25/11/2024 EXTC SEM-III C SCHEME EICS QP CODE: 10068446

Duration: 3 Hours **[Max Marks:80]**

N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt **any FOUR** **[20]**

a Compare resolution and linearity of instruments with suitable examples. **[5]**

b Explain the working principle of Meggar. **[5]**

c Define gain cross over frequency, phase cross over frequency, gain margin and phase margin **[5]**

d Explain the methodology of measurement of low resistance by Kelvin Double Bridge **[5]**

e Explain how stability analysis of the system can be analyzed using Nyquist Criterion **[5]**

2 a Derive the expression for sensitivity of a Wheatstone bridge and mention its significance. **[10]**

b Derive an expression for inductance measurement using Hay bridge. **[10]**

3 a Explain the working principle of strain gauge with mathematical derivations. **[10]**

b Explain Wheatstone bridge and its application in medium resistance measurement. **[10]**

4 a Sketch the root locus for the system with an open-loop transfer function given by **[10]**

$G(S) = \frac{K}{S(S+1)(S+3)}$, $H(S) = 1$

b Sketch the Bode diagram for the following transfer function and obtain Gain margin and Phase margin. **[10]**

$G(S) = \frac{0.75\,(1+0.2\,S)}{S(1+0.5S)\,(1+0.1S)}$

5 a Sketch the root locus for the system with an open-loop transfer function given by **[10]**

$G(S) = \frac{K}{S\,(S^2+8S+32)}$, $H(S) = 1$

b For a certain control system **[10]**

$$G(S) = \frac{50}{(S+1)(S+2)}$$

Sketch the Nyquist Plot and investigate stability of closed loop system

6 Attempt **any FOUR**

a Define the terms a) accuracy b) precision c) sensitivity and d) Linearity **[5]**

b Write a short note on lag and lead compensator. **[5]**

c Write a short note on Maxwell Bridge **[5]**

d Explain Magnitude and Angle criterion for Root locus **[5]**

e Explain how stability analysis is done using Bode plot **[5]**
