

**ENVIRONMENTAL ENGINEERING-I
(Civil Engineering)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain the methods of population forecasting 7M
b) "Forecast the population for the years 2021, 2031 and 2041 by incremental increase method, for the following data. 5M

Year	1971	1981	1991	2001	2011
Population	25000	28000	34000	42000	47000

(OR)

2. a) How the water required for a town is estimated while designing water supply scheme for the same? 7M
b) How do you estimate the water demand for an 'industrial town'? 5M

UNIT-II

3. a) Explain in detail the Physical and Chemical tests of water. 7M
b) If you had two bottles full of lake water and kept one dark and the other in daylight, which would have a higher dissolved oxygen after a few days? Why? 5M

(OR)

4. a) Explain the general layout of a treatment plant with neat sketch. 7M
b) What are the common impurities found in natural sources of water and explain their effects upon its quality? 5M

UNIT-III

5. a) Explain the optimum dosage of coagulant. And how to conduct experiment in Laboratory with the help of diagram. 7M
b) Explain the theory of coagulants and name any three types of coagulants. 5M

(OR)

6. a) Design a circular sedimentation tank for 5MLD flow. 7M
b) Explain how alum and copperas work as coagulating agents. 5M

UNIT-IV

7. a) Design a rapid sand filter to treat 10 million litres of raw water per day allowing 0.5% of filtered water for backwashing. Half hour per day is used for backwashing. Assume any necessary data. 7M
b) Differentiate between Slow Sand Filter and Rapid Sand Filter. 5M

(OR)

8. a) Explain the mechanism of filtration and processes involved in removing solid impurities. 7M
b) Write any 5 advantages and 5 disadvantages of a slow sand filter. 5M

UNIT-V

9. a) Explain different types of joints. 7M
b) Name different types of distribution system and explain any two. 5M

(OR)

10. a) Explain the types of valves used in water distribution network 7M
b) Explain Hardy Cross method. 5M

AR18

CODE: 18EET310

SET-2

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

III B.Tech I Semester Regular & Supplementary Examinations, February-2022

**POWER ELECTRONICS
(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 I-V characteristics of an SCR. 8M
b) Mention the importance of snubber circuit which is connected across SCRs. 4M
- (OR)**
2. a) Illustrate the requirements of good gate driver circuits of IGBT and MOSFET. 6M
Describe in detail.
b) Identify the four quadrants operation of TRAIC by tracing the necessary waveforms. 6M

UNIT-II

3. a) Describe the operation of single phase full-wave controlled rectifier using center tapped transformer with R-L load under continuous mode of operation. Draw the waveforms of output voltage, voltage across SCR and also determine the average load voltage for $\alpha = 45^\circ$. 6M
b) A single phase fully controlled bridge converter is connected to R-L load with $R = 10 \Omega$ and $L = 6 \text{ mH}$. The converter is supplied from 230 V, 50 Hz ac supply. Determine average and rms load voltage. 6M
- (OR)**
4. a) Trace the input and output load voltage waveform of 1- Phase half controlled bridge converter having highly inductive load with firing delay angle of 60° . Justify your comments about the power flow. 6M
b) Derive an expression for i) average load voltage ii) average load current iii) RMS load voltage of 1-phase half-controlled converter with inductive load. 6M

UNIT-III

5. a) A three phase half wave controlled convertor with R-Load $\alpha < 30^\circ$ and also derive the average output voltage. 6M
b) Describe the operation of 3-phase fully controlled Converter with RL load for $\alpha > 60^\circ$. Also derive the average and rms load voltage 6M
- (OR)**
6. A three -phase full converter is connected to a load resistance of 5Ω and it is supplied from a 220 V, 50 Hz ac supply, If the firing angle of thyristor is $\alpha = 30^\circ$. Draw the relevant waveforms and determine i) average output voltage, ii) average output current, iii) rms output voltage and iv) rms output current. 12M

UNIT-IV

7. a) Brief about ac voltage controller. List some of its industrial applications. Also, enumerate its merits and demerits. 3M
- b) A 1-phase a.c. voltage controller has a resistive load of $R = 5 \Omega$ and the input voltage is $V_s = 208 \text{ V}$, 60 Hz. If the desired output is $P_o = 2 \text{ kW}$, Compute i) delay angle, α and ii) input power factor, PF. 9M

(OR)

8. Describe principle of working of 1 – phase to 1 - phase step down midpoint type cyclo-converter for both continuous and discontinuous conductions. Draw voltage and current waveforms for both conditions 12M

UNIT-V

9. a) Explain the operation of step-up chopper with a neat circuit diagram and necessary output waveforms and also derive expression for output voltage. 6M
- b) The step-down dc chopper has a resistive load, $R = 20 \Omega$ and input voltage, $V_s = 220 \text{ V}$. Chopping frequency, $f = 10 \text{ kHz}$. If the duty cycle is 80 %, Estimate the: (i) average output voltage (ii) rms output voltage, and (iii) Chopper efficiency 6M

(OR)

10. a) A 3-phase bridge inverter is operated in 180° conduction mode. Derive output line voltage and phase voltage expression. 6M
- b) A six-step three-phase inverter has an adjustable dc input. The load is a balanced Y connection with a series RL combination in each phase, with $R = 5 \Omega$ and $L = 50 \text{ mH}$. The output frequency is to be varied between 30 and 60 Hz. Determine the range of the dc input voltage required to maintain the fundamental-frequency component of current at 10 A (rms). 6M

**HEAT AND MASS TRANSFER
(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) State Fourier's law and write its mathematical equation for conduction heat transfer. Describe each parameter with SI units. 4
 - b) Derive dimensionless local temperature distribution equation in a one-dimensional plane wall with constant thermal conductivity and heat generation subjected to symmetric Dirichlet boundary condition. 8
- (OR)**
2. a) Explain briefly the concept of critical thickness of insulation and derive an expression for critical radius of insulation for cylinder. 6
 - b) Estimate heat lost through a red brick wall of length of 10 m height 5 m and thickness 0.5 m, temperature of the wall surfaces are maintained at 70°C and 30°C respectively. Assume k for brick = 0.5 W/m K. Also find the conduction resistance of the wall. 6

UNIT-II

3. a) Define fin efficiency and fin effectiveness. Write their expressions with usual notations and describe them. 4
 - b) A straight rectangular fin of cross-section ' $w \times \delta$ ' and of protruding length ' L ' provided on a primary surface at ' T_w ' and exposed to an ambient at ' T_∞ ' offering a convection heat transfer coefficient ' h ' has thermal conductivity ' k '. The tip of fin found to be at a known uniform temperature ' T_L '. Deduce appropriate expressions for dimensionless temperature distribution along the fin 8
- (OR)**
4. a) Distinguish between steady state conduction and transient conduction. 4
 - b) A steel plate of size 0.5 m² area and 2 cm thick ($k = 50$ W/m K) is exposed to convective environment with $h = 25$ W/m².K. Determine the time taken to cool the plate from 500°C to 200°C if the atmospheric temperature is 25°C. Take ρ for steel 8000 kg/m³, $c_p = 0.45$ kJ/kg K. 8

UNIT-III

5. a) Atmospheric air at 30°C is flowing over a flat plate with a velocity of (i) 5 m/s, (ii) 10 m/s and (iii) 15 m/s. Find the distance at which the flow turns into turbulent. What can be inferred from the results obtained? 4
- b) Atmospheric air at a bulk mean temperature 5°C is forced through a 15 m long rectangular duct of cross-sectional dimensions 30 cm \times 20 cm with the wall of duct maintained at a uniform temperature 15°C. Measurements revealed that mean velocity of air through the duct is 10 m/s. Calculate the net rate of heat transfer by convection. 8

(OR)

6. a) What is free convection? How does it differ from forced convection? 4
- b) A steam carrying pipe of 20 cm diameter whose surface is maintained at 160°C is in horizontal position and is exposed to surrounding air 20°C. Calculate the heat loss from the pipe per meter length. 8

UNIT-IV

7. a) Describe fouling and its effects on the performance of heat exchangers. 4
- b) In a Double pipe counter flow heat exchanger, 1000 kg/h of an oil having a specific heat of 2000 J/kg K is cooled from 70°C to 40°C by 6000 kg/h of water entering at 25°C. Determine the heat exchanger area for an overall heat transfer coefficient of 250 W/m² K. Take C_p for water as 4180 J/kg.K. 8

(OR)

8. a) What is the physical significance of the number of transfer units (NTU) in heat exchanger design? 4
- b) Derive an expression for LMTD of a parallel flow heat exchanger. 8

UNIT-V

9. a) Define the properties emissivity and absorptivity. When are these two properties equal to each other? 4
- b) 500 watts of energy is incident on a glass plate per unit area out of which 400 watts is transmitted and 50 watts is absorbed. Calculate the absorptivity, transmittivity and reflectivity of the glass plate. 8

(OR)

10. a) Differentiate between Fourier's law of heat conduction and Fick's law of diffusion. 4
- b) The composition of dry standard atmosphere is given on a molar basis to be 78.1% N₂, 20.9% O₂, and 1.0% Ar and other constituents. Treating other constituents as Ar, determine the mass fractions of the constituents of air. 8

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) With necessary diagrams define the following terms: 6M
(i) Beam Area (ii) Beam Solid Angle
- b) Find the radiation resistance of half wave dipole. 6M
- (OR)
2. a) With necessary schematics define the following terms: 6M
i) Current distribution on a thin wire antenna (ii) Directive Gain
- b) Explain the concept of retarded vector potentials, for a half-wave dipole 6M

UNIT-II

3. a) Write a short note on Broad Side Array (BSA). Also distinguish between EFA and BSA. 6M
- b) Explain binomial array. 6M
- (OR)
4. a) Derive an expression for the array factor of array of two element isotropic point sources fed with a current of; 6M
i. Equal magnitude and in-phase quadrature (ii) Equal magnitude and random phase
- b) Prove that the array factor is same for 2-element linear uniform array Placed on azimuthal or elevation planes. 6M

UNIT-III

5. a) With necessary diagram, write and explain the construction and operation of helical antenna in normal mode operation 6M
- b) Explain the operation folded dipole antenna and its characteristics 6M
- (OR)
6. a) Explain the concepts of rhombic Antenna and design relations 6M
- b) Explain the concepts of V-Antenna and Inverted V-Antenna with necessary diagrams. 6M

UNIT-IV

7. a) Explain about different types reflectors. 6M
- b) Write and explain about the distance Criterion for antenna parameters measurement. 6M
- (OR)
8. a) Explain the working principle of lens antenna. 6M
- b) Explain parabolic reflector with neat sketch. 6M

UNIT-V

9. a) Derive the basic equation wave propagation and also explain the parameters involved. 6M
- b) Explain about troposphere wave propagation. 6M
- (OR)
10. a) Describe the structure of ionosphere and how its layers are aiding in long distance communication at radio frequencies. 6M
- b) Explain ground wave propagation? 6M

AR18

CODE: 18CST309

SET-1

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

III B.Tech I Semester Regular & Supplementary Examinations, February-2022

**COMPUTER NETWORKS
(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) Compare the WAN, LAN and MAN topologies. **6M**
b) Explain the functions of various layers in ISO-OSI reference model. **6M**
- (OR)**
2. a) Explain different Layers and their functionalities in TCP/IP Model. **6M**
b) Differentiate Physical address, Logical address, Port address and Special address **6M**

UNIT-II

3. a) Explain Error Correcting and Error Detecting codes **6M**
b) What is the significance of data link layer? Explain the design issues of data link layer. **6M**
- (OR)**
4. a) Explain Collision-Free Protocols. **6M**
b) Explain the working of Multiple Access Protocols **6M**

UNIT-III

5. a) With an example explain the shortest path routing algorithms used in computer networks. **6M**
b) Explain Link State Routing with an example. **6M**
- (OR)**
6. a) What are the differences between Static Routing Algorithm and Dynamic Routing Algorithm? **6M**
b) Differentiate IPV4 and IPV6. Explain them in detail. **6M**

UNIT-IV

7. a) Explain TCP Connection management Finite State Machine. Explain all states in it. **6M**
b) Explain UDP Internet Transport Protocol. **6M**
- (OR)**
8. a) How a Connection is established in a Transport Protocol. Explain three protocol scenarios for establishing a connection. **6M**
b) Explain the structure of UDP Header format. **6M**

UNIT-V

9. a) Explain the working of domain name system. **6M**
b) Write short notes on E-Mail. Explain about SMTP. **6M**
- (OR)**
10. a) How DNS service maps domain names to IP addresses. **6M**
b) What are the protocols associated with WWW. Explain them. **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) Explain the following: 7 M
 - i. Characteristic load
 - ii. Characteristic strength
 - iii. Partial safety factor
 - b) Derive from fundamentals the expression for area of stress block $0.36f_{ck}$ and depth of centre of compressive force from the extreme fibre in compression $0.42x_u$. 7 M
- (OR)**
2. A rectangular section of effective size 230 mm × 500 mm is used as simply supported beam for an effective span of 6.3 m. What is the maximum total UDL allowed on the beam if maximum percentage of steel is provided on tension side? Use M25 grade concrete and Fe415 steel. Take effective cover = 50 mm. 14 M

UNIT-II

3. A simply supported RC beam supports a service load of 8 kN/m over a clear span 3 m. Support width is 200 mm. Using M20 grade concrete and Fe415 steel. Design the beam for flexure and shear. Sketch the reinforcement details. 14 M
- (OR)**
4. a) A doubly reinforced concrete beam having rectangular section 250 mm × 500 mm is reinforced with 2-12 mm dia in compression 4-20 mm dia in tension. Effective cover 40 mm, Effective span 5 m. Find M_u . Adopt M20 concrete and Fe415 steel. 7 M
 - b) A T beam having flange 1200 mm × 100 mm, web width 300 mm, effective depth 550 mm and area of tension steel 2280 mm². Find M_u . Adopt M20 concrete and Fe415 steel. 7 M

UNIT-III

5. Design a slab over a room 5.5 m × 4 m. Supporting a live load 4 kN/m². Floor finishing 1.0 kN/m². Design the slab if edges are restrained. Adopted M20 concrete and Fe415 steel. 14 M
- (OR)**
6. Design a two-way slab for a hall of size 4.2 m × 5.2 m. The slab is supported all around on walls of width 230 mm. The slab has to carry a live load of 4 kN/m² and floor finish is 0.6 kN/m². All the edges are discontinuous and corners are held down. Use M20 concrete and Fe415 steel. Also sketch the details of reinforcement. 14 M

UNIT-IV

7. Design the necessary reinforcement for RC column 450 mm × 600 mm to carry an axial load of 2000 kN. The length of the column 3.5 m. Use M25 grade concrete and Fe415 grade steel. Sketch the reinforcement details. 14 M

(OR)

8. A rectangular column 300 mm wide and 500 mm deep is subjected to an axial factored load of 1200 kN and a factored moment of 200 kN-m. Calculate the necessary reinforcement distributing equally on all four sides. Sketch the reinforcement details. Adopt M25 and Fe500 grade materials. 14 M

UNIT-V

9. A square column of 400 mm sides carries a load of 900 kN. Design the footing for an SBC of soil 100 kN/m^2 . Show the check for one-way shear, two way shear and bond strength. Adopt M20 grade concrete and Fe415 grade steel. Sketch the reinforcement details. 14M

(OR)

10. Design a rectangular footing of flat type for a column of size $400 \text{ mm} \times 600 \text{ mm}$ to carries load of 1000 kN. Safe bearing capacity of soil is 180 kN/m^2 . Adopt M20 grade concrete and Fe500 grade steel. Sketch the footing showing the details of reinforcement. 14M

AR16

CODE: 16EE3016

SET-1

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

III B.Tech I Semester Supplementary Examinations, February-2022

POWERELECTRONICS

(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. Explain the basic operation of a SCR? Discuss in detail turn on methods of SCR . 14M
Explain briefly about BJT and IGBT along with V-I characteristics

(OR)

2. a) Explain in detail Dynamic Characteristics of SCR 7M
b) Briefly discuss the R-C triggering of SCR? 7M

UNIT-II

3. Explain the operation of single phase full wave controlled rectifiers with centre tapped configuration for RL-Load, and draw the wave forms for $\alpha=60^\circ$? 14M
Define and briefly about commutation angle or overlap angle and also delay angle?

(OR)

4. a) Explain the operation of line commutated inverter? 7M
b) Explain the operation of single phase semi converter with R-load and RL loads? 7M

UNIT-III

5. Explain the operation of three-phase full bridge pulse converter with RL- load. 14M
Draw the voltage and current waveforms for $\alpha=45^\circ$?

(OR)

6. a) Draw circuit diagrams and waveforms for 3 phase fully controlled bridge rectifier with R load and explain its operation? 7M
b) Derive the expression for average value and rms values of thyristor currents in 3phase 3 pulse controlled converter? 7M

UNIT-IV

7. a) Explain the principle of operation of TRIAC and its V-I characteristics? 7M
b) Describe the operation of 1- ϕ ac voltage controller with R load and derive its average and rms value 7M

(OR)

8. Explain the operation of 1- ϕ step down cycloconverter with bridge configuration RL Load under continuous & discontinuous conduction modes? 14M

UNIT-V

9. Explain the principle of operation of step up chopper with neat wave forms and also derive its load voltage and current ? Explain various control strategies of Choppers.. 14M

(OR)

10. a) List various PWM techniques employed in inverters? 7M
b) Explain the principle of operation of basic parallel inverter? 7M

AR16

CODE: 16ME3015

SET-2

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

III B.Tech I Semester Supplementary Examinations, February-2022

METAL CUTTING AND MACHINE TOOLS (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) Explain the mechanism of chip formation? Types of chips? Explain the formation of BUE also discuss its merits and demerits with the help of sketches 9M
b) Explain the properties of cutting tool materials 5M
(OR)
2. a) Explain cutting tool geometry of single point cutting tool with a neat diagram. 8M
b) Establish the relationship between measurable and actual forces using merchant's circle. 6M

UNIT-II

3. a) Explain the mechanism of thread cutting in lathe with the help of neat sketch 8M
b) A Mild steel bar of 170 mm long, 60 mm diameter is turned to 165 mm long 50 mm diameter. Assume the workpiece rotates at 440 rpm, feed is 0.3 mm/rev and maximum depth of cut is 2 mm. consider approach and over travel distance as 5 mm for turning operation, Assume that facing operation is also performed for the finished job and estimate the total machining time? 6M
(OR)
4. a) Suggest and explain a taper turning method for very steep and accurate taper turning on a long work piece with free hand sketch diagram. 7M
b) Compare and contrast capstan and turret lathe with a neat sketch 7M

UNIT-III

5. a) Describe the working principle of crank and slotted lever quick return mechanism used in a shaper with neat sketch and also derive the equation for quick return ratio 7M
b) In a shaper, length of stroke is 300 mm, number of double strokes per minute is 40 and ratio of return time to cutting time is 1:2. Find the cutting speed. 7M
(OR)
6. a) Describe twist drill nomenclature using sketches 7M
Given that hole diameter 20 mm; depth to be drilled 70 mm; feed 1.2 mm/rev; cutting speed 60 m/min, find out drill rpm, and cutting time and metal removal rate assuming tool approach and over run travel as 5 mm.
b) Briefly explain the following operations with help of neat sketches: (i) reaming (ii) tapping (iii) Counter boring. 7M

UNIT-IV

7. a) Explain surface grinding process with a neat sketch. 6M
b) Suggest and explain the process to surface finish the automobile cylindrical walls and also explain the effect of process parameters on output parameters. 8M
(OR)
8. What is super finishing? Explain the principle and mechanism of 14M
(a) Abrasive jet machining b) Gear Hobbing process
(b) Polishing and buffing

UNIT-V

9. a) What is tolerance? Explain different types of tolerances? Explain the effect of tolerance in manufacturing cost with a neat sketch 6M
b) Differentiate the following 8M
i) clearance fit and interference fit
ii) Selective assembly and interchangeable assembly
(OR)
10. a) State and explain the “Taylor’s principle of gauge design’ with a neat sketch 7M
b) Design a GO and NO-GO inspection gauges to check a hole and shaft of assembly 35H7/f8. Allow unilateral gauge tolerance of 10% with a wear allowance equal to one fourth of the gauge tolerance. 10M
Given that $i = 0.45 (D)^{1/3} + 0.001D$, fundamental deviation of ‘f’ = $-5.5 D^{0.41}$, 35 mm falls in the diameter step of 30 mm and 50 mm, IT7=16i, IT8=25i.

AR16

CODE: 16HS3005

SET-1

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

III B.Tech I Semester Supplementary Examinations, February-2022

**MANAGERIAL ECONOMICS AND MANAGEMENT SCIENCE
(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) What is demand analysis? Explain the determinants of demand. 7M
- b) Explain the law of demand and its exceptions. 7M

(OR)

2. a) Explain the factors governing demand forecasting. 7M
- b) Discuss the survey and statistical methods of demand forecasting. 7M

UNIT-II

3. a) What is production function? Explain the production function in Iso-quants. 7M
- b) What do you mean by MRTS discuss with example? 7M

(OR)

4. a) Explain the following: 7M
 1. Fixed cost
 2. Variable cost
 3. Opportunity cost
 4. Total cost
- b) Describe the significance of Break Even Analysis (BEA) with an example. 7M

UNIT-III

5. a) What is perfect competition? Explain its features. 7M
- b) Describe the concept of monopoly in detail. 7M

(OR)

6. a) Explain about price-output determination in case of Perfect Competition. 7M
- b) What is pricing? Describe the different pricing strategies. 7M

UNIT-IV

7. a) Define management. Explain its nature and importance. 7M
- b) Describe the Henry Fayol's principles of Management. 7M

(OR)

8. a) Discuss the Maslow's theory of human needs with an example. 7M
- b) Explain the social responsibilities of management in detail. 7M

UNIT-V

9. a) What is marketing? Explain its functions in detail. 7M
- b) Describe the Product Life Cycle (PLC) in detail. 7M

(OR)

10. a) Define Human Resource Management. Explain its operating functions. 7M
- b) Describe the different steps in selection process. 7M

AR16

CODE: 16CS3012

SET-1

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

III B.Tech I Semester Supplementary Examinations, February-2022

COMPUTER NETWORKS

(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) Explain various categories of networks. 7M
b) Explain the TCP/IP model? 7M
- (OR)**
2. a) Define Encapsulation and Peer to Peer communication in the layered architecture. 7M
b) Explain the ISO/OSI reference model. 7M

UNIT-II

3. a) What is pure ALOHA and slotted ALOHA? Mention the advantages of slotted ALOHA 7M
b) Explain detail about the carrier sense multiple access protocols. 7M
- (OR)**
4. a) What are the various types of error detection methods? 7M
b) Explain flow control mechanism using Sliding window protocol. 7M

UNIT-III

5. a) Describe the design issues of Network Layer. 7M
b) Differentiate the open loop congestion control and closed loop congestion control. 7M
- (OR)**
6. a) Explain Link State Routing with an example. 7M
b) Illustrate Routing of Packets within Virtual Circuit Subnet. 7M

UNIT-IV

7. a) Discuss in detail about the connection establishment and release in TCP. 7M
b) Explain the structure of UDP Header format. 7M
- (OR)**
8. a) List out the services offered by TCP and explain. 7M
b) Explain about the operations and applications of UDP. 7M

UNIT-V

9. a) Write short notes on Electronic Mail. 7M
b) Explain in detail about SMTP. 7M
- (OR)**
10. a) How DNS service maps domain names to IP addresses. 7M
b) What is a URL and explain about its components. 7M

AR13

CODE: 13ME3014

SET-1

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

**III B.Tech I Semester Supplementary Examinations, February-2022
METAL CUTTING & MACHINE TOOLS
(Mechanical Engineering)**

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define crater wear and flank wear
- b) Define the following terms “Rake angle”, “Lip angle” and “clearance angle”.
- c) List out at least the four important accessories used on a Lathe.
- d) How the Automation affects the production rate?
- e) Differentiate the terms Drilling, Reaming, and Boring.
- f) List out principle elements of common type of broaching.
- g) Differentiate up milling and down milling
- h) Why ‘trueing’ and ‘dressing’ are necessary in grinding wheels?
- i) What are the typical applications of “Honing” and “Lapping”?
- j) What are the types of common tool positioning systems used in NC programming?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Draw a Merchant’s circle Diagram and derive expressions to show relationships among the different forces acting on the cutting tool. **8M**
- b) What are the types of chips produced in machining and its reasons? **4M**

(OR)

3. a) Discuss the various factors affecting the tool wear and tool life. **6M**
- b) Discuss various types of cutting fluids and its importance. **6M**

UNIT-II

4. a) List out various types of lathes and explain each briefly with reference to their size, working and its applications. **6M**
b) Describe taper turning attachment of lathe and its merits and demerits over other methods of taper turning? **6M**

(OR)

5. a) Describe a suitable method of feeding the bar stock on Capstan and Turret lathes. **6M**
b) Compare the merits and demerits of Turret and Capstan lathes with an Engine lathe. **6M**

UNIT-III

6. a) Explain with the help of a neat sketch, the working principle of a shaper. **6M**
b) Discuss with neat sketch about adjust the length of stroke and ram position in a Shaper? **6M**

(OR)

7. a) What are the various types of milling cutters? Explain with neat sketch. **6M**
b) Sketch and explain the working principle of broaching machine **6M**

UNIT-IV

8. a) Explain briefly about through feed, in feed, and end feed methods in centre less grinding. **6M**
b) Explain with neat sketch of various types of internal grinders. **6M**

(OR)

9. a) Explain briefly about gear hobbing process. What are the merits and demerits of hobbing process compare to the other generating processes? **6M**
b) Describe the process of Honing with neat diagram and discuss effect of process parameters on surface roughness. **6M**

UNIT-V

10. Explain the elements of CNC machine with neat sketch. **12M**

(OR)

11. Explain the following terms in brief
a) Slide ways,
b) Linear bearings, **12M**
c) Ball screws,
d) Spindle drives