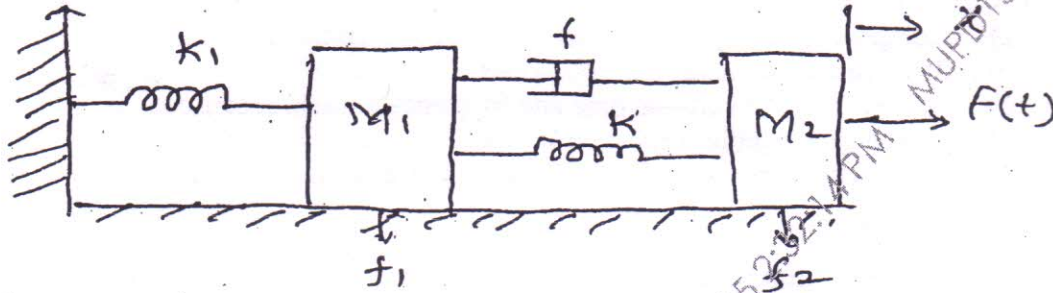
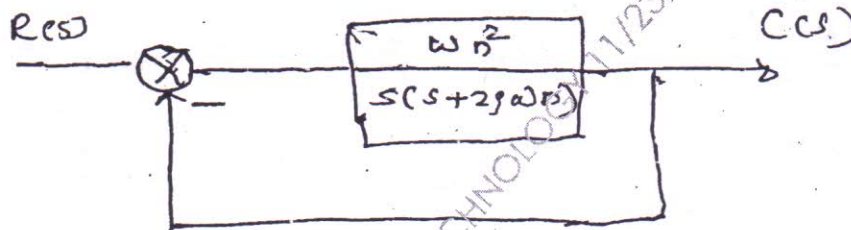




4. a) Given  $G(s)H(s) = \frac{K}{s(Ts+1)}$  Test the given system for absolute stability using Nyquist plot. 10
- b) Obtain the transfer function of a Mechanical system shown below. 10



5. a) For the following system 10



Where  $\zeta = 0.6$  and  $\omega_n = 5$  rad/sec obtain (i) Rise time (ii) Peak time (iii) Maximum overshoot (iv) Settling Time. where the system is subjected to unit step input.

- b) Sketch the polar plot for a unity feed back closed loop system 10

$$G(s) = \frac{1}{s(s+1)^2}$$

6. a) Obtain the static error coefficients for type 0, 1 & 2 systems if the input to the each system is step, ramp and parabolic. 10
- b) Determine the stability of the system having the characteristic equation. 10
- i)  $s^5 + 6s^4 + 15s^3 + 30s^2 + 44s + 24 = 0$
- ii)  $s^5 + 3s^4 + 10s^2 + s + 8 = 0$



Duration: 03 Hours.

Instructions to the candidates if any:-

1. Question No. 1 is compulsory.
2. Answer any Three out of remaining questions.
3. Assumptions made should be clearly stated.

	Marks
Q.1 Solve any Four	20
a) What is Back emf? Explain significance of back emf?	
b) Explain power flow diagram for an Induction Motor	
c) Differentiate between D C Motor and Single phase induction motor.	
d) What are the sources of error in case of wheatstone bridge?	
e) What is power factor? Explain basic Voltmeter and Ammeter	
Q.2 a) A 400 volts shunt motor develops an output of 18.5 kw when taking 22.5 kw	10
Field resistance is $200 \Omega$ and armature resistance is $0.4 \Omega$ . What is the efficiency and power input when output is 9 kw.	
b) Explain speed control methods of DC motor	10
Q.3 a) Explain losses those takes place in Induction motor	10
b) Explain torque slip characteristics of 3 phase induction motor	10
Q.4 a) What is Q factor? Explain its measurement in detail	10
b) Explain the construction and working of PMMC instrument?	10
Q.5 a) Explain the operation of shunt and series type ohm meters	10
b) Explain Capacitance Comparison Bridge and derive its bridge balance equation	10
Q.6 a) Explain difficulties in measurement of high resistance? Explain use of guard circuits	10
b) Draw and explain block diagram of DMM	10

Q.P. Code : 5446

(3 Hours)

[ Total Marks :80

- N.B. : (1) Question No. 1 is compulsory.  
(2) Attempt any three questions out of remaining five questions.  
(3) Make suitable assumptions wherever necessary and mention the same.

1. Attempt any four questions:- 20
  - (a) Explain in brief:-
    - (i) Signal to noise ratio
    - (ii) Noise figure
  - (b) Discuss general telemetry system.
  - (c) With neat block diagram explain the operation of Basic communication system.
  - (d) Compare TDM and FDM.
  - (e) Derive Friss formula.
2. (a) Define AM and explain High Level Collector Modulator along with circuit diagram and waveform. 10  
(b) The antenna current of an AM broadcast transmitter modulated to a depth 40% by an audio sine wave is 11A. It increases to 12A as a result of simultaneous modulation by another audio sine wave. What is modulation index due to second wave. 10
3. (a) Explain any one method of F.M. generation. 10  
(b) In FM broadcasting, What should be the maximum frequency deviation? Who has laid down this constraint? How bandwidth requirement of FM wave are calculated? Explain carson's rule. 10
4. (a) What is pulse amplitude modulation? Explain modulation and demodulation process. 10  
(b) Explain, why it is essential to use radio frequency (RF) telemetry. Describe it with some relevant example. 10
5. (a) Explain in brief:- 10
  - (i) Amplitude shift keying (ASK)
  - (ii) Frequency shift keying (FSK)  
(b) Explain with a neat block diagram Delta modulation transmitter and receiver system. 10

TURN OVER

Q.P. Code : 5446

2

6. Write short notes on **any four**:-
- (a) PCM transmitter system,
  - (b) OSI reference model,
  - (c) Modes of communication.
  - (d) Practical diode detector,
  - (e) Superheterodyne receiver.
- 

20



QP Code : 5488

(3 Hours)

[ Total Marks :80

- N.B. : (1) Question no. 1 is compulsory.  
(2) Answer any three out of remaining five questions.  
(3) Assume suitable data if needed.

1. Attempt any four:- 20
  - (a) What is 'ORP'? Why it is required to measure?
  - (b) Explain 'Vena contracta' with pressure diagram.
  - (c) Derive Bernoulli's equation.
  - (d) Explain types of strain gauges.
2. (a) Classify flow transducers. Explain with diagram variable Area type flow meter. 10  
(b) Explain working of 'McLeod Gauge' 10
3. (a) Compare venturi meter and orifice meter. 10  
(b) A strain gauge is bonded to a beam 0.1 m long and has a cross sectional area of 4 cm<sup>2</sup>. Young's modulus for steel is 207 GPa. The strain gauge has an unstrained resistance of 240  $\Omega$  and gauge factor of 2.2 when a load is applied, the resistance of gauges changes by 0.013  $\Omega$ . Calculate the change in length of the steel beam and an amount of force applied to the beam. 10
4. (a) Explain with neat diagram pressure measurement scheme using primary and secondary transducer 10  
(b) Explain conductivity measurement scheme using suitable diagram. Also explain details about electrodes. 10
5. (a) List the different flow measurement systems. Explain with diagram Ultrasonic flow measurement system. 10  
(b) Classify pressure transducers. Draw neat sketches of pressure sensing elastic elements. Explain with diagram different types of manometers. Also give their mathematical expressions. 10
6. Write a short notes on (any two):- 20
  - (a) Dead weight Tester
  - (b) Bulk modulus
  - (c) Force measurement