

2008

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*

*Illustrate the answers wherever necessary*

GROUP—A

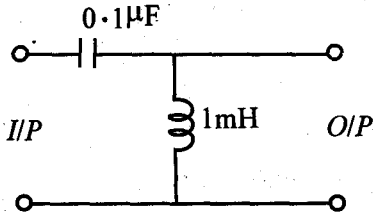
[Marks : 20]

Attempt *all* questions

1. Answer any *five* bits:

2 × 5

(a) Find out the cut-off frequency of the circuit



(b) What do you mean by a symmetrical network? Define its characteristic impedance.

(c) Prove that if a transmission line of finite length be terminated by its characteristic impedance, it will behave as a transmission line of infinite length.

(d) What is a phototransistor? What are its applications?

(e) What kind of dc biasing is applied in a photodiode and why?

(f) What do you mean by  $z$ -parameter equivalent circuit of a two port network? Find the same for a symmetrical  $T$ -network of impedances  $z_1$ ,  $z_1$  and  $z_2$ .

(g) How can you design a band-pass filter using low-pass and high-pass filters?

(h) What are photo-electric transducers? What are their applications?

2. Attempt any *one* bit:

10 × 1

(a) Draw the circuit diagram of a constant  $K$  band stop filter and derive the expressions for the cut-off frequencies. Find out the values of  $\alpha$  and  $\beta$  for the pass band and the attenuation band and show their variations with frequency. 1 + 4 + 3 + 2

(b) Derive the expression for the current and the voltage in a transmission line. What are the cause of distortions in a practical transmission line?

8 + 2

GROUP—B

( *Digital Electronics* )

[ *Marks : 20* ]

Answer all questions

1. Answer any *five* questions: 2 × 5

(a) An 8 MHz square wave clocks a 5-bit ripple counter. What is the frequency of the last FF? What is the duty cycle of this output waveform?

(b) What is a monostable multivibrator? What are its uses?

(c) What are the differences between PISO and SIPO shift registers? Mention the uses of them.

(d) What do you mean by the following instructions? (any two):

(i) LDA 8080 H

(ii) MVI B 0A H

(iii) SUB B.

- (e) A signal has the maximum frequency of 3.5 kHz. What should be the sampling rate if you need 1 kHz guard band?
- (f) Briefly describe PCM technique.
- (g) Show how to construct  $64 \times 4$  RAM from  $16 \times 4$  RAM.

2. Answer any *one* bit:

(a) (i) Explain with neat diagram how to get MOD 17 asynchronous counter.

(ii) With a neat circuit diagram explain the operation of a 555 timer based square wave generator.

(iii) Give the schematic concept of BCD to 7 segment display system. 3 + 5 + 2

(b) (i) In 8085  $\mu$ P describe how the data and address bus are organised.

(ii) Name different functions performed by A.L.U.

(iii) What do you mean by the following pin in 8085  $\mu$ P?

(I) TRAP

(II)  $R/\bar{W}$ .

(iv) Write short note on EEPROM and DRAM.

(v) What do you mean by signal quantization ?

2 + 1 + 1 + 3 + 3