M.Sc. 2nd Semester Examination, 2010

PHYSICS

PAPER —PH-1204 (A + B)

Full Marks : 40

Time : 2 hours

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable
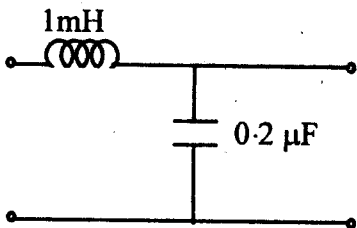
GROUP—A

[*Marks* : 20]

1. Answer any *five* questions from the following :   2 x 5

   (a) Why a photo diode is never used in forward bias ?

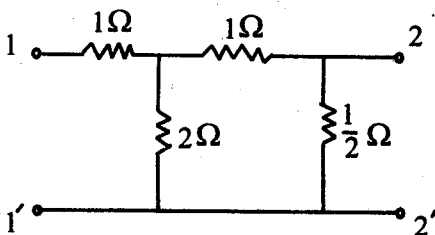   (b) Define image impedance pair of a network.

(c) Find the cut-off frequency of the following filter and write the nature of the filter.

(d) What is a transmission line and draw its equivalent circuit?

(e) Find the Z parameter of the following circuit.

(f) When can you call a 'T-network' symmetric? Write the expression of characteristic impedance of the symmetric T-network.

(*Continued*)

(g) If Z and Y are the series impedance and shunt admittance per unit length of a transmission line, then write the expressions of the characteristic impedance and propagation constant in terms of Z and Y.

(h) By what type of materials does a photo-conductor developed? How does its conductivity depend on the incident light intensity on it?

2. Answer any *one* questions :　　　　　　10×1

(a) (i) Convert the following T-network into its equivalent π form and derive the necessary formulae.
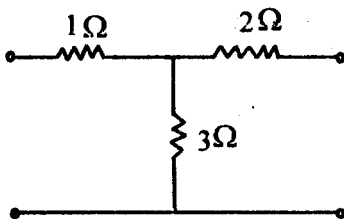
(ii) Design a constant-k high pass filter having cut-off frequency of 10 kHz and derive the expression for cut-off frequency.　　$5 + 5$

　　　　　　(*Turn Over*)

(b) (i) Obtain the expression of voltage and current equations of a transmission line.

(ii) Using the above equation find also the expression of reflection co-efficient of the line.

(iii) Discuss the principle of cable fault location of a telephone line with supporting equation.   5 + 2 + 3

GROUP—B

[*Marks* : 20]

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

1. Attempt any *five* :   2 x 5

   (a) Give the basic block diagram of an ALU. Mention the operations it executes.

   (b) Give the idea of addition of two signed binary numbers.

   (c) What are the different status flag ? How many bits are allocated for each status flag ?

(d) What is the basic differences between SRAM and DRAM?

(e) What is the value of B register after the execution of the following programme?

> XRA A
> MVI D 10
> ADD D
> MOV BA
> HLT

(f) Draw the architecture of a basic bipolar memory cell using multiemitter bipolar transistors.

(g) What is pulse code modulation? Write one advantage of this modulation over other pulse modulation schemes.

(h) What is the method of recording information in a magnetic memory?

2. (a) Give the neat block diagram of an ADC system. 3

(b) Explain the idea of getting T.D.M in PAM system. 3

(c) With supporting diagram discuss the function of a dynamic MOS RAM cell. 4

3. (a) What is accumulater? 2

   (b) What do you mean by machine language and mnemonics? 2

   (c) What are the function of the following pins in 8085 µP?

   (i) TRAP

   (ii) SID 2

   (d) Three numbers are stored in memory location X onwards. Write a program for 8085 µP to arrange the numbers in reverse direction i.e. the last number should be stored in first position and so on. 4

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