

M.Sc. 2nd Semester Examination, 2012

PHYSICS

PAPER— PHS-204 (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

Illustrate the answers wherever necessary

Write the answers to questions of each Group—A and Group—B in separate books

GROUP — A

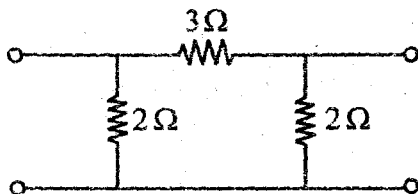
[Marks : 20]

Time : 1 hour

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

1. Attempt any *five* of the following : 2 ×

- (a) Explain the differences between an 'active' and a 'passive' filter.
- (b) State and explain Foster's reactance theorem.
- (c) Compute the iterative impedance and characteristic impedance of the following network. Comment on the result.



- (d) Design a constant K -low pass filter using the following specifications :

Nominal resistance = 500Ω and

Cut off frequency = $1000/\pi$ Hz.

- (e) Show that TEM mode is not possible in a rectangular wave guide.
- (f) Explain in short the basic principle of working of a phototransistor.

(g) What are the drawbacks of constant K prototype filter?

(h) Differentiate between photo conductive and photo emissive transducers.

2. (a) Find the expression for the voltage and current at any point on a transmission line.

(b) Show that a line of finite length, terminated in a load equivalent to its characteristic impedance, appears to the sending end generator as an infinite line.

(c) Define voltage standing wave ratio (VSWR).

5 + 3 + 2

3. (a) Show that a symmetrical T-network of reactive impedances, with different types of reactances in the series and shunt arms, can be used as a two port frequency selective network.

(b) Define attenuation constant and phase constant of the above network and examine analytically their variations as a function of frequency for a high pass filter.

5 + 5

GROUP – B

[Marks : 20]

Time : 1 hour

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

1. Answer any *five* bits :

- (a) What do you mean by signed binary number? Give example.
- (b) What are the operations that ALU can perform?
- (c) What is the meaning of TDM-PAM?
- (d) Define sampling theorem.
- (e) Write down the meaning of 'flipflop', 'register' and 'memory' mentioning the inter-relationships among them.
- (f) What purpose does the ALE signal serve in 8085 microprocessor?
- (g) Compute the no. of address lines required to directly access 128 MB RAM.

(h) Define quantising error in connection with PCM system.

2. (a) Discuss the basic difference in utility between RAM and ROM.

(b) Give the idea of optical memory.

(c) How to expand a RAM cell of $(1\text{ K} \times 8)$ capacity into $(4\text{ K} \times 16)$ capacity by cascading ?

(d) What is the function of the following pin in 8085 μP ?

(i) TRAP

(ii) SOD

(iii) $\overline{\text{HLDA}}$

(iv) $\text{R} / \overline{\text{W}}$

2 + 2 + 4 + 2

3. (a) What is the difference between machine language and mnemonics ?

(b) What do you mean by floating number system ?
Give example.

(c) Explain a dual-slope A to D converter and mention its application.

(d) Why input-output synchronization is important in TDM system ?

2+4+2+2

