2019

PG

2nd Semester Examination

PHYSICS

Paper - PHS 203

Full Marks : 20   Time : 2 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.

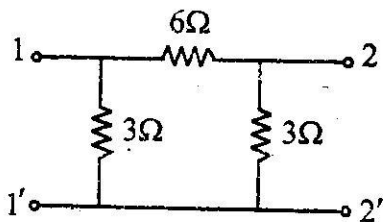### Group - 203.1

(Analog Electronics - II)

1. Attempt any *two* of the followings :-   2×2=4

   (a) The characteristic impedance of a co-axial cable
   is $75\,\Omega$. It is terminated by an impedance of
   $(25 - j75)\Omega$. Calanlate the reflection coefficient
   at the receiving end.

[Turn Over]

(b) State an explain Foster's reactance theorem.

(c) Find the characteristic impedance of the following π network

(d) Which device is more sensitive - A photo diode or a photo transistor ? Why ?

2. Attempt any *two* of the followings :-   4×2=8

(a) Convert the following T network into its equivalent π from with derivation of the different formulae used in this conversion.

4
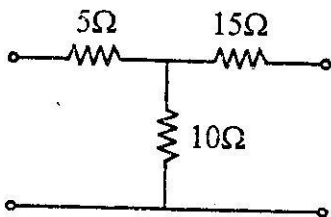
(b) Explain the origin of distortions in a transmission line and hence find the condition for development of a distortionless transmission line.   4

(c) Define iterative impedance and image impedance pair for a 4-terminal network and find out their expressions for a T-network.   4

(d) Draw the cross-sectional diagram of an SCR with its circuit symbol. Explain how an SCR can be used as a controlled rectifier with proper circuit diagram and relevant waveforms of the signals.   1+3

3. Attempt any *one* of the followings :-   8×1=8

(a) (i) Draw the circuit diagram of a T-type constant-k band pass filter and derive the expressions for its cut-off frequencies. Also show that the resonant frequency of any arm (ω_o) is equal to the geometric mean of its two cut-off frequencies (ω_L & ω_H).   5

(ii) Find the expressions for α and β (usual meanings) in the pass band and attenuation band of this filter.   3

[Turn Over]

(b) Derive Telegrapher's equations for transmission of electromagnetic signal through a transmission line and solve these to show that the general expression for voltage at any point along the transmission line is a superposition of infinite number of forward and backward moving waves. 8

Group - 203.2

(Digital Electronics - II)

Answer Q. No. 1 and 2 and any one from the rest.

1. Answer any *two* of the followings : $2 \times 2 = 4$

   (a) In a 6 bit DAC the full scale deflection is 32V. What is the value for 110011 input ?

   (b) How many numbers can be stored in 4 bit signed binary number system ? Write the highest number in this system.

   (c) Give example of double byte and triple byte memories in 8085 μp

   (d) Design a 4 : 1 Mux using 2 : 1 Mux only.

2. Answer any *two* of the followings :-   2×4=8

    (a) What is sampling theorem ? Show that if sampling rate is maintained then the signal can be reconstructed.

    (b) Give the meaning of the following instructions. Find also the value of 'A' after execution of the program

        MVI A 27

        XRI B1

            HLT

    (c) Explain the operation of 3 bit R-2R ladder type DAC.

    (d) Expand the memory capacity of

        (16×4) to (64×8).

3. (a) Write a short note on PROM.

    (b) Schematically explain the structure of A.L.U.

    (c) What is dynamic RAM ?   3+3+2

4. (a) In digital communication what do you mean by quantization error ?

(b) Explain the idea of 'carry look ahead' type full adder.

(c) Discuss the different type registers available in 8085 μP.   2+3+3

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