

# AR16

**CODE: 16CE3013**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations January-2019**

**DESIGN OF CONCRETE STRUCTURES**

**(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) Explain briefly mode of failures. 6M
- b) Derive stress block parameters. 8M

**(OR)**

2. a) A simply supported beam of size 230mmX600mm overall depth is reinforced with 3 no of 16mm diameter bars as a tension reinforcement. Find the safe central concentrated load on the beam in addition to its self weight on a span of 4m. The materials are M20 & Fe415. 10M
- b) Write the assumptions in limit state design. 4M

## **UNIT-II**

3. A rectangular beam of size 230mmX570mm effective depth is subjected to a factored bending moment of 270kN-m. Design the reinforcement for flexure. The materials are M20 & Fe250. Assume effective compression cover as 50mm. Draw the reinforcement details. 14M

**(OR)**

4. A simply supported beam of span 5m is subjected to a characteristic dead load of 15 kN/m and live load of 8 kN/m. Design the beam. The materials are M20 grade concrete and HYSD reinforcement of grade Fe 415. Draw the reinforcement details. 14M

### UNIT-III

5. A five span continuous one way slab is to be used for an office floor of size 8mX15m. The centre to centre distance of supporting beams are 3m. Consider live load 3kN/Sqm and floor finish 1kN/Sqm. Design the slab using M20 grade concrete and Fe415 grade steel. Draw the reinforcement details. 14M

(OR)

6. Design a slab for an office floor of size 3.5mX4.5m with four edges are continuous. Slab is subjected to a live load of 4 kN/Sqm. Design the slab using M20 grade concrete and Fe415 grade steel. Draw the reinforcement details. 14M

### UNIT-IV

7. a) Briefly explain the column reinforcement requirements. 6M  
b) Design a circular column to carry an axial working load 1000kN. Assume  $e_{min} < 0.05D$ . The materials are M30 grade and HYSD reinforcement of grade Fe500. Use helical reinforcement. Draw the reinforcement details. 8M

(OR)

8. Design column for the following data: Column size: 300mmX450mm; Materials Grade :M20 & Fe415; Loads:  $P_u=1000\text{kN}$ ;  $M_{ux}=70\text{kN-m}$ ;  $M_{uy}=54\text{kN-m}$ . Effective length of column is 6m and unsupported length of column is 7m. Draw the reinforcement details. 14M

### UNIT-V

9. a) Explain different types of footings with sketches. 7M  
b) Explain the design procedure of the isolated footing. 7M

(OR)

10. Design a rectangular isolated footing to carry a column load of 600 kN & 15 kN -m from a 300mmX450mm column. The safe bearing capacity of the soil is 150 kN/Sqm. Consider base of footing at 1.5m below the ground level. The unit weight of earth is 20 kN/Cum. The materials are M20 grade and HYSD reinforcement of grade Fe415. Draw the reinforcement details. 14M

# AR16

**CODE: 16EE3016**

**SET-2**

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

**III B.Tech I Semester Supplementary Examinations January-2019**

**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) Mention the importance of snubber circuit which is connected across SCRs. 7M
- b) Draw and explain the transfer and output characteristics of n-channel enhancement type MOSFET's. 7M
- (OR)**
2. a) Discuss various turn-on methods of SCRs. 7M
- b) Explain operation of IGBT along with its characteristics. 7M

## **UNIT-II**

3. A single phase full converter is driving a RLE load. The output current is continuous and ripple free and equal to 10 A. Determine the triggering angle if the load resistance is  $10\ \Omega$  and supply is 230 V/ 50 Hz mains in each of the following cases: 14M  
(a) If  $E_b = +100\text{ V}$  (b) If  $E_b = -100\text{ V}$   
Also, determine the mode in which the converter operates and indicate the power flow diagram
- (OR)**
4. a) A 1- phase fully controlled bridge rectifier is given 230 V, 50 Hz supply. The firing angle is  $45^\circ$  and the load is highly inductive. Determine 7M  
i) Average output voltage and current  
ii) Input Power factor
- b) Discuss the effect of source inductance in case of both single phase and three phase fully controlled converters. 7M

### UNIT-III

5. Explain the operation of 3-phase fully controlled Converter with R load for rectifier and inverter operation. 14M

(OR)

6. a) Interpret the basic difference of circulating and non-circulating current mode operation of dual converter 7M
- b) A 3 - phase semi-converter is operated from a 3 - phase star connected 415 V, 50 Hz supply and the load resistance is  $R = 10 \Omega$ . If it is required to obtain an average output voltage of 25 % of the maximum possible output voltage, calculate Delay angle. 7M

### UNIT-IV

7. Derive the expression for rms output voltage, rms output current and input power factor for a single phase ac voltage controller fed to R load and also draw SCRs across voltage wave forms. 14M

(OR)

8. a) Describe the operation of a single phase AC voltage controller with a neat circuit diagram and output wave forms with respect to source voltage waveforms at  $\alpha = 60$  degrees for R-load. 7M
- b) For a single phase Bridge type cyclo-converter, explain the operation of the circuit when fed to R-load with the help of neat circuit diagram and relevant output waveforms for,  $f_o = 1/4 f_s$ . 7M

### UNIT-V

9. a) Write short notes on 7M
- i) time ratio control, and
  - ii) current limit control of dc-dc converter.
- b) Illustrate operation of dc to dc converter whose input voltage is less than output voltage. Derive the expressions for same converter. 7M

(OR)

10. a) Describe the working of single-phase full bridge inverter and draw the associated waveforms with RL-Load. 7M
- b) Compare the various PWM techniques employed in inverters? 7M

# AR16

**CODE: 16ME3015**

**SET-1**

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

**III B.Tech I Semester Supplementary Examinations, January-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) Define various tool angles used in single point cutting tool with neat sketch. 6  
b) In an orthogonal turning of a mild steel bar on a lathe the following data were available: Diameter of work piece = 60 mm; cutting speed = 100 m/min, back rake angle =  $14^0$ ; Feed rate = 0.25 mm/rev. Cutting force = 150 kg; Feed force = 50 kg; chip thickness = 0.4 mm. calculate shear angle, coefficient of friction, cutting Power chip flow velocity and shear force. 8  
(OR)
2. a) What are the adverse effects are of built up edge? How can we avoid them? 7  
b) In an orthogonal cutting experiment with a tool of rake angle  $\alpha = 7^0$ , the chip thickness was found to be 2.5mm when the uncut chip thickness was set to 1mm. Find i) the shear angle and ii) the friction angle assuming that Merchant's formula holds good. 7

## **UNIT-II**

3. a) With a block diagram explain the method of taper turning by tail stock set over Method. 7  
b) Explain in detail the single-spindle automatic lathe and compare it with multi-spindle automatic lathe. 7  
(OR)
4. a) Explain briefly the following lathe operations:- 10  
i) Threading (ii) Knurling (iii) Forming  
iv) Taper turning v) Facing  
b) Explain bar feed mechanism. 4

### **UNIT-III**

5. a) With a neat sketch explain the processing of producing horizontal flat surface by using a Shaper 7  
b) What are the difference between a face plate and a drive plate? Explain when you use them. 7  
(OR)  
6. a) What is the principle of working of planer? 2  
b) Explain briefly with neat sketches:- 12  
(i) Face milling (ii) Dove-tail milling (iii) Straddle milling

### **UNIT-IV**

7. a) How is grinding classified? Explain grinding wheel specifications? 7  
b) Bring out the differences between Lapping and Honing. Explain polishing and Buffing? 7  
(OR)  
8. a) Discuss in detail about internal cylinder grinding. 6  
b) Explain the principle, construction and working of a plain cylindrical grinder with a neat block diagram. 8

### **UNIT-V**

9. a) Describe the terminology of Limit systems? 6  
b) Calculate the limits of tolerance and allowance for a 25 mm shaft and hole pair designated by H8d9. Take the fundamental deviation for 'd' shaft is  $-16D^{0.44}$  8  
(OR)  
10. a) Discuss the different types of fits used in engineering applications? 7  
b) Shafts of  $75 \pm 0.02$  mm diameter are to be checked by the help of a Go, Not Go snap gauges. Design the gauge, sketch it and show its Go size and Not Go size dimensions. Assume normal wear allowance and gauge maker's tolerance 7

# AR16

**CODE: 16EC3017**

**SET-2**

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

**III B.Tech I Semester Supplementary Examinations January-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 transition times, propagation delay and power consumption of CMOS logic. 7M  
b) Design 4 input  $Y = \text{NOT}(AB + CD)$  logic using CMOS and give its function table. 7M  
(OR)
2. a) With neat diagram, explain the functionality of two input TTL NAND gate. 7M  
b) Write comparison between various parameters of different logic families. 7M

## **UNIT-II**

3. a) Design 5x32 decoder using IC 74x138 and 139. 7M  
b) Write dataflow VHDL code for four bit comparator. 7M  
(OR)
4. a) Explain the functionality of IC 74X151 with the help of logic diagram. 7M  
b) Write behavioural VHDL program for 8x3 priority encoder. 7M

## **UNIT-III**

5. a) Explain barrel shifter operation using multiplexer ICs. 7M  
b) Write a HDL modelling for Ripple adder/subtractor. 7M  
(OR)
6. a) Explain the functionality of dual priority encoder. 7M  
b) Write a structural HDL code for combinational multiplier. 7M

## **UNIT-IV**

7. a) Design decade down counter circuit using JK flip-flops. 7M  
b) Explain the functionality of bidirectional shift register. 7M  
(OR)
8. Explain various latches and flip-flops using truth tables and logic diagrams and design MOD-6 counter using D flip-flops. 14M

## **UNIT-V**

9. a) Explain the basic structure of CPLD. 7M  
b) Design XOR and XNOR output functions using PROM. 7M  
(OR)
10. Explain the functionality of both combinational and sequential PAL with example. 14M

# AR16

**CODE: 16CS3013** **SET-1**  
**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI**  
**(AUTONOMOUS)**

**III B.Tech I Semester Supplementary Examinations, January-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) Explain Water fall Model. What are the problems that are sometimes encountered when the waterfall model is applied? 7M
- b) Differentiate product engineering and business engineering overview? 7M

**(OR)**

2. a) How does system engineering differ from software engineering? Also write brief notes on computer based system and system engineering hierarchy 7M
- b) Explain the various levels of capability maturity model integration? 7M

## **UNIT-II**

3. a) Draw and Explain the use case diagram for an ATM system in requirement elicitation. 7M
- b) Explain about the cardinality and modality with suitable example? 7M

**(OR)**

4. a) Explain by constructing a context flow diagram level-0 DFD and Level-1 DFD for a library management system? 7M
- b) Why the customer interaction is a difficult process? Explain one formal procedure used for customer interaction 7M



### **UNIT-III**

5. a) Discuss in detail about the design process in software development process? 7M  
b) Explain golden rules for user interface design. 7M
- (OR)**
6. a) What are the different types of architectural styles exist for software and explain any one software architecture in detail 7M  
b) Write short notes on design evaluation. 7M

### **UNIT-IV**

7. a) i) Why Unit testing is important? Explain the concept of unit testing in detail. ii) Write a note on regression testing. 7M  
b) What are the attributes of a good test? Explain the test case design? 7M
- (OR)**
8. a) What are the various testing strategies to software testing? Discuss them briefly? 7M  
b) How the RST (Reflexive, Symmetric, and Transitivity) is related to black box testing? 7M

### **UNIT-V**

9. a) What is SQA? Explain in detail the process of Formal Technical Review? 7M  
b) Define Software Risk. Explain various types of risks occur during development of software 7M
- (OR)**
10. a) Explain in detail about risk identification 7M  
b) Explain in detail about Quality planning and control. 7M

# AR13

CODE: 13CE3012

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January-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) For a particular grade of steel and with increasing the grade of concrete, the percentage of Steel limit
- b) In a singly reinforced beam, the effective depth is measured from the compression edge to the
- c) As per IS 456-2000 maximum depth of neutral axis for mild steel
- d) Define partially safety factor
- e) Write the expression for calculation of Minimum area of steel in a RCC beam
- f) Side face reinforcement shall be provided in the beam when depth of the web in a beam exceeds
- g) As per IS 456-2000 The diameter of longitudinal bars of a column should never be less than
- h) The maximum reinforcement in columns as per IS 456-2000 is
- i) Define Two way slab
- j) In a simply supported slab, the pitch of distribution reinforcement should not be more than ----- the effective depth of slab.

### PART-B

Answer one question from each unit

[5x12=60M]

#### UNIT-I

2. a. i) Define a) Modular ratio b) Neutral axis
- ii) In working stress method, what are the factors of safety as applied to concrete and steel? 6M
- b. Evaluate the design constants for the following combination of concrete and steel in working stress method i) M-25 and Fe415 ii) M-30 and Fe500 6M

(OR)

3. a. Write a short notes on a) Under reinforced section b) Balanced section c) Over reinforced section 6M
- b. An RC beam section is 300 mm wide and 500 mm deep is reinforced with tension reinforcement  $3200\text{mm}^2$  at an effective cover of 30 mm. Determine the ultimate moment of resistance of beam section. Use M20 mix and steel is of Fe 250 grade steel 6M

# AR13

**CODE: 13CE3012**

**SET-2**

## UNIT-II

4. a. Derive stress block parameters as per the Limit state method. 7M  
b. Write the assumptions made in limit state design 5M
- (OR)
5. a. Determine the ultimate moment of resistance of a beam section of 230X470mm an effective dimensions, reinforced with 4 bars of 16mm diameter on the tension side. Assume M25 and Fe 415 steel by limit state method/? 8M  
b. Explain stress-strain curves of concrete and steel? 4M

## UNIT-III

6. Design a singly reinforced beam of clear span 6m to support a working load of 12kN/m. Use M20 concrete and Fe415 steel. Check for shear and development length 12M
- (OR)
7. Design a simply supported T-beam for the given data. 12M  
Span= 10m; Spacing of beams= 2.5m; Slab thickness= 100mm  
Live load=6kN/m<sup>2</sup>; Grade of concrete=M20; Grade of steel= Fe415

## UNIT-IV

8. Design the R.C.C column of size 250 x 400mm for the given data. Use M25 concrete and Fe415 steel. Pu =100kN, L=6m, leff(x)=4.8m, leff(y)=4.0m, Mux=30 kN-m, Muy=10kN-m and effective cover =45mm 12M
- (OR)
9. Design a short helically reinforced column of unsupported length 3.6m to carry an axial service load of 1200kN. Use M30 concrete and Fe 415 grade steel. Sketch the reinforced details. Assume moderate exposure condition 12M

## UNIT-V

10. Design the interior slab panel for a room having dimensions 4.2 m × 5.4 m. The slab is Subjected to live load of 3 kN/m<sup>2</sup> and floor finish of 1.5 kN/m<sup>2</sup>. Assume the width of support is 300 mm 12M
- (OR)
11. Design a one way continuous slab of spans 4 m, if imposed load is 3.5 kN/m<sup>2</sup> and finishing load is 1.5 kN/m<sup>2</sup>. Assume width of beams as 250 mm. Use M20 concrete and Fe 415 steel. 12M

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

**III B.Tech I Semester Supplementary Examinations, January-2019**

**LINEAR DIGITAL INTEGRATED CIRCUITS  
(Electrical and Electronics Engineering)**

**Time: 3 Hours**

**Max Marks: 70**

**PART-A**

**ANSWER ALL QUESTIONS**

**[1 x 10 = 10 M]**

1. a) Draw the Pin Diagram of an op-amp.
- b) Define input bias current of an op-amp.
- c) Draw the circuit diagram for I to V converter using IC 741.
- d) List out various conditions required to produce oscillations in oscillators.
- e) Define notch filter?
- f) Draw the block diagram of PLL.
- g) Design 2x1 Multiplexer using CMOS transmission gates
- h) Define Resolution of converters.
- i) Give truth table for JK flip-flop.
- j) Draw the structure of 1-bit DRAM

**PART-B**

**Answer one question from each unit**

**[5x12=60M]**

**UNIT-I**

2. a) Explain about various DC characteristics of an op-amp. 8M
- b) Give different ideal and practical characteristics of an op-amp. 4M

**(OR)**

3. a) Explain about external frequency compensation techniques of an op-amp. 6M
- b) With neat diagram, explain about the block diagram of an operational amplifier. 6M

**UNIT-II**

4. a) With neat diagrams and equations explain about instrumentation amplifier. 8M
- b) Design Schmitt trigger using op-amp and explain its operation. 4M

**(OR)**

5. a) Explain the operation of AC amplifiers with diagrams. 6M
- b) With neat diagrams explain the operation of comparators. 6M

**UNIT-III**

6. a) Design 1<sup>st</sup> order LPF for the given cut-off frequency 4KHz. 6M
- b) Derive time period formula for monostable operation using IC 555. 6M

**(OR)**

7. a) Explain the functional diagram of IC 555 timer. 6M
- b) Design 1<sup>st</sup> order HPF for the given cut-off frequency 4KHz. 6M

**UNIT-IV**

8. a) Explain the operation of dual slope ADC with diagrams. 8M
- b) Explain about IC interfacing with necessary diagrams. 4M

**(OR)**

9. a) Design 4-bit weighted resistor DAC and explain its operation. 8M
- b) Explain CMOS Open Drain and Tristate Outputs. 4M

**UNIT-V**

10. a) Design 8x3 priority encoder and explain its operation. 6M
- b) Explain about the operation of static RAM. 6M

**(OR)**

11. a) Design decade counter using flip-flops. 8M
- b) Explain about the operation of ROM. 4M

# AR13

CODE: 13ME3014

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January-2019  
METAL CUTTING & MACHINE TOOLS  
(Mechanical Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What are the two basic motions required to perform any machining operation?
- b) What do you understand by hot hardness of a cutting tool material?
- c) What is the function of half nut mechanism in lathe?
- d) Name the operation on a lathe which results in a flat surface
- e) What is a reaming operation?
- f) What is the purpose of indexing operation?
- g) What do you understand by loading of a grinding wheel?
- h) What is a lapping operation?
- i) What is the advantage of ball lead screw?
- j) What is an automatic pallet changer?

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2. a) Illustrate the types of chips and conditions favourable for their occurrence 6M
  - b) What do you understand by orthogonal cutting? Give practical examples of it. 6M
- (OR)
3. a) Define tool life and discuss the factors affecting it. 6M
  - b) Describe the functions of cutting fluids. list the types of cutting fluids 6M

### UNIT-II

4. Sketch the lathe machine and indicate various parts. Also explain the function of each part. 12M

(OR)

5. a) Distinguish between ordinary lathe and turret lathe. 6M  
b) With a sketch explain the principle of working of Swiss type automatic lathe. 6M

### **UNIT-III**

6. a) With the help of a diagram explain the working of a crank and slotted lever mechanism 6M  
b) Explain following operations which can be performed on a drilling machine 6M  
(i) Boring (ii) Spot facing (iii) Trepanning  
(OR)  
7. a) Discuss the features of a vertical milling machine. 6M  
b) Explain following operations on a milling machine. 6M  
(i) Straddle milling (ii) slab milling (iii) Face milling

### **UNIT-IV**

8. a) Interpret the specification of a grinding wheel. 6M  
b) Illustrate the steps involved in grinding of a cylindrical bar of 25mm diameter and 150 mm in length on a cylindrical grinding machine. 6M  
(OR)  
9. a) Describe the process of abrasive jet machining 6M  
b) With a neat sketch the process of gear shaping 6M

### **UNIT-V**

10. Define numerical control of machine tools. Explain the various components of an NC system. 12M  
(OR)  
11. a) Distinguish between absolute part programming and incremental part programming. Also differentiate between fixed zero and floating zero 6M  
b) What do you mean by circular interpolation? Mention the codes used for it. What information is required to program circular interpolation? 6M

# AR13

CODE: 13EC3013

**SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January-2019

**DIGITAL IC APPLICATIONS**

(Electronics and Communication Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define combinational logic circuit  
b) Give the arithmetic operators in VHDL  
c) What is programmable switch element  
d) Draw the block diagram of 8:1 multiplexer  
e) Differentiate encoder and multiplexer  
f) Distinguish between latch and flip-flop  
g) What is PLA?  
h) What is two-level logic? What is its advantage?  
i) What is the difference between structural and behavioural model in VHDL?  
j) What are the requirements to construct PROM?

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2. a) Explain the terms transition time and propagation delay with reference to CMOS logic. 6  
b) Design a two input CMOS NAND gate and verify the functional verification and explain its operation. 6
- (OR)
3. a) Design a CMOS transistor circuit with the functional behaviour  $f(Z) = \overline{(A + \bar{B}) + (C + \bar{D})}$  6  
b) Draw the resistive model of a CMOS inverter and explain its behaviour for LOW and HIGH outputs 6

## **UNIT-II**

4. a) Design a 32 to 1 multiplexer using four 74X151 multiplexers and 74X139 decoder 6  
b) Draw and explain floating point encoder in detail 6  
(OR)
5. a) Explain about parity generator and checker 6  
b) Write a behavioural VHDL program to compare 16-bit unsigned integers 6

## **UNIT-III**

6. a) Explain in detail about combinational multiplier 6  
b) Implement the full adder circuit using basic gates and explain its operation 6  
(OR)
7. a) Draw the carry look ahead adder and explain its operation 6  
b) What is ALU and explain its operation along with circuit diagram in detail? 6

## **UNIT-IV**

8. a) Explain basic sequential logic design steps of a counter in detail 6  
b) Design a conversion circuit to convert T flip flop to JK flip flop 6  
(OR)
9. a) Design a divide by 128 counter using 7493 ICs 6  
b) What is race around condition? How can it be eliminated by using master slave JK Flip flop? 6

## **UNIT-V**

10. a) With the help of logic diagram explain the function of PAL with one example 6  
b) Compare between the fixed function IC approach, ASIC approach and PLD approach? 6  
(OR)
11. a) Distinguish between PROM, PLA and PAL in detail 6  
b) Design a combinational circuit using PLA. The circuit accepts 3-bit number and generates an output binary number equal to square of input number 6



# AR13

CODE: 13CS3011

**SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January-2019

## COMPILER DESIGN (Common to CSE & IT)

Time: 3 Hours

Max Marks: 70

### PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Define bootstrapping a compiler.  
b) Differentiate compiler and interpreter.  
c) Write the rules of LL(1) grammar.  
d) What is panic mode error recovery?  
e) Differentiate synthesized translation and inherited translation.  
f) What is type checker?  
g) Write the rules for leader statement of a three address statements.  
h) What is copy propagation?  
i) What is activation record?  
j) Differentiate between pass and phase.

### PART-B

Answer one question from each unit

[5x12=60M]

#### UNIT-I

2. a) Explain the different phases of a compiler, showing the output of each phase, for the statement "position = initial + rate \* 60" [8M]  
b) What is LEX? Explain in detail LEX source program. [4M]

(OR)

3. a) What is the need of separating Lexical analysis from Syntax analysis? Explain [6M]  
b) Explain the input buffering scheme for scanning the source program and describe how the use of sentinels can improve its performance. [6M]

#### UNIT-II

4. a) What is left recursion? Eliminate the left recursion of the grammar  
 $E \rightarrow E + T / T, T \rightarrow T * F / F, F \rightarrow ( E ) / id$  [6M]  
b) Test whether the grammar is LL (1) or not, and construct a predictive parsing table for following grammar.  $S \rightarrow iEtSS1 / a, S1 \rightarrow eS / \epsilon, E \rightarrow b$  [6M]

(OR)

5. a) Show that the following grammar is LR(1) but not SLR(1)  
 $S \rightarrow L=R, S \rightarrow R, L \rightarrow *R, L \rightarrow id, R \rightarrow L.$  [6M]  
b) Explain stack implementation of shift reduce parser. [6M]

### UNIT-III

6. a) Give the SDT scheme for Desk calculator which performs basic Arithmetic operations and evaluate the expression  $23*5+4$  using SDT scheme. [6M]
- b) What is a three address code? Generate quadruples, triples and indirect triples for the expression  $W = (A + B) - (C + D) + (A + B + C)$ . [6M]

(OR)

7. a) Describe the representation of scope information in the symbol table. [6M]  
Consider the following program structure and give its symbol table organization:

Program main

Var x, y : integer;

Procedure P

Var X, a : boolean;

Procedure Q

Var x, y, z : real;

- b) Discuss run-time storage administration for block structured languages. [6M]

### UNIT-IV

8. a) Construct Directed Acyclic Graph for the code:  $(a - b) + ((a - b) + c)$  [6M]
- b) Consider the following sequence of three address code: [6M]

(1) PROD:=0  
(2) I:=1  
(3) T1:=4 \* I  
(4) T2:=addr (A) - 4  
(5) T3:= T2[T1]  
(6) T4:= addr (B) - 4  
(7) T5:= T4[T1]  
(8) T6:= T3 \* T5  
(9) PROD:= PROD + T6  
(10) I:= I + 1  
(11) If I <= 20 goto (3)

Find the basic blocks and construct a flow graph.

(OR)

9. a) Discuss in detail machine independent code optimization. [8M]
- b) Discuss in detail peephole optimization. [4M]

### UNIT-V

10. a) Write an algorithm for simple code generation [6M]
- b) Generate the code for the expression  $d:=(a-b)+(a-c)+(a-c)$  using simple code generation algorithm. [6M]

(OR)

11. a) Discuss in detail machine dependent code optimization. [6M]
- b) Discuss in detail issues in the design of code generator. [6M]