/V\text{-sec}$? [6M]
- b) Derive an expression for Fermi level in an intrinsic semiconductor? [6M]

UNIT - II

- 4. a) List the applications of Zener diode [4M]
- b) Explain Avalanche breakdown and Zener breakdown? [8M]

(OR)

5. a) A 230V, 60Hz voltage is applied to the primary of a 5:1 step-down, center-tap transformer used in a full wave rectifier having a load of 900Ω . If the diode resistance and secondary coil resistance together has a resistance of 100Ω . Determine (i) dc voltage across the load, (ii) dc current flowing through the load, (iii) dc power delivered to the load, (iv) PIV across each diode, and (e) ripple voltage and its frequency. [8M]
- b) Why capacitor filter is not suitable for variable loads? [4M]

UNIT -III

6. Draw the input and output characteristics of a transistor in CE configuration and discuss [12M]

(OR)

7. a) Define and transconductance g_m , drain resistance r_d , and amplification factor μ of a FET? Derive the relation between them? [8M]
- b) A FET has a driven current of 4mA. If $I_{DSS} = 8\text{mA}$ and $V_{GS(off)} = -6\text{V}$. Find the values of V_{GS} and V_P . [4M]

UNIT -IV

8. Draw and explain a self bias circuit and obtain the expression for stability factor. [12M]

(OR)

9. Derive expressions for A_i , Z_i , A_v , A_{VS} , A_{IS} and Y_o in terms of CE amplifier hybrid parameters [12M]

UNIT -V

10. a) A voltage-series negative feedback amplifier has a voltage gain without feedback of $A=500$, input resistance $R_i = 3\text{K}\Omega$, Output resistance $R_o = 20\text{K}\Omega$ and feedback ratio $\beta = 0.01$. Calculate the voltage gain A_f , input resistance R_{if} , and output resistance R_{of} of the amplifier with feedback? [6M]
- b) Draw the Current series feedback amplifier and derive the expression for expressions for transconductance, input resistance and output resistance. [6M]

(OR)

11. With a neat circuit diagram explain the operation of transistor RC phase shift oscillator? Derive the expressions for the frequency of oscillations. [12M]