

Reg. No. : .....

Name : .....

**Seventh Semester B.Tech. Engineering Degree (Regular Including Part Time)  
Examination, December 2010  
PT2K6/2K6 EE 701 : INDUSTRIAL MANAGEMENT**

Time : 3 Hours

Max. Marks : 100

Group I. Answer all :

(8×5=40)

- 1) Comment on Mayo's Hawthorne experiments.
- 2) How to select a management approach for a newly started software industry ?
- 3) Suggest a suitable structure for a process industry and justify.
- 4) Define boundaryless organization and mention its disadvantages.
- 5) What are all the objectives of plant location and provide the necessary steps ?
- 6) Enumerate the importance of PERT.
- 7) Mention the methods for time study with an example.
- 8) Classify evaluation methods and give examples.

Group II. Answer all :

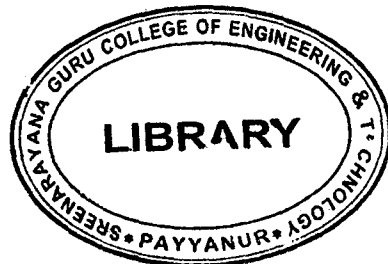
(4×15=60)

- 9) a) Explicate Douglas McGregor's theory with an example and discuss its merits and demerits.

OR

- b) Explain about two factor theory of motivation and comment on this concept with suitable example.

P.T.O.





- 10) a) Discuss virtual organization and cellular organization with examples.

OR

- b) Explain the importance of TQM in a construction company and mention about quality circles.
- 11) a) Suggest a suitable method to evaluate a newly recruited management trainee and suggest some techniques of project management.

OR

- b) Explain the programme evaluation review techniques and brief how it can be useful for improving the performance of the employer.
- 12) a) Describe the methods of work measurement and explain it with an example from process industry.

OR

- b) Explain in detail about different methods of merit rating with examples.

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**VII Semester B.Tech. Engineering Degree (Regular Including Part-Time)  
Examination, December 2010**

**PT2K6 / 2K6 EE 702 : DIGITAL SIGNAL PROCESSING**

Time: 3 Hours

Max. Marks: 100

***Instruction : Answer all questions.***

1. a) With suitable examples, illustrate the different types of operations performed on discrete-time signals.
- b) A discrete time system is represented by the input-output formula :  
 $y(n) = n x(n)$ , where  $x(n)$  is the input and  $y(n)$  the output. Determine whether the system is
  - i) Linear
  - ii) Time variant.
- c) Determine the z-transform for the analog input signal  $x(t) = e^{-at}$  applied to a digital filter.
- d) Find the IDFT of  $x(k) = \{1, 2, 3, 4\}$ .
- e) Explain the fixed-point and floating-point representation of binary numbers.
- f) What is truncation ? Discuss the error that arises due to truncation in floating point numbers.
- g) What is meant by prewarping ? Why it is employed ?
- h) What is window ? List the desirable characteristics of the window. **(8×5=40)**

P.T.O.



2. a) Find the total response of the system described by the difference equation :

$$y(n) + 2y(n-1) + y(n-2) = x(n) + x(n-1), \text{ when the input is}$$

$$x(n) = \left(\frac{1}{2}\right)^n u(n) \text{ with the initial conditions } y(-1) = y(-2) = 1. \quad 15$$

OR

- b) Determine the impulse response,  $h(n)$  for the system described by the difference equation :

$$y(n) + y(n-1) - 2y(n-2) = x(n-1) + 2x(n-2) \quad 9$$

- c) Define and explain the following terms, with suitable examples as applied to a discrete-time system :

i) Static system

ii) Dynamic system and

iii) Stable system. 6

3. a) Determine the frequency response, magnitude response and phase response for the system given by :

$$y(n) - y(n-1) + \frac{3}{16}y(n-2) = x(n) - \frac{1}{2}x(n-1) \quad 10$$

- b) Find the inverse z-transform of the following  $X(z)$  for the region of convergence  $|z| > 3$

$$X(z) = \frac{z+2}{2z^2 - 7z + 3} \quad 5$$

OR

- c) Find the output  $y(n)$  of a filter whose impulse response is  $h(n) = \{2, 2, 1\}$  and the input signal to the filter is  $x(n) = \{3, 0, -2, 0, 2, 1, 0, -2, -1, 0\}$  using overlap-add method. 10
- d) State and prove the complex conjugation property of DFT. 5



4. a) Find the DFT of the following sequence  $x(n)$ , using radix 2, DIT - FFT algorithm  
 $x[n] = [1, 2, 3, 4, 4, 3, 2, 1]$  10
- b) Prove that FFT algorithms help in reducing the number of computations involved in DFT computation. 5
- OR
- c) Obtain the cascade and parallel form realization structures for the following system : 10
- $$y(n) + y(n-1) + 4y(n-2) - 2y(n-3) = x(n) - 2x(n-2)$$
- d) With neat schematics, explain the architecture of fixed point DSP core in detail. 5
5. a) Using bilinear transformation, design a highpass filter, monotonic in passband with cutoff frequency of 1000 Hz and down 10 dB at 350 Hz. The sampling frequency is 5000 Hz. 15
- OR
- b) Discuss about the effects of finite word length in the implementation of IIR filters in DSP. 15
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## VII Semester B.Tech. Engineering Degree (Regular Including Part Time)

Examination, December 2010

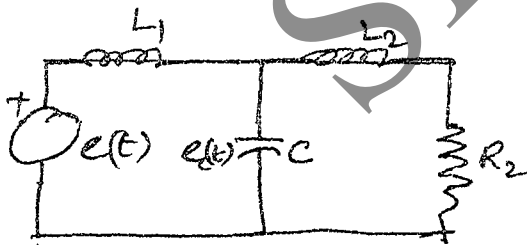
## PT 2K6/2K6 EE 703 : CONTROL SYSTEMS – II

Time : 3 Hours

Max. Marks : 100

- I. a) What are the advantages of state space representation over transfer function approach ? (8×5=40)
- b) Find the state transition matrix for a system which has  $A = \begin{bmatrix} 0 & 1 \\ -20 & -9 \end{bmatrix}$ .
- c) A control system's open loop transfer function is  $G(s) = \frac{700}{s(s+34.5)}$ . If a derivative control with  $\tau_d = 0.01$  sec. is introduced, what is the new value of damping ratio and overshoot ?
- d) How lead, lag networks are achieved using RC networks ?
- e) Explain about limit cycle in a nonlinear system.
- f) Explain how singular points are classified.
- g) Explain about the sign definiteness of a function.
- h) Check the controllability of the following system  $\dot{x} = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} r(t)$ .

- II. a) Write the state equations of the following system. 15



OR

- b) Find the state space representation of the system which has the differential equation in the following form, 15

$$\frac{d^2c(t)}{dt^2} + 6 \frac{dc(t)}{dt} + 5c(t) = r(t) + 2 \cdot \frac{dr(t)}{dt}$$

P.T.O.



- III. a) Design a series compensator for the following plant  $G(s) = \frac{1}{s(s+1)(s+4)(s+6)}$  such that  $\delta = 0.5$  and  $\omega_n = 2$  for the two dominant poles. **15**

OR

- b) Explain the procedure for designing PID control for the given frequency response specifications. **15**
- IV. a) Explain about the isocline method of phase plane analysis. **15**

OR

- b) Derive the describing function for the non-linearity dead zone. **15**
- V. a) Describe the Liapunov stability analysis for LTI continuous time systems. **15**

OR

- b) A regulator system has the plant **15**

$$\dot{X} = \begin{bmatrix} 0 & 1 \\ 20.6 & 0 \end{bmatrix} X + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

Design a control law  $u = -kx$  so that the closed loop system has eigenvalues at  $-1.8 \pm j 2.4$ .

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**Seventh Semester B.Tech. Engg. Degree (Regular Including Part Time)  
Examination, December 2010  
PT 2K6/2K6 EE 704 : POWER SYSTEMS – III**

Time : 3 Hours

Max. Marks : 100

**PART – A**

Answer all questions :

(8×5=40)

1. a) What is a circuit breaker ? Discuss the arc phenomenon in a circuit breaker.
- b) Explain the term “Basic Impulse Level (BIL)”. Give its value for 132 and 400 kV effectively grounded system. Explain its significance.
- c) Define the following terms as applied to protective relaying :
  - i) Pick up value
  - ii) Current setting
  - iii) Plug Setting Multiplier.
- d) Discuss some of the important faults on an alternator.
- e) Write short notes on various mechanical considerations to be considered in selection of motor for a particular application.
- f) Draw the speed time curve for a main line and sub urban service and hence discuss various regions associated with it.
- g) Draw the model of a Thyristor Controlled Series Capacitor (TCSC) and hence explain its operation.
- h) What do you understand by harmonics ? How are they introduced into a power system network ? How they can be filtered ?

P.T.O.



## PART – B

(4×15=60)

suitability of SF6 as an arc quenching medium. Why is it called an electro negative gas ? How contact movement is done in a SF6 circuit breaker ? Explain the same with a suitable diagram.

OR

- b) With a neat schematic, explain the working principles of an oil circuit breaker.
3. a) Briefly discuss Differential Protection and Fault bus protection schemes as applied to busbar protection.

OR

- b) Write short notes on Microprocessor based protective relaying. With a generalized block diagram explain the same.
4. a) Write short notes on the following :
- General features and selection of traction motors
  - Suitability of DC series motor for traction services
  - AC series motor.

OR

- b) A motor working in a Steel Rolling Mill has to exert power starting from zero to 80 kW in 5 minutes after which it works on a constant load of 50 kW for 10 minutes and then runs on no load for a period of 5 minutes. The cycle again starts and is repeated indefinitely. Estimate a suitable size of the motor of S1 type.
5. a) Draw the one line diagram of a typical static var compensator SVC. Plot its voltage current characteristics and hence explain its operation.

OR

- b) Briefly discuss the sources, causes and effects of power quality problems.
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**VII Semester B.Tech. Engineering Degree (Regular Including Part Time)  
Examination, December 2010  
PT2K6/2K6 EE 705 (D) : BIOMEDICAL ENGINEERING**

Time: 3 Hours

Max. Marks: 100

**PART – A**

1. a) Discuss about the human EEG patterns for different stages of sleep. (8×5=40)
- b) Describe about the unipolar limb lead system used for measuring ECG signal.
- c) What is sphygmomanometer ? When can you hear Korotkoff sounds ?
- d) What is the principle of indicator dilution method ?
- e) Give the principle of measurement of gas flow rate.
- f) What are the other electric stimulators that stimulate heart's function ?
- g) Brief the need for isolation circuit in recording setup.
- h) Give the construction and working of pH electrode.

**PART – B**

1. a) Draw the equivalent circuit of a bipotential electrode interface. Discuss in detail about various types of biopotential electrodes. **15**

**OR**

- b) With a neat circuit diagram explain the working of instrumentation amplifier and differential amplifier. **15**

**P.T.O.**



2. a) i) List the classification of heart sounds on the basics of origin. 5  
ii) What is cardiac output ? How it can be measured using indicator dye dilution technique ? 10
- OR
- b) i) Explain about spirometer in detail. 8  
ii) Brief the principle of electromagnetic blood flow meter. 7
3. a) What are internal and external pacemakers ? Draw and explain them with a block diagram. 15
- OR
- b) Explain with a diagram (i) lithiotripsy and (ii) infant incubators. 15
4. a) Explain briefly about the micro and macro shock hazards. 15
- OR
- b) Explain the method of measurement of  $p\text{CO}_2$  and  $p\text{O}_2$ . 15
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