Code No.: 10211/20211

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Maisammaguda, Dhulapally,(Post Via Kompally), Secunderabad-500 100.

III B.Tech I SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018
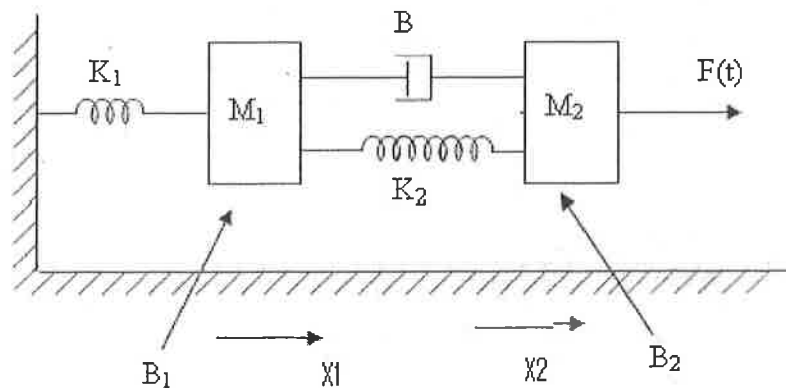SUBJECT: **Control Systems**

Branch: **EEE**

Time: **3 Hours**   Max. Marks: **75 Marks**

Answer any 5 questions   5×15M = 75M

1. A) What is closed loop control systems and describe its feedback characteristics.   [7M]

   B) Obtain the transfer function $\frac{X_1(s)}{F(s)}$ for the following mechanical system   [8M]

2. A) Explain the operation of synchros in detail.   [8M]

   B) Discuss the various rules of Block diagram algebra.   [7M]

3. A) The open loop transfer function of a unity feedback system is
$$G(s) = \frac{4}{s(s+1)}$$

   Determine the rise time, peak time, delay time, peak overshoot and settling time when
   excited the system with unit step input.   [8M]

   B) Describe the various error constants in control systems.   [7M]

4. A) Examine the stability of the system described by the following characteristic equation using
   Routh-Hurwitz criteria.   [7M]
$$D(s) = s^4 + 2s^3 + s^2 + 4s + 2 = 0$$

   B) Enumerate the procedure to sketch the Root-locus   [8M]

5. Draw the Bode plot for the system whose transfer function is

$$G(s) = \frac{2000(s+1)}{s(s+10)(s+40)}$$

Also Find the gain margin and phase margin of the system and comment on system stability.

[15M]

6. A) Explain the various stability conditions using polar plot. [7M]
   B) Discuss the Nyquist stability criterion in detail. [8M]

7. A) Define the Lead and Lag compensators. Also derive its transfer functions and sketch the pole-zero plots. [10M]
   B) What is the necessity of PI controller in electrical systems and write its properties. [5M]

8. A) Derive the relation between transfer function and state space model. [7M]
   B) Obtain the state model of the system described by [8M]
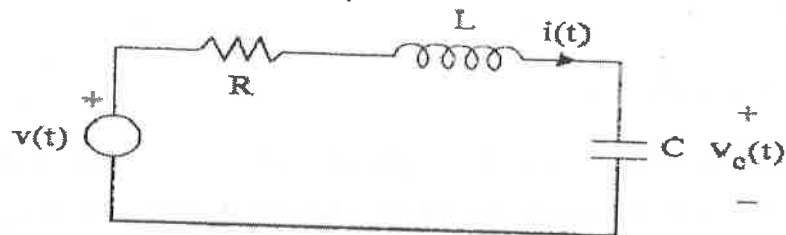
MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: Integrated Circuits And Applications

Branch: EEE

Time: 3 hours   **Max. Marks: 75**

Answer any **FIVE** Questions of the following   **5x15M=75M**

1. a) Draw with neat Pin diagram & Block diagram of 741 IC & explain each Block separately.   [8]

   b) Mention the AC characteristics of OP-amp.   [4]

   c) An OP amp inverting Amplifier with R_1 = 100K & R_f = 10K, V_{ios} = 6mv, Ib = 500nA. Calculate

       i) maximum O/P offset voltage caused by the Input offset voltage V_{ios}.

       ii) maximum O/P offset voltage caused by the input bias current Ib.   [3]

2. a) Draw and explain the ideal differentiator circuit using an OP-AMP. Mention its drawbacks and how

       these can be eliminated by using a practical differentiator.   [8]

   b) Explain the operation of astable multi-vibrator using op-amp.   [7]

3. a) Design and explain Notch filter?

   b) Explain Quadrature oscillator?

4. a) Explain the Basic 555 timer circuit with internal architecture.

   b) Explain 565 IC with neat sketches

5. a) Sketch the circuit of a R-2R DAC and explain its operation. Explain how the R-2R DAC performance improves on that of the weighted-resistor DAC   7M

   b) Explain about counter type ADC.   8M

6. a) Explain the TTL open collector o/p's?

   b) Explain how the TTL driving CMOS?

7. a) Design a bit gray code the Binary code converter

   b) Design Digital 4 bit comparator with TTL IC's?

8. a) Design an asynchronous counter?

   b) Design a 3 bit a synchronous counter using T flip flop?

   c) Explain the difference between synchronous and asynchronous counters?