4/22

1006E552

Candidate's Seat No :_____

M.Sc Sem.-2 Examination

P - 410

Electronics

Time : 2-00 Hours] **June 2022** **[Max. Marks : 50**

Instructions:

There are two sections.
Section-1 having eight questions you has to appear any three out of eight.
Section-1 carry equal marks.
Section -2 is compulsory.

SECTION-1

QUE. No.	Questions	Marks
Q.1.(a)	State the classification of photonics in terms of their working. Explain the emission spectra in detail.	07
(b)	State the methods of excitations and explain device structure of LED.	07
Q.2.(a)	State the types of efficiencies and explain internal quantum efficiency as well as optical efficiency.	
(b)	Write the full form of LASER and MASER. Discuss important points of semiconductor laser over conventional Laser also explain stimulated emission and population inversion.	07
Q.3.(a)	Define basic three processes of photo-detectors. Write types of photo-detectors and explain photo-detectors in terms of $h\nu > \Delta E$ and $h\nu < \Delta E$ with absorption coefficient in detail.	07
(b)	Write short-note on Phototransistor.	07
Q.4.(a)	Explain photoconductor in detail and also find the $\left.\frac{S}{N}\right\|_{power}$ for photoconductor.	07
(b)	Discuss quantum efficiency and response speed of photodiode.	07
Q.5.(a)	What is meant by poles and zeros of a transfer function of any control system? The transfer function of a control system is given by **G(s) = (s+j) / (s+1)(s+3j)** Find out the poles and zeros of the system and represent on Pole-Zero plot.	07
(b)	What is meant by a control system? Differentiate between open loop and	07

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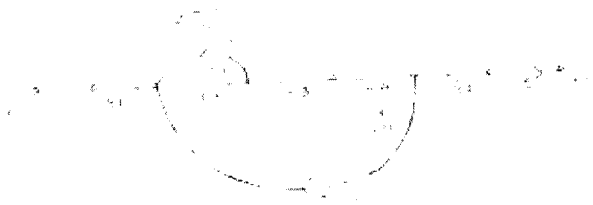
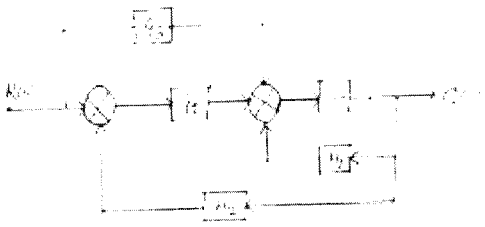
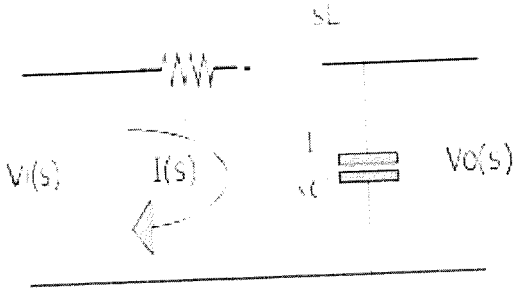
	closed loop control system and give two examples of each. Write the main requirements of a good control system.	
Q.6.(a)	List the advantages of analogous systems. Discuss Force-current analogy.	07
(b)	Define transfer function of a control system? The output of a linear system for a unit step input is given by $t^2 e^{-3t}$. Find the open loop transfer function of the system.	07
Q.7.(a)	Obtain the transfer function of the following Signal Flow Graph (SFG) using Mason's gain formula indicating the steps as applied. 	07
(b)	Reduce the following block diagram to its canonical form and get its transfer function(indicating the rules as applied). 	07
Q.8.(a)	Discuss time response of second order system subjected to unit impulse input for over damped condition ($\xi>1$).	07
(b)	Compare the block diagram and Signal flow graph (SFG) methods .What is Mason's gain equation. State the steps for solving SFG using this formula.	07

SECTION-2

Q.9.	MCQs	08
1.	Middle of the_____ spectrum, the emission spectrum width is around____nm. (a) IR,10 (b) VIS,10 (c) UV,10 (d) VIS,100	
2.	When conduction band minima are not at the same value of K as valence band, assistance of a_____ is necessary to conserve ____momentum and the transition is called indirect. (a) Photon, Crystal (b) Photon, Non-crystal (c) Phonon, Crystal (d) Phonon, Non-crystal	
3.	Photodetectors are semiconductor devices that can detect _____signals through ____ processes. (a) Optical, Electronic (b) Optical, Mechanical (c) Electronic, Optical (d) Light, Mechanical	
4.	The constructions of some _____photodiodes with an _____coating to increase quantum efficiency. (a) High-speed, Anti-reflection (b) High-speed, Reflection (c) Low Speed, Anti-reflection (d) Low-Speed, Reflection	
5.	Which one in the following is not the requirement of good control system (a) Accuracy (b) Sensitivity (c)Economy (d) Stability	
6.	The transfer function of following electrical network is given by  (a) 1/sCR (b) 1/(sCR+LC) (c) 1/sCR+s^2LC+1 (d) 1/(sCR+ s^2LC+1)	

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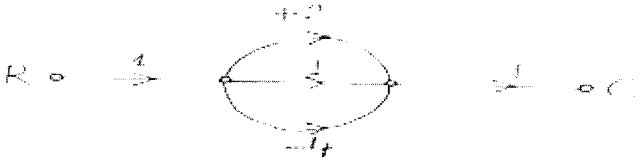
7.	The Laplace transform of a unit step function is given by (a) 1 (b) 1/s (c) $1/s^2$ (d) $1/s^3$	
8.	How many loops are there in following Signal Flow Graph (SFG)  **(a) 0** **(b) 1** **(c) 2** **(d) 3**	

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