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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Industrial and Production engineering

Semester End Examination; Dec. - 2019

Control Engineering and Machine Tool Technology

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. Explain with block diagram open loop and closed loop control system. Also mention their differences. 8

b. With the help of a block diagram, explain an automobile driving system. 12

2 a. What are the requirements from a control system? Explain. 10

b. Obtain the transfer function for the electrical system shown in Fig. 2(b). 10

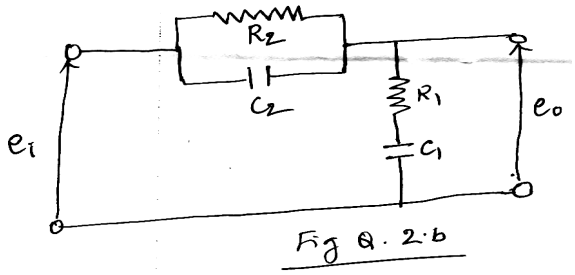

Fig Q. 2.b

UNIT - II

3 a. Explain the following input in control system: 12

i) Step input ii) Ramp input iii) Sinusoidal input

b. Find the response, initial value and final value for the following functions: 8

$$i)\ F(S)=\frac{S(S+10)}{(S+2)(S+4)(S+6)} \qquad ii)\ F(S)=\frac{12(S+1)}{S(S+2)^2(S+3)}$$

4 a. Explain Type-0, Type-1 and Type-2 system for ramp input of magnitude 'A'. 12

b. Determine the error coefficient and static errors for units and non units feedback system; 8

$$G(S)=\frac{1}{S(S+1)(S+10)},\ H(S)=(S+2)$$

UNIT - III

5a. Reduce the block diagram into simple form and calculate the closed loop transfer function for the block diagram shown in Fig. Q.5a. 14

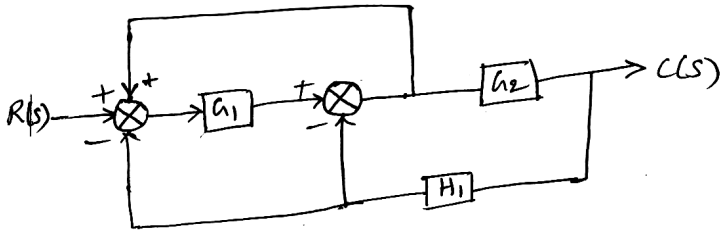

Fig Q.5a

Contd…2

b. Illustrate with block diagram the method of transferring take off point ahead of summing point and behind the summing point. 6

6 a. Explain Mason's gain formula. 6

b. Draw the signal flow graph for the block diagram shown in Fig. Q.5a and find the closed loop transfer function using Mason's Gain formula. 14

UNIT - IV

7 a. Explain the characteristic of machine tools. 8

b. Briefly explain the classification of machine tool. 12

8 a. Design the machine tool bed based on rigidity and dynamic characteristics. 10

b. With the help of sketches, explain difference types of slide ways used in machine tools state their application. 10

UNIT - V

9. An eight speed gear box is to be designed for transmissing 7 kW power minimum speed is 100 rpm speed are to be arranged in geometric progression with a progression ratio 1.25. Motor shaft runs at 1000 rpm and input to the first shaft of the gear box may be taken as 500 rpm.

i) Calculate the values of all speeds 20

ii) Draw the speed diagram

iii) Sketch the layout of gear box showing the number of teeth on each gear

iv) Module calculation between shaft I and II

10 a. Explian Ruppert drive . 10

b. Explian with a neat sketch a PIV drive. 10

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