

# AR13

CODE: 13CE3011

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

III B.TECH I SEM REGULAR EXAMINATIONS, NOVEMBER, 2015

## TRANSPORTATION ENGINEERING-I (CIVIL ENGINEERING)

Time: 3 Hours

Max Marks: 70

### PART-A

ANSWER ALL QUESTIONS

[1 X 10 = 10 M]

1. a) List out various types of engineering surveys.  
b) What are obligatory points?  
c) Write the relationship between SSD and ISD.  
d) When Grade compensation is provided for gradients?  
e) What is CRR and where it was located?  
f) List out the factors affecting Design speed?  
g) List out the Different types of Parking?  
h) Write Different types of Traffic Signals?  
i) What is meant by Cycle length?  
j) Write different types of Intersections?

### PART – B

Answer one question from each unit

[5x12=60M]

#### UNIT- 1

2. Explain briefly about 1<sup>st</sup>, 2<sup>nd</sup> & 3<sup>rd</sup> twenty year road development plans? 12M  
(OR)
3. Briefly discuss about the following organizations? 12M  
i) IRC ii) CRR iiii) NHAI iv) National Highway Act v) Motor Vehicle Act  
vi) CRF

#### UNIT- II

4. a) Explain about OSD calculation procedure for two way roads with neat sketch? 6M  
b) On a two lane highway car A & B are moving at a speed of 40 kmph and 80 kmph. Distance between A & C is 450 m. After initial hesitation period of 2 sec driver of A started overtaking operation. Distance between A & B at that time was 30 m. Acceleration of Vehicle A is  $1.20 \text{ m/Sec}^2$ . Distance between B & A is 25 m. Determine the distance between two cars A & C at the instance of completion of overtaking operation also calculate the desirable length of overtaking zone. 6M  
(OR)
5. a) A vehicle skids for a distance of 16 m before coming to stop on a road having a gradient of 4%. If the coefficient of friction developed between tyres and the surface of road is 0.4? Calculate the speed of vehicle? 6M  
b) On two lane National highway vehicle is negotiating a curve with radius 200 m at a design speed is 65 kmph of, Radius of circular curve is 200 m, the road is passing through a rolling terrain and the pavement is rotated about centre line to attain super elevation. Design transition curve? 6M

**UNIT-III**

6. a) Discuss about the ill effects of Parking? 6M  
b) Explain about the different types of parking surveys? 6M

(OR)

7. a) Explain the term Traffic Volume? What are the objectives of carrying out traffic Volume Studies? 6M  
b) Explain about the Different Types of Speed Studies Carried out For the Traffic Survey? 6M

**UNIT-IV**

8. What are the various types of traffic markings commonly used? Explain the use of each? 12M

(OR)

9. a) Explain the IRC Design Method procedure for traffic signals. 8M  
b) Differentiate between Webster's method and IRC methods of Signal Design? 4M

**UNIT-V**

10. Write a note about the grade separated structures. Draw neat sketches where ever necessary? 12M

(OR)

11. What are the various types Traffic islands used? Explain the use of each? 12M

**CODE: 13EE3015****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****III B.TECH I SEM REGULAR EXAMINATIONS, NOVEMBER, 2015****ELECTRICAL MACHINES – III  
(ELECTRICAL AND ELECTRONICS ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 X 10 = 10 M]**

1. (a) What is the nature of armature reaction of an alternator when it is operating at the zero power factor leading?  
(b) Define winding factor?  
(c) How synchronous impedance is calculated from O.C.C and S.C.C?  
(d) Define hunting?  
(e) What is synchronous condenser?  
(f) List the applications of synchronous motor?  
(g) Name the applications of AC series motor?  
(h) Why single phase induction motor do not have self starting?  
(i) What is infinite bus? state the characteristics of infinite bus?  
(j) List applications of single phase capacitor start and run induction motor?

**PART-B****Answer one question from each unit****[5 X 12 = 60 M]****UNIT-I**

2. (a) Derive EMF equation of an alternator [6M]  
(b) A 3- $\phi$  16 pole alternator has following data ,no. of slots 192, conductors Per slot 8, the coil span  $150^\circ$  electrical degrees. Determine the phase and line voltage if the machine runs at 375 rpm and flux/pole is 64mwb distributed sinusoidally over the poles? [6M]

**(OR)**

3. (a) Explain the phenomena of armature reaction when an alternator is delivering a load current at i)purely lagging power factor ii)unity power factor iii)purely leading power factor [6M]  
(b) A 50HZ, 3 phase star connected alternator which generates 10,000V between line in open circuit has flux/pole of  $15 \times 10^{-2}$  WB. If the distribution factor of the full pitch coil is 0.96. Find the number of armature conductors in series/phase. [6M]

**UNIT-II**

- 4.(a) Describe the slip test method for measurement of  $X_d$  and  $X_q$  of synchronous machine and draw phase diagram for lagging power factor loads of synchronous machine. [6M]  
(b) A salient pole synchronous generator has following P.U parameters  
 $X_d=1.2; X_q=0.8; R_a=0.025\Omega$ . Compute the excitation voltage  $E_f$  on P.U basis when it is delivering rated load. [6M]

**(OR)**

**CODE: 13EE3015**

5. (a) Explain what is meant by synchronizing of an alternator and also explain connecting an alternator with infinite bus. [6M]  
(b) A 2000KVA, 6000V, 3phase, 8pole alternator runs at 750rpm. Find the excitation voltage and load angle on full load 0.8 power factor lagging. The synchronous reactance is  $6\Omega/\text{phase}$ . [6M]

**UNIT-III**

- 6 (a) What are the effects of change in excitation and mechanical input when alternators operated in parallel. [6M]  
(b) Two single phase alternators operate in parallel and supply a load impedance of  $(3+j4)\Omega$ . If the impedance of the machines is  $(0.2+j2)\Omega$  and e.m.f.s are  $(220+j0)$  and  $(220+j0)$  volts respectively, determine for each machine (i) terminal voltage (ii) power factor and (iii) output [6M]

**(OR)**

7. (a) Explain the factors which effect to sharing of loading between two alternators operating in parallel. Deduce relevant expression. [6M]  
(b) Two identical 3 phase alternators work in parallel and supply a total load of 500 kW at 11kV. At a power factor of 0.867 lagging, each machine supplies half the total power. The synchronous reactance of each is  $5\Omega$  per phase and the resistance is  $0.4\Omega$  per phase. The field excitation of the first machine is so adjusted that its armature current is 50A lagging. Determine the armature current of the second alternator and the generated voltage of the first machine. [6M]

**UNIT-IV**

- 8 (a) Explain the effect of variable excitation on the behavior of the synchronous motor under constant load condition. [6M]  
(b) 3phase 3300V star connected synchronous motor has  $Z_s = (0.5 + j5)\Omega$  and taking an input power of 1500 kW, when the back emf is 4000V. Calculate the i) line current ii) power factor for the above condition. [6M]

**(OR)**

9. (a) Derive an expression for power developed in a 3phase synchronous motor. [6M]  
(b) A 75 kW 400V 4 pole 3phase star connected synchronous motor has a resistance and synchronous reactance per phase of  $0.04\Omega$  and  $0.4\Omega$  respectively. Compute for full load 0.8 power factor leading the open circuit emf /phase and gross mechanical power developed. Assume an efficiency of 92.5%. [6M]

**UNIT-V**

10. (a) Explain double field revolving theory & cross field revolving theory related 1 phase induction motor. [6M]  
(b) Why 1-phase induction motor not self starting? What do you have to do for self starting? [6M]

**(OR)**

11. (a) Explain about universal motor with neat sketch and list out its applications. [6M]  
(b) Explain about different starting methods of 1-phase induction motor. [6M]

**AR13****CODE: 13ME3014****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****III B.TECH I SEM REGULAR EXAMINATIONS, NOVEMBER, 2015****METAL CUTTING & MACHINE TOOLS  
(MECHANICAL ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 X 10 = 10 M]**

1. a) Write down at least two important assumption made by merchant to establish relationship between forces acting on the chip during metal cutting?
- b) What are major functions of cutting fluids?
- c) What are the parts of a carriage on Lathe?
- d) Bring out at least two differences between the capstan and turret lathe?
- e) What is meant by quick return ratio?
- f) What are the difference between up milling and down milling?.
- g) How do you specify the grinding wheel?
- h) What is meant by gear shaping?
- i) Write any two functional elements involved in machine control unit (MCU).
- j) How NC machines are classified based on control system?

**PART-B****Answer one question from each unit****[5 X 12=60M]****UNIT-I**

2. (a) Explain about principle cutting angles in single point cutting tool with neat sketch. [6M]
  - (b) Explain briefly about mechanisms of various chip formation in metal cutting. [6M]
- (OR)**
3. (a) Explain various factors influencing tool wear and tool life [6M]
  - (b) Write about HSS tool materials. [6M]

**UNIT-II**

4. Explain with neat sketches about taper turning methods on Lathe. [12M]
- (OR)**
5. Explain briefly about different types of lathe attachments. [12M]

**CODE: 13ME3014****UNIT-III**

- 6 (a) Sketch and explain the slotting machine working principle and its parts. [6M]  
(b) Illustrate and describe the working principle of planer with major parts. [6M]  
**(OR)**
- 7 (a) With the help of a neat sketch, discuss the working of a surface broaching machine. [6M]  
(b) How do you specify the drilling machine and discuss the various possible operations can be done by drilling machine. [6M]

**UNIT-IV**

- 8 (a) Explain centerless grinding process with a neat sketch. [6M]  
(b) How do you select a grinding wheel? Explain each factor briefly. [6M]  
**(OR)**
- 9 Explain briefly following processes with neat sketch: [12M]  
(i) Honing  
(ii) Lapping  
(iii) Super finishing  
(iv) Polishing  
(v) Buffing  
(vi) Gear hobbing

**UNIT-V**

- 10 Explain the working of NC system with the help of block diagram. [12M]  
**(OR)**
- 11 Discuss briefly about the following: [12M]  
(i) Slide ways  
(ii) Linear bearings  
(iii) Ball screws  
(iv) Spindle drives

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

**III B.TECH I SEM REGULAR EXAMINATIONS, NOVEMBER, 2015**

**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) State the advantage of ECL over other logic families.  
b) Define fan-in of a logic gate.  
c) How a decoder can be used as a demultiplexer?  
d) Differentiate between combinational and sequential logic circuits.  
e) Sketch the circuit of a full adder.  
f) What is a barrel shifter?  
g) Draw the circuit of D latch with NAND gates.  
h) List the advantages of synchronous counter over ripple counter.  
i) State the merits of FPGA device.  
j) Draw the circuit of 3-bit serial-in, parallel-out shift register.

**PART– B**

**Answer one question from each unit**

**[5 X 12 = 60 M]**

**UNIT- I**

2. a) Illustrate the functional behavior of 3-input CMOS NOR gate with the help of neat sketches. [6 M]  
(b) Discuss about the operation of Schottky TTL NAND gate. [6 M]

**(OR)**

3. a) Explain the operation of ECL inverter with neat diagrams. [6 M]  
b) Distinguish between various logic families with respect to fan-in, fan-out, noise margin, and power dissipation. [6 M]

**UNIT- II**

4. a) Explain the operation of 74 x 280 odd/even parity generator with neat diagrams. [6M]  
b) Write a behavioral VHDL program for a 9-input parity checker. [6 M]

**(OR)**

5. a) Draw the circuit of 74 x 148 priority encoder and describe its operation. [6 M]  
b) Write a VHDL program for a 2 x 4 decoder in data flow model. [6 M]

**UNIT- III**

6. (a) With the help of neat diagram, explain the operation of carry look ahead adder. [6M]  
(b) Write a VHDL program for 8 x 8 combinational multiplier. [6M]

**(OR)**

7. Explain the operation of 74 x 283 4-bit binary adder with the help of neat sketch. [12 M]

## UNIT- IV

8. a) Explain the operation of 4-bit synchronous binary counter with the help of timing diagram. [6 M]  
b) State the VHDL program for 74 x 163 4-bit binary counter. [6 M]

**(OR)**

9. a) Explain the operation of 4 bit parallel-in, serial-out shift register. [6 M]  
b) Illustrate the operation of 3-bit ring counter with the help of timing diagrams. [6 M]

## UNIT- V

10. a) Illustrate the operation of a full subtractor using PROM. [6 M]  
b) Realize  $F(A, B, C, D) = \sum m(0, 2, 5, 9, 11, 13, 15)$  using a PLA. [6 M]

**(OR)**

11. a) Implement the operation of 3 bit Binary to Gray code converter using PLA. [6 M]  
b) Draw the block diagram of CPLD and explain its operation. [6 M]



**CODE: 13CS3011**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)  
III B.TECH I SEM REGULAR EXAMINATIONS, NOVEMBER, 2015**

**COMPILER DESIGN  
(COMMON TO CSE & IT)**

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

1.
  - a) Differentiate phase and pass.
  - b) What do you mean by ambiguous grammar?
  - c) Infer the syntactic error recovery methods?
  - d) Perform left factoring for the following grammar.  
$$S \rightarrow iCtSeSl\ iCtS, C \rightarrow a$$
  - e) Define Abstract Syntax Tree?
  - f) What is buffering?
  - g) What is peephole optimization?
  - h) Construct DAG for the Expression  $a+a*(b-c)+(b-c)*d$ ?
  - i) What do you mean by constant propagation?
  - j) What do you mean by loop un-rolling?

**PART-B****Answer one question from each unit****[12 X 5 = 60 M]****UNIT-I**

2. a) Explain about bootstrapping with an example? 4M  
  
b. Are phases required for converting source program to machine level language? Justify your answer by considering input string position=initial+ rate\*60. 8M

(OR)

3. Write briefly about LEX tool and elaborate more on programming with LEX by giving a small example on it. 12M

**UNIT-II**

4. Consider the following grammar and construct an LL (1) parsing table for it. 12M

$$S \rightarrow aBDh, B \rightarrow cC, C \rightarrow bC/\epsilon, D \rightarrow EF, E \rightarrow g/\epsilon, F \rightarrow f/\epsilon$$

(OR)

5. Describe Backtracking and explain with an example why backtracking parsers are not being used currently? 12M

**UNIT-III**

6. What is syntax tree? Write syntax-directed definition for constructing a syntax tree for an expression. The grammar for an expression is given below. 12M

$$E \rightarrow E+T \mid E-T \mid T$$

$$T \rightarrow (E) \mid \text{id} \mid \text{num}$$

(OR)

7. Describe Run-time storage administration and explain memory organization for C program? 12M

**UNIT-IV**

8. a) Write the benefits of Intermediate Code Generation 6M

b) Construct a DAG for  $a+a*(b-c)+(b-c)*d$  6M

(OR)

9. Briefly describe about the following

a) Common sub-expression elimination 4M

b) Copy propagation 4M

c) Dead code Elimination 4M

**UNIT-V**

10. Explain the various properties desired by an object code generation? 12M

(OR)

11. Explain about Machine dependent code optimization/ peep hole optimization 12M