

G 1484

(Pages : 2)

Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

EE 010 606 L06—RENEWABLE ENERGY RESOURCES (Elective I) (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Mention advantages and limitations of renewable energy sources.
2. Discuss solar time and solar constant.
3. Draw the equivalent circuit of solar cell.
4. What are the criteria for the selection of site of wind farms ?
5. What are the components of a tidal power plant ?

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Explain present energy scenario in India.
7. Write short note on solar green house.
8. Explain the properties of solar selective coatings.
9. Explain the terms-lift and drag in wind power generation.
10. Discuss different types of tidal power plants.

(5 × 5 = 25 marks)

**Part C**

*Answer all questions.*

*Each full question carries 12 marks.*

11. Explain the types of turbines and generators used in small, mini and micro hydro power plants.

Or

12. Explain environmental aspects of electrical energy generation and the types of renewable energy sources.

**Turn over**

13. (a) Explain the method for predicting the availability of solar radiation. (8 marks)  
(b) Write a short note on solar furnace. (4 marks)

Or

14. (a) Discuss the various methods for radiant energy measurement. (8 marks)  
(b) Explain the design of solar water heater. (4 marks)

15. Explain the classification of PV systems and the design of a stand alone PV system.

Or

16. Discuss voltage current characteristics of solar cell. Explain efficiency of solar cell and the methods to improve the efficiency.

17. (a) Explain how estimation of wind energy can be obtained from wind data. (8 marks)  
(b) Discuss ideal and real fuel cells. (4 marks)

Or

18. (a) Explain the principle involved in operation of fuel cell. Discuss about the types of fuel cells. (8 marks)  
(b) Discuss the types of rotors used in wind turbines. (4 marks)

19. Explain estimation of geothermal power and geothermal energy conversion process.

Or

20. Explain the following :—

- (a) Biomass energy conversion process.  
(b) Wave energy conversion devices.

(6 × 2 = 12 marks)

[5 × 12 = 60 marks]

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**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

EE 010 606 L05—BIOMEDICAL ENGINEERING—(Elective I) (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Explain the physiology of Heart.
2. What is Electro-oculography ?
3. What is peritoneal dialysis ?
4. Explain the working of shortwave diathermy machine.
5. What are the important applications of Lasers in Medicine ?

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. What are Micro shock and Macro shock ?
7. What are the important Electrode configurations used in EEG ?
8. Briefly explain the ECG lead configurations.
9. What are de-fibrillators ?
10. Explain the working of anesthesia machine.

(5 × 5 = 25 marks)

**Part C**

*Answer all questions.*

*Each full question carries 12 marks.*

11. Explain how action potentials are generated and propagated.

*Or*

12. What are the different devices used to protect against shock hazard ?

Turn over

13. Explain the working of Electromyography.

Or

14. Explain the working of a modern 8 channel ECG recording setup.

15. Explain the indirect method of blood pressure measurement. What are the limitations of this method ?

Or

16. What are the different types of pacemakers ?

17. Explain the working of an Electromagnetic type blood flow meter.

Or

18. Describe briefly the working of a Microwave diathermy machine.

19. Explain how images are produced in a computed tomography machine. What are the important applications of computed tomography ?

Or

20. Explain the principle of ultrasonic imaging. What are the important applications of ultrasound in medicine ?

(5 × 12 = 60 marks)

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Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

EE 010 605—MICROCONTROLLERS AND EMBEDDED SYSTEMS (EE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Maximum : 100 Marks

Time : Three Hours

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. How are stacks accessed in 8051 ?
2. Explain the following instructions :
  - (a) DAA.
  - (b) DJNZ R1, rel.
3. What are the important handshaking signals in RS 232 ?
4. How can a DAC be interfaced to 8051 ?
5. Explain various reset conditions of 16F877.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Compare and contrast microcontrollers and microprocessors.
7. Explain with examples the bitwise logic operators in 8051.
8. List advantages of serial communications.
9. Show a simple keyboard interface with a port of 8051 and explain its operation.
10. Discuss the memory organization of P1C 16 F877.

(5 × 5 = 25 marks)

Turn over

**Part C**

*Answer all questions.*

*Each question carries 12 marks.*

11. With neat diagram, explain the internal architecture of 8051 microcontroller.

*Or*

12. Explain the functions of the various internal registers used in 8051.

13. Write an ALP to realize an exclusive or gate. Assume P1.0 and P1.1 as inputs and P 2.0 as output bit.

*Or*

14. With relevant figure, write the sequence of events that occur in 8051 when CALL and RET are executed. Explain the different ranges associated with CALL instructions with egs.

15. What are edge triggered interrupts ? How to set INTO as level triggered and INT1 as edge triggered interrupt ? Explain with the help of SFR related to it.

*Or*

16. Explain in detail how timers are used as counters in 8051.

17. Explain with diagram how an LCD is interfaced to 8051.

*Or*

18. With schematic and timing diagram, explain the interfacing of a standard 8 bit ADC to 8051.

19. Describe the various modes of operation of timer 1 in P1C16F877.

*Or*

20. With neat diagram, explain the architecture of P1C16F877.

(5 × 12 = 60 marks)

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Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

EE 010 602—INDUCTION MACHINES (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

Answer all questions.

Each question carries 3 marks.

1. Draw equivalent circuit of *three* phase induction motor with usual notations. State the meaning of each notation.
2. Explain why three phase induction motor draws high current during starting Condition. State any *two* methods of starting three phase induction motor.
3. Draw a neat sketch of Brushless DC motor and label all the parts.
4. Why are rotor iron losses in case of *three* phase induction motor negligibly small ?
5. State any *three* applications of universal motor.

(5 × 3 = 15 marks)

**Part B**

Answer all questions.

Each question carries 5 marks.

6. Draw power stage diagram or power flow diagram of *three* phase induction motor and explain it in brief.
7. Explain how rotating magnetic field is produced in case of *three* phase induction motor.
8. Explain how and why the following parameters change when load on three phase induction motor is increased: (i) Slip ; (ii) Rotor induced e.m.f. ; (iii) Rotor current ; (iv) Rotor frequency ; and (v) Copper losses.
9. What is single phasing in case of *three* phase induction motor ? State the remedy for it.
10. Explain the working principle of commutator motor.

(5 × 5 = 25 marks)

Turn over

## Part C

Answer all questions.  
Each question carries 12 marks.

11. With suitable diagram explain working of induction generator. State its applications.

Or

12. With suitable diagram explain construction and working of synchronous induction motor. State the advantages of this motor.
13. With a neat circuit diagram explain —No load and Blocked rotor test on *three* phase induction motor. What information can be obtained from these tests ?

Or

14. No load and blocked rotor test on *three* phase induction motor rated 500 volt, 50 Hz gave following observations :

No load test	500 volt	4 Amp	750 Watt
Blocked rotor test	100 volt	16 Amp	800 Watt

From above observations, draw circle diagram and find (i) Efficiency ; (ii) Power factor when motor supplies 25 HP. Assume suitable data if necessary.

15. With suitable diagram explain the working of linear induction motor and state its applications.

Or

16. Explain conductively compensated and inductively compensated single phase a.c. series motor. Draw phasor diagram of single phase a.c. series motor.
17. Why single phase a.c. motor are not self starting ? Explain double field revolving theory.

Or

18. The capacitor start induction motor has the following results :—

Rating-230 volt, 50 Hz, 250 watt.

Main winding impedance  $Z_m = 4.5 + j 3.7$  Ohm.

Auxiliary (starting) winding impedance  $Z_s = 9.5 + j 3.5$  Ohm.

Find the value of capacitance of a capacitor which will give maximum starting torque.

19. What are the advantages of a deep bar double cage induction motor ? Draw its equivalent circuit and state applications of this motor.

Or

20. With suitable diagrams, explain construction and working of (i) Reluctance motor (ii) Hysteresis motor. State *two* applications of each motor.

(5 × 12 = 60 marks)



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**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

**MICROPROCESSORS AND APPLICATIONS (E)**

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 4 marks.*

1. What are the functions of an accumulator ?
2. List the 16-bit registers of 8085 microprocessor.
3. How many interrupts does 8085 have ? Mention them.
4. Define instruction cycle, machine cycle and T-state.
5. Explain the signals HOLD, READY and SID.
6. What is the use of bi-directional buffers ?
7. What are the two modes of operations present in 8086 ?
8. What is multiprogramming ?
9. What are the three classifications of 8086 interrupts ?
10. What are the various programmed data transfer methods ?

(10 × 4 = 40 marks)

**Part B**

*Answer all questions.*

*Each question carries 12 marks.*

11. Draw and explain the architecture of 8085 microprocessor.
- Or*
12. Draw the Pin Diagram of 8085 and explain the function of various signals.
  13. Explain the instruction classification and instruction sets.

*Or*

**Turn over**

14. Explain in detail about the types of addressing modes in 8085 microprocessor with examples.
15. Explain in detail about 8085 instruction timing and execution.

Or

16. Write in detail about the interrupt structure of 8085.
17. Explain the concept of memory mapped I/O.

Or

18. Describe the 8085 Interrupts.
19. Draw and discuss about the internal architecture and signals of the Keyboard/Display Controller 8279.

Or

20. Explain in detail about CRT controller and graphics controller chip.

(5 × 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

EE 010 601—POWER GENERATION AND DISTRIBUTION (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Draw the schematic diagram of a fast breeder reactor.
2. Define the load factor.
3. What is primary distribution system and what is its normal operating voltage ?
4. What are the advantages of DC 3 wire distribution system compared to DC 2 wire system ?
5. Briefly state about the need for energy management.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Differentiate between open and closed gas turbine cycles.
7. What is diversity factor and how does it influence the cost of generation ?
8. Give the reasons why the voltage drop is of primary importance in the design of the distribution systems.
9. Explain the principle of shunt capacitors used in distribution systems and their locations.
10. Explain how the maximum demand control will reduce energy consumption.

(5 × 5 = 25 marks)

**Turn over**

**Part C**

*Answer all questions.*

*Each question carries 12 marks.*

11. With the help of a neat sketch explain the working of a hydroelectric power plant station.

*Or*

12. Draw the schematic diagram of a steam power and explain its operation with its important components.

13. Explain different factors related to plants and consumer for power plant economics.

*Or*

14. Calculate the number of units to be consumed so that the annual bill on the basis of two part tariff is same as that on the basis of flat rate tariff for the following data :

Maximum demand = 10 kW

Two part tariff – Rs. 1,200 per annum per kW of maximum demand + Rs. 1.80 per unit consumed.

Flat rate tariff – Rs. 2.40 per unit.

15. A d.c. two wire distributor cable AG 1200 meters long is fed at A at 250V. Loads of 80, 70, 100, 90 and 60A are tapped from points B, C, D, E and F whose distances from A are 250, 400, 600, 800 and 1100 meters respectively. If the voltage at G is 210V, find the resistance per meter of the distributor.

*Or*

16. With a neat sketch, explain the operation of ring and radial distribution systems.

17. A 400V, 50Hz, three-phase line delivers 200 kW at 0.8 p.f. lagging. It is desired to raise the line power factor to unity by installing shunt capacitors. Calculate the capacitance of each unit if they are connected in : (i) Star and ; (ii) Delta.

*Or*

18. Explain the AC three-phase four-wire distribution system.

19. Explain different losses in a transformer. How does the location of the transformer influence the distribution losses ?

*Or*

20. Explain good practices to be adopted in designing and selecting lighting systems.

(5 × 12 = 60 marks)

**G 1055**

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Reg. No.....

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**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

**ELECTRICAL POWER TRANSMISSION (E)**

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.  
Each question carries 4 marks.*

1. Define resistance of a transmission line.
2. What is proximity effect ?
3. Define vibration and dampers.
4. Explain the mechanical characteristics of overhead lines.
5. List out the different methods for voltage control.
6. Explain power circle diagram.
7. What is local corona ?
8. Explain neutral grounding.
9. Define Graetz circuit.
10. What are the requirements of EHV lines.

(10 × 4 = 40 marks)

**Part B**

*Answer all questions.  
Each full question carries 12 marks.*

11. Derive the expression for the capacitance of a three phase overhead transmission line :
  - (i) Symmetrical spacing ;
  - (ii) Unsymmetrical spacing.

*Or*

12. Discuss about bundled conductors.
13. Elaborate the various methods to improve the string efficiency.

*Or*

**Turn over**

14. With a neat sketch explain the construction of pin type insulator ?

15. Write a short note on :

(a) Phase modifier ;

(b) Booster transformer.

Or

16. A three phase 5 km long transmission line, having resistance of  $0.5 \Omega / \text{km}$  and inductance of  $1.76 \text{ mH/km}$  is delivering power at  $0.8 \text{ pf}$  lagging. The receiving end voltage is  $32 \text{ kV}$ . If the supply end voltage is  $33 \text{ kV}$ ,  $50 \text{ Hz}$ , find line current, regulation and efficiency of the transmission line.

17. Discuss the advantages and disadvantages of corona.

Or

18. Write short notes on :

(a) Neutral Grounding ;

(b) Resistance earthing.

19. Explain why EHV transmission is preferred. What are the problems involved in EHV AC transmission ?

Or

20. Explain the principle of HVDC. Mention its advantages and disadvantages.

(5 × 12 = 60 marks)

19. Find gain margin and phase margin for unity feedback system with

$$G(s) = \frac{K}{s(0.5s + 1)(0.05s + 1)}$$

when  $k = 1$ , also find the 'k' value for 15 db gain margin and 45 degree phase margin.

Or

20. Write a note on control system components such as :

- (i) Synchros.
- (ii) Tachogenerators.
- (iii) DC and AC servomotors.
- (iv) Stepper motor.

(5 × 12 = 60 marks)



**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

CONTROL SYSTEMS—I (E)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

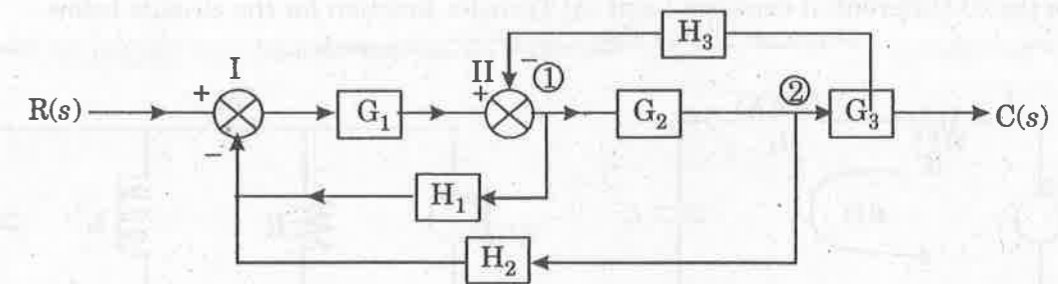
Time : Three Hours

Maximum : 100 Marks

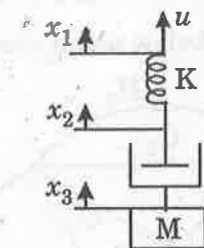
**Part A**

Answer all questions.  
Each question carries 4 marks.

1. Define open loop and closed loop system, give two examples for each ?
2. Reduce the block diagram given below.



3. Draw the force-voltage analogous system for the given mechanical system ?



4. Write the definitions for any four transient response specifications ?

Turn over

5. Find the steady state error for unit step, ramp and acceleration inputs for the systems.

(i)  $\frac{10}{s(0.1s+1)(0.5s+1)}$       (ii)  $\frac{1000}{s^2(s+1)(s+20)}$

6. State three necessary conditions for stability and why system  $s^3 + s^2 + 3s + 24 = 0$  on satisfying all three necessary condition is unstable ?

7. Write four important properties of root locus.

8. Compare and comment on time domain and frequency domain analysis.

9. Define polar plot and their uses. Draw polar plot for  $G(s) = \frac{1}{(1+T_1s)(1+T_2s)}$ .

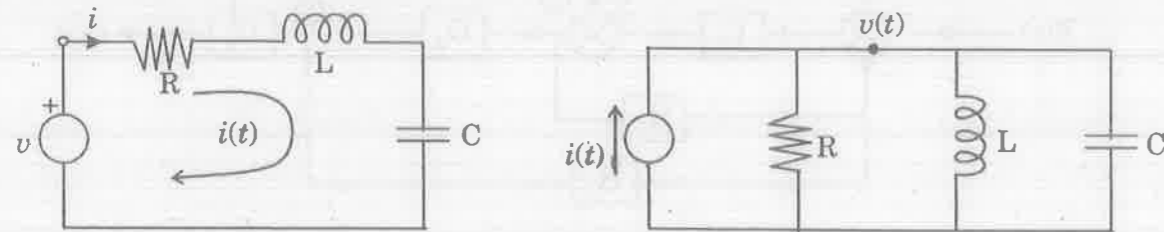
10. Write about Amplidyne and Gyroscope.

(10 × 4 = 40 marks)

**Part B**

Answer all questions.  
Each question carries 12 marks.

11. Obtain the (i) Differential equation ; and (ii) Transfer function for the circuits below.

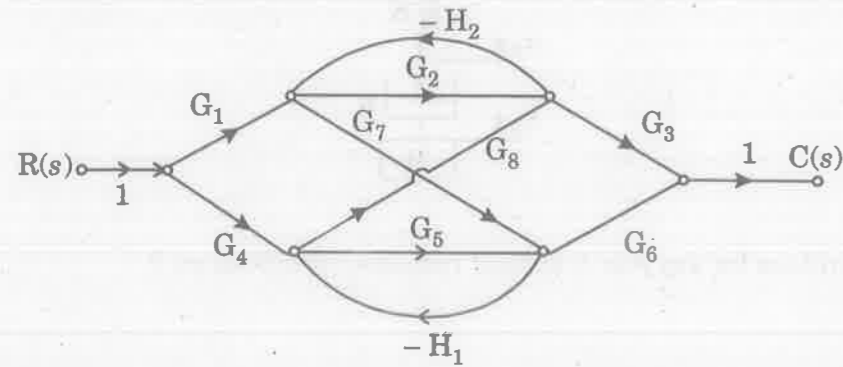


Or

12. (i) Write any four rules of block diagram reduction technique.

(4 marks)

(ii) Reduce the signal flow graph given below using mason's gain formula.



(8 marks)

13. (i) The open loop transfer function of a unity feedback system is given by,

$$G(s) = \frac{k}{s(\tau s + 1)} K, \tau > 0$$

With a given value of K, the peak overshoot was found to be 80 %. It is proposed to reduce the peak overshoot to 20 % by decreasing the gain. Find the new value of K in terms of the old value.

(8 marks)

(ii) Define the following 1. Transient response 2. Steady state response 3. Absolute stability 4. Relative stability.

(4 marks)

Or

14. Explain P, PI, PD, PID controller.

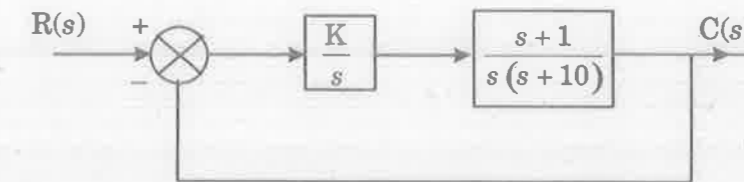
15. Comment on the stability of the system with the following characteristic equation.

$$D(s) = s^6 + s^5 + 7s^4 + 6s^3 + 31s^2 + 25s + 25$$

and draw the roots in s-plane.

Or

16. Sketch the root locus of the system below.



17. Obtain magnitude and phase angle Bode plots for the system

$$G(s) = \frac{20(0.1s+1)}{s^2(0.2s+1)(0.02s+1)}$$

Or

18. Obtain magnitude and phaseangle Bode plots for the system

$$G(s) = \frac{100}{s(s^2 + 12s + 100)}$$

Turn over



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**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

EE 010 603—CONTROL SYSTEMS (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

Answer all questions.  
Each question carries 3 marks.

1. Write a note on servomotors.
2. What are gain margin and phase margin ? Explain.
3. What are minimum phase and non-minimum phase systems ? Explain.
4. Realize lead compensator using Operational Amplifier. What is its transfer function ?
5. What is transportation lag ? Explain.

(5 × 3 = 15 marks)

**Part B**

Answer all questions.  
Each question carries 5 marks.

6. Write a note on polar plots.
7. What is meant by principle of argument ?
8. State and explain Nyquist stability criterion.
9. What is meant by similarity transformation ? Explain.
10. What are controllability and observability ? Explain.

(5 × 5 = 25 marks)

**Part C**

Answer all questions.  
Each question carries 12 marks.

11. The open loop transfer function of a unity feedback system is given by

$$G(s) = \frac{1000}{s(1+0.1s)(1+0.001s)}$$

Determine the phase-crossover frequency, Gain cross-over frequency, GM and PM.

Or

Turn over

12. Sketch the polar plot for the transfer function  $\frac{100}{s(s+2)(s+4)(s+8)}$ . Find whether the system is stable or not. Find the G.M. and P.M. also.

13. For a unity feedback system,  $G(s) = \frac{4(s^2 + 10s + 100)}{s^2(s+3)(s^2 + 6s + 10)}$ . Find the step, ramp and parabolic error coefficients.

Or

14. Using Nyquist stability criterion, determine the range of K for stability :

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

15. Design a suitable compensator using root locus technique for a system with open loop transfer function  $G(s) = \frac{K}{s(s+1)(s+4)}$  so that  $K_v \geq 5 \text{ sec}^{-1}$ , damping ratio = 0.5 and settling time = 10 sec.

Or

16. The open loop transfer function of a unity feedback system is  $G(s) = \frac{K}{s(s+1)}$ . Design a lead compensator to meet  $K_v = 12 \text{ sec}^{-1}$  and phase margin =  $40^\circ$ .

17. Diagonalize the matrix  $A = \begin{bmatrix} 0 & 1 & 0 \\ 3 & 0 & 2 \\ -12 & -7 & -6 \end{bmatrix}$ .

Or

18. Find a state model for the differential equation :

$$\frac{d^3C(t)}{dt^3} + 6\frac{d^2C(t)}{dt^2} + 11\frac{dC(t)}{dt} + 6C(t) = 4u + \frac{du(t)}{dt}$$

19. Show that eigen values remain stationary under similarity transformation.

Or

20. (a) Find the state transition matrix for the system  $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ .

- (b) Check the controllability and observability of the system :

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -2 & -3 & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ -1 & 1 \end{bmatrix} u$$

$$Y = \begin{bmatrix} 0 & 1 & -1 \\ 1 & 2 & 1 \end{bmatrix} [X]$$

(5 × 12 = 60 marks)

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**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Sixth Semester**

Branch : Electrical and Electronics Engineering

EE 010 604—DIGITAL SIGNAL PROCESSING. (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

Answer all questions.

Each question carries 3 marks.

1. Explain any *three* types of standard test signals.
2. What is a butterfly structure in FFT computation ?
3. Compare Chebyshev type I and type II filters.
4. How window functions are useful in the design of FIR filters ?
5. What are the problems of finite register length, in digital systems.

(5 × 3 = 15 marks)

**Part B**

Answer all questions.

Each question carries 5 marks

6. How systems are classified ? Explain any *five* types of systems.
7. Perform linear convolution of the sequences  $x_1[n] = \{2, -1, -2, 1\}$  and  $x_2[n] = \{4, 3, 1, 2\}$ .
8. Realize the given system in cascade form :

$$H(z) = \frac{1 + 0.25z^{-1}}{\{(1 - 2z^{-1} + 0.25z^{-2})(1 - 3z^{-1} + 0.2z^{-2})\}}$$

9. How will you design an FIR filter using frequency sampling method ?
10. What do you understand by limit cycle oscillations in an IIR filter ?

(5 × 5 = 25 marks)

Turn over

## Part C

Answer all questions.  
Each question carries 12 marks.

11. Determine the inverse  $z$  transform of  $X(z) = \frac{1}{1 - 1.5z^{-1} + 0.5z^{-2}}$ ,

when (a) ROC:  $|z| > 1$

and

(b) ROC:  $|z| < 1$ .

Or

12. Determine the step response of the causal system

$$y[n] = -a_1 y[n-1] + b_0 x[n] + b_1 x[n-1], \text{ if } y[-1] = A \neq 0.$$

13. Find the response of the system with input  $x[n]$  and impulse response  $h[n]$ , using overlap save method. Given  $h[n] = \{1, 2, 3\}$  and  $x[n] = \{3, -1, 0, -3, 4, 2, -1, 1, -2, 3, 2\}$ .

Or

14. Find the 8 point DFT of  $x[n] = \{1, 1, 1, 1, -1, -1, -1, -1\}$ . Use DIF-FFT algorithm.

15. Find Direct form I and Direct form II realizations for the system described by the system function :

$$H(z) = \frac{2z^3 - 4z^2 + 11z - 8}{(z-8)(z^2 - z + 3)}$$

Or

16. A digital IIR low-pass filter is required to meet the following frequency specifications : pass band ripple  $\leq 4.436$  dB, passband edge frequency =  $0.35 \pi$  rad/sample, stop band attenuation  $\geq 20$  dB, stop band edge frequency =  $0.7 \pi$  rad/sample. Determine the order of the digital Butter worth filter, designed by bilinear transformation. Take  $T = 0.1$  second.

17. Design a linear phase FIR low-pass filter using rectangular window by taking 7 samples of window sequence and with a cut-off frequency  $\omega = 0.2 \pi$  rad/sample.

Or

18. Design a low-pass filter with cut-off frequency of 1 kHz and sampling frequency of 4 kHz with 11 samples using Fourier series method.

19. Explain the internal block diagram of TMS 320 C54xx processor.

Or

20. Explain various types of errors present in digital filter implementation.

(5 × 12 = 60 marks)