

EI - 801
B.E. VIII Semester
Examination, June 2014
Optical Instruments & Sensors

Time : Three Hours

Maximum Marks : 70

Note: Attempt any one question from each unit. All questions carry equal marks.

Unit - I

1. Explain what is meant by the critical bending radius for an optical fiber. Also calculate for both SM and MM fibers, the critical radius of curvature at which large bending losses occur in a SI fibre of core refractive index of 1.45 and relative index difference of 3% at an operating wavelength of $1.5\mu\text{m}$ and core radius of $5\mu\text{m}$. 14

OR

2. Explain in brief. 14
 a) Chromatic aberration b) Osages

Unit - II

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3. What is intermodal dispersion? Show that the delay difference between the extreme meridional ray and the axial ray in MMSI

Fiber is given as $\delta T_{SI} = \left(\frac{Ln_1}{c} \right) \Delta$. 14

OR

4. What is DCF. What DCF (Dispersion Compensated Fiber) does one need to use in order to compensate for dispersion in a conventional SM fiber link of 100KM. 14

Unit - III

5. Explain in brief 14
 a) Stabilized calibrated high sources
 b) end - to - end measurement of fiber losses.

OR

6. How we can process optical signal? Explain in detail function of different blocks in optical signal processing. 14

Unit - IV

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7. Explain the concept of Fabry-perot resonator cavity. How logic devices are based on this concepts. Explain in detail. 14

OR

8. Draw and explain working principle of optical spectrum analyser. 14

Unit - V

9. What are stimulated and spontaneous emission? With the aid of suitable diagram, discuss the principles of operation of the injection laser. 14

OR

10. Explain the following 14
 a) Dark current noise
 b) Quantum noise
 c) Noise equivalent power
 d) Quantum limit.

EI - 802**B.E. VIII Semester****Examination, June 2015****Digital Control Systems****Time : Three Hours****Maximum Marks : 70**

- Note:** i) Attempt one question from each unit.
 ii) All question carry equal marks.

Unit - I

1. a) With the help of Block diagram explain digital control system.
 b) Discuss the uses of A/D, D/A and ZOH elements.

OR

2. a) State and prove sampling theorem. What is Nyquist frequency?
 b) How is a discrete LTI system characterized by difference equations?

Unit - II

3. a) How is the mapping between s-plane and z-plane done?
 b) Determine the response of the system for unit impulse response. Using z-transform.
 $y(n) = x(n) + 2x(n-2) + x(n-4)$.

OR

4. a) Find inverse Z-Transform of the following:

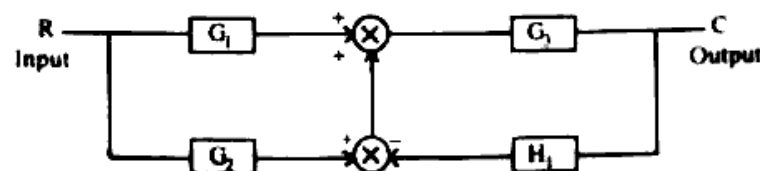
(i) $X(z) = \frac{Z}{(Z-1)(Z-2)}, |Z| > 2$

(ii) $X(z) = \frac{Z^3}{(Z-1)^3}, |Z| > 1$

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[2]

- b) From the block diagram of fig.1 draw the corresponding signal flow graph and evaluate closed loop transfer function.



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Unit - III

5. Discuss about the stability study using Routh's test and Jury's test.

OR

6. Discuss the root locus analysis for stability of discrete control system.

Unit - IV

7. a) Discuss the Aliasing in discrete transform analysis.
 b) Discuss about the pseudo continuous time control system.

OR

8. a) Discuss about Transformation methods between planes s, z and w.
 b) Discuss briefly about Jordan Transformation.

Unit - V

9. a) Discuss about the state variable representation of a discrete time SISO system using canonical variables.
 b) Discuss the state variable representation in the z-domain.

OR

10. a) Discuss about the state variable representation of a discrete time SISO system using physical variables.
 b) Discuss about system stability and Time response between sampling instants.

EI-802

B.E. VIII Semester

Examination June, 2013

Digital Control Systems

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

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Note: Attempt one question from each unit. All questions carry equal marks.

Unit - I

1. a) Explain advantages and disadvantages of digital control systems. 5
b) State and explain sampling theorem. 10
c) Drive the transfer function of zero order hold devices. 5

Or

2. Explain the principal of digital to analog conversion with the help of schematic diagram. Discuss weighted resistor D/A converter in detail. 20

Unit - II

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3. a) Find inverse Z transform of $F(Z) = \frac{Z^2}{(Z-1)(Z-0.2)}$ 10
b) What are the popular methods are used to find the inverse Z transform. Explain each of them.

{2}

Or

4. Find the Z transform of

(10 + 10)

- i) $f(t) = t^2$
ii) $f(t) = e^{-at} \sin wt$.

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Unit - III

5. a) What is root locus analysis? Discuss summary of steps for constructing root loci. 10
b) Explain steady state error analysis for stable and unstable system. 10

Or

6. a) A simplified form of the open loop transfer function of an airplane with an autopilot in the longitudinal mode is

$$G(S)H(S) = \frac{K(S+a)}{S(S-b)(S^2 + 2\zeta\omega_n S + \omega_n^2)} \quad a > 0, b > 0$$

such system involve open loop pole in right half S-plane may be conditionally stable. Sketch root loci when $a=b=1$, $\zeta=0.5$ and $\omega_n=4$. Find the range of gain K for stability.

20

Unit - IV RGPVONLINE.COM

7. a) Explain Pseudo continuous time control system with proper example. 10
b) What are Jordan transformation. Discuss its advantages over other transformation methods. 10

Or

8. Find state model for the following difference equation. Obtain different canonical forms.

$$Y(K+3) + 5Y(K+2) + 7Y(K+1) + 3Y(K) = 0$$

20

Unit - V

- 9.//a) Explain the concept of controllability and observability of discrete time control system. 10
- b) Discuss state variable representation of discrete time Siso system using phase variables. 10

Or

10. Short notes (any two) (10+10)
- a) System stability
- b) State variable representation in Z domain.
- c) State transition equation
