

(19)

TE sem-VI - Electrical - CBSG - EM-III

20/1/17

QP CODE : 25664

(3 Hours)

Marks : 80

N.B. :

- 1: Q No 1 is compulsory;
- 2: Attempt any three from the remaining questions.
- 3: Figure to the right indicate full marks
- 4: Assume any suitable data if necessary & justify,
- 5: Answer to the questions should be grouped and written together

- Q1,** a: Explain hunting of synchronous machine. What is the purpose of damper winding in synchronous machine? 20
- b. Compare salient pole and non salient pole synchronous machine.
- c. State advantages and disadvantages of short pitch winding, distributed winding in alternator and derive an expression for distribution factor.
- d. Describe the difference in construction of rotors of alternators used in hydroelectric plants and steam plants
- Q2,** a: Explain steady state analysis of synchronous machine. 08
- b: Explain how armature reaction influences the field distribution of alternator for lagging & leading load power factor . 06
- c: Explain the method of finding regulation of alternator by synchronous impedance method. 06
- Q3,** a: A three phase synchronous generator has per phase direct axis synch. Reactance of 1.0 pu and quadrature axis synchronous reactance of 0.65 pu .Draw the phasor diagram of the machine when operating at full load of 0.8 pf lagging and estimate (a) Load angle (b) pu no load emf, neglect armature resistance 08
- b. Explain V and inverted V curve of synchronous motor. 06
- c: What do you mean by synchronizing of alternator? Describe any one method of synchronizing 06

[TURN OVER

QP CODE : 25664

2

- Q4, a: Derive the expression for armature to field mutual inductance and armature self inductance of salient pole synchronous machine. 08
- b: Calculate the speed and no load induced emf of a 4 pole 3 phase 50 Hz star connected alternator with 36 slot and 30 conductor per slot .the flux per pole is 0.05 wb sinusoidal distributed 06
- c: Explain slip test to measure x_d and x_q of salient pole synchronous machine 06
- Q5, a: Derive the commonly used expression for the power developed by salient pole synch. Motor 08
- b: The synch. reactance per phase of a three phase 6000 v star connected synch motor is 20Ω for a certain load the input power is 900 kw at normal voltage and induced line emf is 8500 volt determine the line current and pf of motor. 06
- c. Explain starting methods of synchronous motor 06
- Q6. Write Notes on (any two) 20
- (a) Effect of varying excitation on alternator connected to infinite bus bar
- (b) Power angle characteristics of alternator
- (c) Synchronizing power and synchronizing torque of synchronous machine

EE / VEE / VI

04/12/17

04

Q. P. Code : 27352

Duration – 3 Hours

Total Marks - 80

- N.B.:-** (1) Question No.1 is compulsory.
 (2) **Attempt** any **three** questions out of remaining **five** questions.
 (3) Assume suitable data if necessary and justify the same.

- | | | |
|--------|---|----|
| Q 1. | Answer the following questions. | 20 |
| | A) What are the various welding techniques? | |
| | B) Explain the effect of weight transfer in traction. | |
| | C) Draw and explain the electric circuit of domestic refrigerator. | |
| | D) What are the different configurations of Hybrid Electric Vehicle? | |
| Q 2 a) | Write a detailed note on photometers. | 10 |
| Q 2 b) | What do you mean by quadrilateral speed time curve. Explain. | 10 |
| Q 3 a) | Design the interior illumination required for a workshop with example. | 10 |
| Q 3 b) | Why it is required to study the heating methods used? | 10 |
| Q 4 a) | What are the different types of track electrification? | 10 |
| Q 4 b) | Draw and explain speed control methods for traction purpose | 10 |
| Q 5 a) | Write a short note on specific energy consumption of traction. | 10 |
| Q 5 b) | Explain and Compare the types of motors used for traction in EV/HEV | 10 |
| Q 6 a) | What are the factors which are affecting the scheduled speed of train? | 10 |
| Q 6 b) | Explain and the working principle of arc furnace with emphasis on power supply requirements for the same. | 10 |

98

Q.P. Code :27290

[Time: Three Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Question.No.1 is compulsory.
 2. Attempt any three questions from the rest.
 3. Assume suitable data wherever necessary.
 4. Use graph paper and semi log paper wherever required.

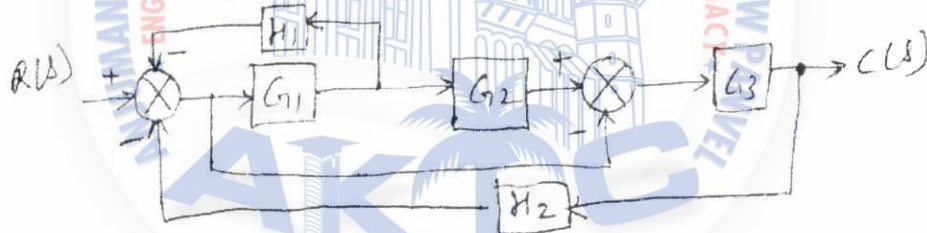
Q. 1 Answer any four. (20)

- a) Explain with suitable diagram, the different elements of a closed loop control system.
- b) Explain what you mean by type of the system and its relation with steady state error.
- c) Explain Routh Hurwitz criteria of stability.
- d) What is Nyquist stability criteria?
- e) Explain the phase variable form of state-space modelling.

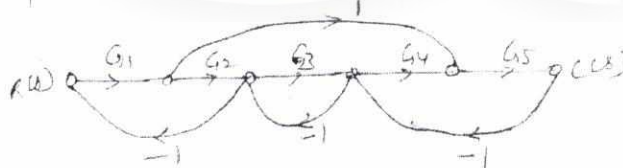
Q. 2 a) Obtain the transfer function of the following network.



b) Find the closed loop transfer function $T(s) = c(s) / R(s)$ for the system shown using block diagram reduction technique.



Q. 3 a) Using Messon's Rule find the transfer function $T(s) = C(s) / R(s)$ for the system. (10)



b) Given the unity feedback system with (10)

$$G(s) = \frac{K}{s(s+a)}$$

Find the following

- i) K and a to have $K_v = 1000$ and 20% overshoot.
- ii) K and a to have a 1% error in the steady state and a 10% overshoot.

Q.P. Code :27290

- Q. 4 a) Using Hurwitz stability criteria, find the value of gain K to ensure stability in the unity feedback system with open loop transfer function (10)
- $$G(s) = \frac{K(s+2)}{(s^2+1)(s+4)(s-1)}$$
- b) Given the unity feedback system with open loop transfer function $G(s) = \frac{K}{(s+2)(s+4)(s+6)}$ sketch the root locus. (10)
- Q. 5 a) Given the following response function, determine whether the pole-zero cancellation is possible. If it is then find the percent overshoot, settling time rise time and peak time. (10)
- $$C(s) = \frac{s+2.1}{s(s+2)(s^2+s+5)}$$
- b) Plot the Bode magnitude and phase plot and obtain the phase margin and gain margin (10)
- $$G(s) = \frac{(s+5)}{(s+2)(s+4)}$$

- Q. 6 a) Given the transfer function (10)
- $$G(s) = \frac{2}{s^3+4s^2+9s+10}$$
- obtain the phase variable form of state space representation.
- b) Given the state model of a system. Find the transfer function. (10)

$$X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -5 & -6 & -9 \end{bmatrix} X + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} U$$

$$Y = [1 \ 0 \ 0] X$$

State whether the system is controllable.



6

Q.P. Code :27296

[Time: 3 Hours]

[Marks:80]

Please check whether you have got the right question paper.

N.B:1. Question No. 1 is compulsory. Attempt any three questions from the rest..

2. Figure to the right indicates marks

3. Make suitable assumption wherever applicable

4. Write neat and clean in a legible handwriting.

- Q.1 Answer any four questions 20
- Differentiate microprocessor and microcontroller in terms of specification, architecture operations, cost and use.
 - Explain the different data bus and address bus of PIC 18 microcontroller.
 - Explain what is file select register. What is the significance of the size of file select register?
 - What is an interrupt process and what is interrupt service routine.
 - What are different data transfer scheme.
- Q.2
- Draw the programming model of PIC 18 and explain different register of ALU and register unit. 10
 - Explain all move and load instruction of PIC 18 microcontroller. 10
- Q.3
- What is an assembler and assembler directives? Explain any six assembler directives. 10
 - Write instructions to add ten eight bit numbers stored in consecutive memory location in data memory and save the result in 11th and 12th locations. 10
- Q.4
- Explain the basic concept of input output interfacing in PIC18 microcontroller. 10
 - Explain the RCON, INTCON and PIR register of PIC 18 microcontroller. 10
- Q.5
- Explain what is prescaler. 05
 - What is T0CON register? 05
 - Write a program to set up timer 0 in 16 bit mode to generate 1 sec delay. 10
- Q.6 Write short note on any two 20
- Serial communication unit PIC 18 that is USART.
 - Seven segment LED interfacing with PIC 18 microcontroller.
 - DC motor control using PIC 18.
