

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. Sketch the stress block parameters of Flanged T-beam section and derive expression for moment of resistance if (i) Neutral axis lies within flange (ii) neutral axis lies within web 14M

(OR)

2. a Discuss in detail limit state of strength and serviceability. 7M
b Explain salient features of stress-strain curve of mild steel specimen. 7M

UNIT-II

3. A simply supported R.C beam of rectangular cross section 250x400mm effective depth and effective span 4m, supports UDL service load 6kN/m and supported by column 300x300mm. Design the shear reinforcement, by using (i) only vertical stirrups reinforcement (ii) combination of stirrups and bent up bars, (iii) Anchorage of tension reinforcement Use M25 grade concrete and Fe415 steel. Detail the reinforcement with neat sketch 14M

(OR)

4. Design the reinforcement of a simply supported R.C beam of rectangular cross 200x300mm section between an effective span 4m and supported by two columns of size 300x300mm. Assume the UDL live load 12kN/m and clear cover to reinforcement 40mm at both top and bottom. Use M25 grade concrete and Fe500 steel. Apply necessary design checks for strength and serviceability conditions. Detail the reinforcement of beam with neat sketch 14M

UNIT-III

5. a) Explain the design provisions between one way and two way slabs as per I.S code 4M
b) Design a simply supported slab of size 4x6m resting on 200mm wide monolithic casted beams that are located at spacing 3m center to center and arranged in all four sides. Assume the super imposed load on slab 6kN/m^2 and clear cover of reinforcement 15mm. Use concrete grade M25, steel Fe415. Detail the reinforcement of beam with neat sketch. (Use IS code method) 10M

(OR)

- | | | |
|-------|---|-----|
| 6. a) | Explain the design steps of one way R/C slab. | 4M |
| b) | Design a waist slab of stair case of clear span 3.6m between the landings of each size 1.2mx1.2m. Assume the size of stairs riser 125mm and thread 250mm monolithic casted with waist slab to carry live load 4kN/m^2 . Neatly sketch the reinforcement detail of slab (use Concrete grade M20 and Steel grade Fe415 | 10M |

UNIT-IV

- | | | |
|-------------|--|-----|
| 7. a) | Design a R/C square column fixed at top and bottom to carry axial load 300kN. Assume the column is subjected to moment 10kN-m and the height of column 3m. Use steel grade Fe415, M25 grade concrete and clear cover 40mm. Apply necessary design checks for strength and serviceability conditions. Detail the reinforcement of column with neat sketch | 9M |
| b) | Write short notes on interaction curves for columns. | 5M |
| (OR) | | |
| 8. a) | Design a R/C rectangular column fixed at top and hinged bottom to carry axial load 100kN. Assume the column is subjected to biaxial bending moment 10kN-m and 12kN-m respectively in major and minor axis respectively. Assume the clear height of column 4.2m. Use steel grade Fe500, M30 grade concrete and clear cover of steel 50mm. Apply necessary design checks for strength and serviceability conditions. Detail the reinforcement of column with neat sketch | 10M |
| b) | Explain different types of failure modes in Long and Short columns | 4M |

UNIT-V

- | | | |
|-------------|--|-----|
| 9. a) | Neatly sketch and explain the functionality of different types of R.C footings | 6M |
| b) | Design a square type trapezoidal footing of uniform thickness to receive axial load 600kN from column size 300x300. Assume safe bearing capacity of soil 180kN/m^2 Use concrete grade M20, steel Fe415. Do the necessary design checks and sketch the detailing of reinforcement | 8M |
| (OR) | | |
| 10. a) | Explain the I.S code provisions in the design of footings | 4M |
| b) | Design a isolated footing of uniform thickness to receive axial load 400kN and moment 20kN-m from column size 250x250. Assume safe bearing capacity of soil 200kN/m^2 Use concrete grade M25, steel Fe415. Do the necessary design checks and sketch the detailing of reinforcement | 10M |

**POWER ELECTRONICS
(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 different modes of operation of a thyristor with the help of its static V-I characteristics. 7M
- b) Explain the snubber circuit for protection of SCR. 7M

(OR)

2. a) Discuss the two transistor model of a transistor. Derive an expression for the anode current and discuss therefrom the turn on mechanisms of a thyristor. 7M
- b) Describe class C type of commutation used for thyristors with appropriate current and voltage waveforms. 7M

UNIT-II

3. a) A single phase half wave SCR circuit feeds power to a resistive load. Draw waveforms for source voltage, load voltage, load current and voltage across the SCR for a given firing angle, α . 7M
- b) Show that the performance of a single phase full converter as effected by source inductance is given by the relation 7M

$$\cos(\alpha + \mu) = \cos \alpha - \frac{\omega L_s I_0}{V_m}$$

Where the symbols used have their usual meanings.

(OR)

4. a) A 230V, 50Hz, of controlled converter is triggered at a firing angle of 40° and the load current extinguishes at an angle of 210° . Find the circuit turn off time, average output voltage and average load current for $R=5\Omega$, $L=2\text{mH}$. 7M
- b) Describe the working of a single phase full bridge converter in the rectifier mode with RL load. Also draw the waveforms for source voltage, load voltage, load current and voltage across SCR's. 7M

UNIT-III

5. a) Draw the circuit diagram of three phase half wave controlled rectifier with RL load. Explain its operating principle with voltage and current waveforms. 7M
- b) A three phase fully controlled bridge converter with 415V supply, 0.05Ω per phase and 0.3Ω reactance per phase is operating in the inverting mode at a firing advance angle of 35° . Calculate the mean generator voltage when the current is level at 60A. The thyristor voltage drop is 1.5V. 7M

(OR)

6. a) A three phase full bridge converter is connected to a load resistance of 5Ω and it is supplied from a 220V, 50Hz ac supply. If the firing angle of thyristor is $\alpha=30^\circ$, determine
 - (i) Average output voltage
 - (ii) Average output current
 - (iii) RMS output voltage
 - (iv) RMS output current
- b) With neat circuit diagram, explain the operation of dual converter without circulating current. 7M

UNIT-IV

7. a) A single phase ac voltage controller has a load resistance $R = 50\Omega$ with an input ac supply voltage is 230V RMS at 50Hz. The input supply transformer has a turn's ratio of 1:1. If the thyristor is triggered at $\alpha = 60^\circ$. Calculate 7M
(i) RMS output voltage.
(ii) RMS load current and average load current.
(iii) Input power factor.
- b) What is TRIAC? Draw the V-I characteristics of a TRIAC and explain different operating regions. 7M

(OR)

8. a) Describe the principle of phase control in single phase full wave AC voltage controller. Derive the expression for the RMS value of its output voltage. 7M
- b) Describe the basic principle of working of a single phase to single phase bridge type cyclo converter for discontinuous conduction with the relation 7M

$$f_a = \frac{1}{4} f_s$$

Mark the conduction of various thyristors also.

UNIT-V

9. a) Describe the principle of step-up chopper. Derive an expression for the average output voltage in terms of input voltage and duty cycle. State the assumptions made. 7M
- b) What is Time ratio control(TRC) in DC choppers? Explain the use of TRC for controlling the output voltage in choppers. 7M
- (OR)
10. a) Explain the working of a single phase half bridge inverter with RL load. What is its main drawback? Explain how this drawback is overcome. 7M
- b) What is pulse width modulation(PWM)? List the various PWM techniques. How do these differ from each other? 7M

AR16

CODE: 16ME3015

SET-2

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

III B.Tech I Semester Regular/Supplementary Examinations, Oct / Nov-2019

**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) What is the effect of cutting speed, depth of cut and feed rate on the force on Cutting tool? 6
- b) During an orthogonal cutting a chip length of 160mm was obtained from an uncut chip length of 350 mm. The cutting tool has 22° rake angles and a depth of cut is 0.8mm. Determine the shear plane angle and chip thickness. 8

(OR)

2. a) State the conditions under positive and negative rake angles are recommended. 6
- b) In an orthogonal cutting experiment with a tool of rake angle $= 6^\circ$, the chip thickness was found to be 2 mm when the uncut chip thickness was set to 0.75 mm. Find (i) The shear angle and (ii) The friction angle assuming that Merchant's formula holds good. 8

UNIT-II

3. a) What are machining operations that can be performed on a centre lathe? Explain them with sketches. 7
- b) Describe a multi spindle automatic lathe machine in details 7

(OR)

4. a) Explain briefly the parts of a lathe? How is the size of lathe specified? 7
- b) Sketch and explain a method used for taper turning of long jobs. 7

UNIT-III

5. a) Describe the specifications of horizontal boring machines. 6
- b) A shaper is operated at 130 cutting strokes per minute and is used to machine a work piece of 300mm in length and 122mm in width. Use a feed of 0.7mm per stroke and a depth of cut of 5mm. Calculate the total machining time for machining the component. The forward stroke is completed in 220° . Calculate the percentage of time when the tool is not contacting the work piece. 8

(OR)

6. a) Briefly explain the following operations with help of neat sketches: 7
(i) Boring (ii) Counter sinking (iii) Counter boring (iv) up milling (v) down milling.
- b) Explain with a neat sketch the feed mechanism used on drilling machines. 7

UNIT-IV

7. a) What is surface grinding? Explain 7
b) Explain in detail about centreless grinding process. 7
(OR)
8. a) Bring out the differences between Lapping and Honing. 7
b) Sketch and explain the tool and cutter grinding machine. 7

UNIT-V

9. a) What is meant by tolerance? Describe any one type of tolerance? 7
b) Calculate all the relevant dimensions of 35H7/f8 fit, dimension 35 mm falls in the step of 30-50 mm. The fundamental deviation for f shaft is $-5.5D^{0.41}$. i (in microns) $=0.45(D)^{1/3}+0.001D$, IT7=16i and IT8=25i. 7
- (OR)
10. a) What are the types of fit? Describe the differences. 6
b) Determine the actual dimensions to be provided for a shaft and hole 90 mm size for H8e9 type clearance fit. Size 90 mm falls in the diameter step of 80-100 mm. Value of standard tolerance unit $i=0.45\sqrt[3]{D}+0.001D$. The values of tolerances for IT8 & IT9 grades are 25i & 40i respectively. Value of fundamental deviation for 'e' type shaft is $-11D^{0.41}$. Also design the GO & NO GO gauges considering wear allowance as 10% of gauge tolerance. 8

AR16

CODE: 16EC3017

SET-2

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

III B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov-2019

DIGITAL IC APPLICATIONS

(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 about the terms 'Logic Levels' and 'Noise Margin' with reference to CMOS logic. 7M
b) Compare All logic families with reference to different parameters. 7M
- (OR)**
2. a) Explain the CMOS circuit behaviour with resistive load. 7M
b) Draw the circuit diagram of basic TTL NAND gate and explain the three parts with the help of functional operation. 7M

UNIT-II

3. a) Design a two bit comparator circuit and explain its operation 7M
b) Write a VHDL code for implementing a 4 bit comparator. 7M
- (OR)**
4. a) Explain different data types available in VHDL with relevant examples. 7M
b) Draw and explain floating point encoder in detail 7M

UNIT-III

5. a) Write a VHDL program for n-bit ripple carry adder. 7M
b) Design a barrel shifter for 8-bit using three control inputs. 7M
- (OR)**
6. a) Draw the block diagram of barrel shifter and explain its operation. 7M
b) Design a 4x4 combinational multiplier and write the VHDL program in data flow model. 7M

UNIT-IV

7. a) Explain basic sequential logic design steps of a counter in detail 7M
b) Design a 4 bit 4- state ring counter using 74X194 7M
- (OR)**
8. a) Design a serial in and parallel out shift register and explain its operation 7M
b) Write a VHDL code for a 4-bit upcounter with enable and clear inputs. 7M

UNIT-V

9. a) Compare between PROM, PLA and PAL? 7M
b) Implement the following functions using PLA and PAL $F1=ABC$, $F2=A'B'C'$, $F3=A'+B'+C'$ and explain its operation 7M
- (OR)**
10. a) Explain briefly about design considerations of PLD's along with circuit diagram? 7M
b) Explain complex programmable logic device (CPLD) with neat diagram. 7M

AR16

CODE: 16CS3013

SET-1

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

III B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov-2019

SOFTWARE ENGINEERING (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) Describe the characteristics of software. List out the software application domains which are challenging for software engineers. [8M]
- b) Explain in detail about Software myths. How to avoid them and find the correct solutions. [6M]

(OR)

2. a) Discuss the steps involved in waterfall model Explain with a neat diagram?. List out the advantages and disadvantages?. [8M]
- b) What is software process improvement?. Explain how the capability maturity model integration will improve organizations capabilities and maturity levels?. [6M]

UNIT-II

3. a) Outline the features of Software Requirement Specification template?. [8M]
- b) Explain collaborative requirements and quality function deployment?. [6M]

(OR)

4. a) What is structured language specification?. Draw a graphical model for ATM for withdrawal of amount. [8M]
- b) Differentiate between context model and behavioural model with simple examples. [6M]

UNIT-III

5. a) Explain features of various design concepts. [7M]
- b) Compare and contrast architectural design elements versus interface design elements? [7M]

(OR)

6. a) Draw the architectural context diagram for the safe home security function and explain how to refine the system?. [8M]
- b) Explain User Interface analysis and design process with a neat diagram?. [6M]

UNIT-IV

7. a) Describe software testing strategies with a neat diagram and mention the criteria for completion testing. [8M]

b) List different types of debugging strategies. What is automated debugging?. [6M]

(OR)

8. a) Describe the important attributes of effective software metrics. What are functions based metrics? [7M]

b) Explain the important features of latest constructive cost model for project effort estimation using object points?. [7M]

UNIT-V

9. a) Define software risk?. What are the steps involved in risk identification and risk projection?. [8M]

b) Summarize the elements of software quality assurance and mention its goals and metrics. [6M]

(OR)

10. a) Explain Mc Call's quality factors with a neat diagram? [8M]

b) What is RMMM?. Explain in detail how it is used as a document for the risk analysis?. [6M]

AR13

CODE: 13CE3012

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, Oct / Nov-2019

DESIGN AND DRAWING OF CONCRETE STRUCTURES-I (Civil Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is characteristic load?
b) How to estimate the design loads in (i) limit state method, and (ii) working stress method?
c) Write about limiting neutral axis?
d) What are the principles of limit state method?
e) Define bond stress?
f) Write the formula for developing length.
g) What are the assumptions made in the design of short columns?
h) Briefly explain the classification of columns?
i) Explain the one way slab in single line?
j) Why design of a two-way-slab supported on all four sides involves the computation of:

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Determine depth of neutral axis for the section 200 mm x 450mm. it contains 3-20 ϕ at bottom and having effective depth 50mm
(i) $\sigma_{ck} = 15 \text{ N/mm}^2$, $\sigma_y = 250 \text{ N/mm}^2$
(ii) $\sigma_{ck} = 20 \text{ N/mm}^2$, $\sigma_y = 415 \text{ N/mm}^2$
b) Determine the lever arm for section 250mm X 400mm. it contains 3-16 ϕ at bottom and having effective depth 40mm
(i) $\sigma_{ck} = 20 \text{ N/mm}^2$, $\sigma_y = 250 \text{ N/mm}^2$
 $\sigma_{ck} = 25 \text{ N/mm}^2$, $\sigma_y = 415 \text{ N/mm}^2$
(OR)
3. Design a rectangular beam to resist a bending moment equal to 75kNm using (i). M25 mix and Fe 415 grade steel, and (ii). M25 mix and Fe 550 grade steel.

UNIT-II

4. a) Derive the stress block parameters for a rectangular section, using the theory of limit state of flexure?
b) Write the assumptions of limit state method?
(OR)
5. Design a rectangular beam for 4m effective span which is subjected to a dead load of 15KN/m and a live load of 12 KN/m. Use M25 mix and Fe500 grade steel.

UNIT-III

6. A reinforced concrete beam is supported on two walls 750 mm thick , spaced at a clear distance of 6m. the beam carries a super-imposed load of 9.8 kN/m. Design the beam using M20 concrete mix and HYSD bars of Fe 415 grade. 12
- (OR)**
7. A cantilever beam projects 2.5m beyond the fixed end , and carries a super imposed load of 12 kN per meter run. Design the cantilever using M15 concrete and Fe415 steel. 12

UNIT-IV

8. Design a short column , square in section , to carry an axial load of 2000 kN using (i).mild steel (ii) Fe 415 grade and M20 mix. 12M
- (OR)**
9. Design a slender braced circular column under uni – axial bending with the following data: 12M
Size of column = 40cm
Concrete grade = M20,Steel grade = Fe 415
Effective length = 6m, unsupported length = 7m,Factored load $P_u = 1200\text{kN}$,
Factored moment $M_{ux} = 75\text{ kNm}$ at top ; 50kNm at bottom. the column is bent in single curvature.

UNIT-V

10. Design a R.C. slab for a room having inside dimensions 3m X 7m.the thickness of supporting wall is 300mm. The slab carries 75mm thick lime concrete at its top, the unit weight of which may be taken as 20kN/m^3 . The live load on the slab may be taken as 20kN/m^2 .assume the slab to be simply supported at the ends.use M15 concrete and Fe 250 steel. 12M
- (OR)**
11. Design a two way slab for a room 5.5m X 4.0m clear in size if the superimposed load is 5 kN/m^2 . Use M25 mix and Fe415 grade steel & edges simply supported – corners not held down. 12M

AR13

CODE: 13EC3016

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, Oct / Nov-2019

LINEAR AND DIGITAL IC APPLICATIONS (Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is meant by virtual ground?
b) Draw the high frequency equivalent circuit of op-amp?
c) What is the purpose of using back to back set of zener diodes in comparators?
d) Define frequency stability of oscillator.
e) Why do we use higher order filters?
f) List-out the applications of PLL.
g) Write the draw backs of counter type analog to digital converter (ADC).
h) What is the number of pins required in an IC package for four 2-input OR gates?
i) Define edge triggered flip-flop.
j) How does a synchronous counter differ from an asynchronous counter?

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Briefly explain the necessity and function of different stages of Op-Amp with respect to its block diagram. 8M
b) What are the three factors that affect the electrical parameters of an op-amp? 4M
- (OR)
3. a) Explain in detail about AC Characteristics of an Op-Amp. 6M
b) For an op-amp, CMRR=10⁵ and differential gain, A_{DM}=10⁵. Calculate the common mode gain, A_{CM} of the op-amp. 6M

UNIT-II

4. a) Draw the circuit of a voltage to current converter if the load is (i) floating and (ii) grounded. Is there any limitation on the size of the load when grounded? 6M
b) Explain the operation of a square wave generator by drawing the capacitor and output voltage waveforms. 6M
- (OR)
5. a) What is an Instrumentation Amplifier? Draw a system whose gain is controlled by an adjustable resistance. 8M
b) Explain the difference between the AC and DC Amplifiers. 4M

UNIT-III

6. a) List the disadvantages of passive filters. 4M
b) Design a high pass filter with a cut-off frequency of 10 kHz with a pass band gain of 1.5. 8M

(OR)

7. a) Draw the functional diagram of a 555 timer IC and explain the function of each internal block neatly. 8M
b) With reference to a PLL, define capture range, lock range and pull in time. 4M

UNIT-IV

8. a) A dual slope ADC uses a 16-bit counter and a 4 MHz clock rate. The maximum input voltage is +10V. The maximum integrator output voltage should be -8V when the counter has cycled through 2^n counts. The capacitor used in the integrator is $0.1\mu\text{F}$. 6M
(i) Find the value of the resistor R of the integrator.
(ii) If the analog signal V_a is +4.129V, find the equivalent digital number.
b) Explain the operation of a successive approximation type analog to digital converter with neat sketches. 6M

(OR)

9. a) Explain the comparison of various logic families with truth tables. 6M
b) Explain in detail about the TTL open collector outputs. 6M

UNIT-V

10. a) Explain the operation of 8X1 multiplexer. 6M
b) A 3-line to 8-line decoder can be used for octal to decimal decoding. When a binary 101 is on the inputs, which output line is activated? 6M

(OR)

11. a) Explain Serial in-serial out shift register with its logic block diagram. 6M
b) Describe the expansion of ROMs and RAMs to increase word length and word capacity. 6M

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

1. a) Differentiate orthogonal cutting and oblique cutting
- b) What are the types of chip breakers?
- c) What is the function of face plate?
- d) List out the common tools used on turret and capstan Lathes.
- e) What are the functions of flutes in a twist drill?
- f) How push broach differs from pull broach.
- g) What is meant by indexing in milling?
- h) How the centre less grinding is differ from cylindrical grinding?
- i) List out the gear finishing operations?
- j) Write any one example for non conventional machining.

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

2. a) Derive the expression for relationship between chip flow velocity, cutting velocity and velocity of shear. **6**
 - b) During orthogonal machining with on HSS tool, the rake angle is 5° , the undeformed chip thickness 0.25 mm, chip thickness is 0.5 mm and width of cut is 4 mm. The shear strength of material and coefficient of friction to be 50 N/mm² and 0.4. How to calculate the cutting force? **6**
- (OR)**
3. a) While machining a mild steel work piece with a HSS tool the following data was recorded. Cutting speed is 32 m/min and tool life 50 minutes. If the cutting speed is increased by 50%, how the tool life will be affected? Assume exponent 'n' of Taylor's equation is 0.2 **6**
 - b) What are the types of cutting tool materials? Explain briefly about its important properties and applications. **6**

UNIT-II

4. a) With a neat sketch explain thread cutting operation on lathe. **5**
 - b) Explain with neat sketches about taper turning methods? **7**
- (OR)**
5. a) Explain in detail about turret indexing mechanism with neat diagram. **6**
 - b) Explain the following terms in brief **6**
 - (i) Turret Lathes
 - (ii) Automatic feed screw
 - (iii) Multi Spindle

UNIT-III

6. a) Describe the working principle of planer machine with neat sketch. **6**
 - b) Discuss in detail about the quick return mechanism in shaper with neat sketch. **6**
- (OR)**
7. a) Describe briefly about the simple and direct indexing mechanisms in milling. **6**
 - b) Sketch and explain the working principle of horizontal pull type broaching machine. **6**

UNIT-IV

8. a) Explain about specification and selection of grinding wheel? **6**
b) Briefly explain the following processes
i) Surface grinding **6**
ii) Centreless grinding
iii) Cylindrical grinding
- (OR)**
9. a) Explain about the gear shaping process with neat sketch. **6**
b) Describe the working principle of Abrasive jet machining process with neat sketch and also its applications? **6**

UNIT-V

10. Explain the working principle of CNC machine tool with neat schematic diagram **12**
(OR)
11. Explain briefly following terms: **12**
i) Spindle drives
ii) Feed drives
iii) Structural members
iv) Ball screws

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

1. a) Draw the circuit diagram of non 5V Tolerant HC
- b) Why two input NAND gate using CMOS logic works faster than two input NOR gate using CMOS logic
- c) What is the main functionality of 74x245
- d) Mention any one advantage of Carry Look Ahead Adder
- e) What is the difference between 74x85 and 74x682
- f) Which ICs are required for the design of Floating Point Encoder
- g) What is the importance of RCO Pin in 74X163
- h) Write the characteristic Equation of T Flip-Flop
- i) What is the need for Chip Select in RAM
- j) What is the main function of Macro cell

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

2. a. Compare CMOS, TTL, ECL in terms of Propagation Delay, Power Dissipation [4M]
- b. Analyse the rise time and fall time of CMOS inverter outputs with $R_L = 100 \Omega$, $V_L = 2.8V$ and $C_L = 100 \text{ pF}$. Assume V_L as stable state voltage [8M]

(OR)

3. a. Design a CMOS Transistor Circuit with the Functional behaviour $F=(A+BC)'$ [6M]
- b. Explain the factors to be considered for CMOS/TTL Interfacing or vice versa [6M]

UNIT-II

4. a. Design a 2 bit comparator and Write VHDL programme. [7M]
- b. Write the VHDL Code for 8x3 Encoder using Data Flow Modelling [5M]

(OR)

5. a. Design a 3x8 Decoder using 2x4 decoder and draw the logic diagrams. [8M]
- b. Write the VHDL code for 1x4 De-multiplexer in Data Flow modelling [4M]

UNIT-III

6. a. Design a full adder using half adder and write the VHDL code for the same in structural modelling [7M]
- b. Design universal shift register using flip-flops and multiplexers. [5M]

(OR)

7. a. Explain Dual Priority Encoder. [6M]
- b. Write the VHDL code for 4 bit ALU in Behavioural Modelling performing the following operations [6M]
 - i) Addition of two 4-bit Numbers
 - ii) Complementing all the bits of a 4-bit vector
 - iii) XOR Operation of two Four bit Numbers
 - iv) AND operation of two Four Bit Numbers

UNIT-IV

8. a. Write the VHDL code for 74x76 [6M]
- b. Design a Mod-3 Asynchronous Counter using flip-flops. [6M]

(OR)

9. a. Convert SR Flip-Flop to JK flip-flop [6M]
- b. Write the VHDL Code for Universal Shift Register. [6M]

UNIT-V

10. a. Realize the following functions using PROM of size 8x3 [6M]

$$F_1(A,B,C) = \sum m(0,4,7)$$

$$F_2(A,B,C) = \sum m(1,3,6)$$

$$F_3(A,B,C) = \sum m(1,2,4,6)$$
- b. Define the timing parameters for Read Operations in a RAM with Timing Diagram [6M]

(OR)

11. a. With the help of neat diagrams, explain the working of FPGA Block diagram. [7M]
- b. Implement a Half Adder using PAL Logic [5M]

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

1. a) Define Ambiguous grammar
- b) Define Left recursion
- c) Define Lexeme
- d) Write a regular expression for an identifier
- e) Write short notes on symbol table manager?
- f) Draw parse tree for expression: position:=initial+rate*60
- g) Write short note on DAG(Directed Acyclic Graph) representation
- h) Explain in briefly about issues in code generation
- i) Define Synthesized attributes
- j) Define LL(1) grammar

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

2. What are the various phases of compiler? Explain each phase in details. Write down the output of each phase for the expression a:=b+c*15 12M

(OR)

3. a) What is a preprocessor? Explain various functions of preprocessor 6M
- b) What is the role of lexical analysis? Give examples 6M

UNIT-II

4. Construct LALR parsing for following Grammar 12 M
S--> AalbAc|BclbBa, A-->d, B-->d

(OR)

5. a) What are the advantages of top down parsing? 6M
- b) Explain backtracking in top-down parsing 6M

UNIT-III

6. Explain in detail about different storage allocation schemes 12M

(OR)

7. a) What are the contents of the symbol table 6M
- b) Describe about block structured and non block structured storage allocation 6M

UNIT-IV

8. a) Explain Data Flow analysis of structured flow graph 6M
- b) Explain in briefly about global optimization 6M

(OR)

9. a) What is Flow-graph. Explain how given program can be converted into flow graph? 6M
- b) Explain in detail about copy propagation with an example 6M

UNIT-V

10. a) Explain in detail about machine dependent code optimization 6M
- b) Discuss in detail about the issues in the design of a code generator 6M

(OR)

11. a) Explain simple strategy to generate assemble code from quadruple 6M
- b) Explain in detail about object code forms and give examples 6M