Acc No. 8T40

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Second Semester Examination-2018

M.Sc. PHYSICS

Paper Code: PHS 203

Full Marks : 40 **Time: 2 Hours**

Use Separate scripts for Group A & Group B

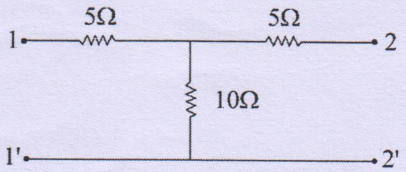
Group A

(Analog Electronics-II)

Answer Question no 1 and any One from the rest.

1. **Answer any five the following:** **2×5=10**

   a. Find the characteristic impedance of the following T – network.



   b. Is it possible to design a constant – k filter (Ray-LPF) using capacitors or inductors only? Why?

   c. Suppose your transmission line is open ended. Find the value of the refection coefficient and Voltage Standing Wave Ratio (VSWR).

   d. Why a photo transistor is more sensitive than a photo diode?

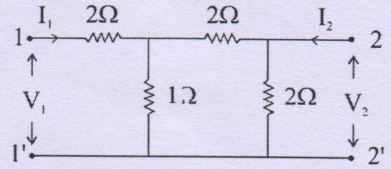
   e. Define hybrid parameters of a two port network.

   f. Draw the cross sectional diagram of a disc and its IV characteristics.

   g. Show that an ideal transmission lime is distortion less line.

2.a. Explain how a given T- network can be converted into its equivalent π network with necessary derivations. **5**

   b. Find out the hybrid parameters of the following circuit. **5**



3.a. Obtain the expression of Voltage and current equations of a transmission line.

4

b. Using the above equations find also the expression of reflection co-efficient of the line. **2**

c. Describe the principle of operation with a proper circuit diagram of a band-pass filter. **4**

or

Design a constant K high pass filter having cut-off frequency of $10kH_z$ and derive the expression for cut off frequency.

Group B

(Digital electronics-II)

Answer Question no 1 and any One from the rest.

1. Answer any five of the following: **5×2=10**

a. Design a half adder circuit using 4:1 MUX.

b. Define settling time & resolution.

c. Design a one bit comparator.

d. What are the advantages of digital communication over analog communication?

e. What are positive & negative logic.

f. What is volatile & non-volatile memory?

g. What is aliasing effect & how it can be overcome.

2.a. Explain steps and timing of data flow using timing diagram when instruction code (MOVC, A – $4F_H$) stored in a location 8005H is fetched in case of 8085 microprocessor. **6**

b. What is sampling theorem? Discuss different techniques of sampling. **1+3**

3.a. State the working principle of any one ADC system with proper block diagram. **3**

b. Construct 512×4 bit memory using two 256×4 bit PROM. **2**

c. Store the following two outputs in a single FPLA memory circuit **3**

$X=\overline{A}B+A\overline{B}$

$Y=AB+\overline{A}\,\overline{B}$

d. Show how to solve the equation

$Y=A\overline{B}\,\overline{C}+\overline{A}\,\overline{B}C+\overline{A}B\overline{C}$

by using 8:1 multiplexer IC. **2**