2016

M.Sc. 2nd Seme. Examination

PHYSICS

PAPER—PHS-204

Full Marks : 40

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.

Illustrate the answers wherever necessary.

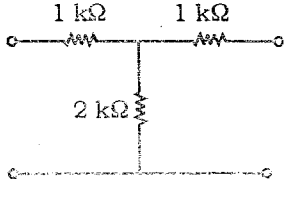
Use separate Answer-scripts for Group-A & Group-B

Group—A

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

1. Answer any *five* questions : 5×2

(a) Convert the following T network to its π type.



(b) What do you mean by voltage standing wave ratio of a transmission line ?

(c) What is the origin of distortions in a transmission line ?

(d) Write the difference between a transducer and sensor with one example for each.

(e) Define image impedance pair of a network and find out their expressions.

(f) Show that if a transmission line is terminated by its characteristic impedance, then there will be no reflection of the signal.

(g) Discuss the function of a thermistor mentioning one example of it.

2. (a) What do you mean by constant-k filter ? 1

(b) Draw the circuit diagram of a constant-k band stop filter and derive the expressions for its cut-off frequencies. Derive the expressions for attenuation constant and phase constant in the pass band and attenuation band. Also represent graphically their variations as a function of frequency in the pass band and attenuation band. 1+3+4+1

3. (a) Draw the cross sectional diagram of a triac and explain its operation by drawing its I-V characteristics.

Explain the use of a triac in a light dimmer by drawing the necessary circuit diagram and corresponding wave forms. 1+2+2

(b) Obtain the expression of characteristic impedance and propagation constant of a transmission line with respect to its line parameters. $2\frac{1}{2}+2\frac{1}{2}$

Group—B

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

1. Answer any *five* questions : 5×2

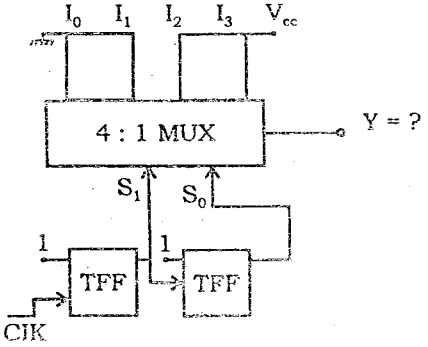
(a) Design the circuit to check whether $A(A_1A_0)$ is greater than $B(B_1B_0)$ or not.

(b) What are the basic differences between SRAM and DRAM ?

(c) Explain the term "overflow" with example in signed binary arithmatics.

(d) Give example of four conditional jump statements in 8085 μp.

(e) What will be the output in the following circuit for different selector inputs ?



(f) What is the difference between natural sampling and flat-top sampling ?

(g) Show the addition and subtraction, in signed binary number representation of two numbers +9 and +5.

(h) What are the different register present in 8085 μp ?

2. (a) What is EPROM ? What do you mean by NVRAM ?

(b) Show the expantion of (1k × 16) memory cell into (4k × 16) with neat diagram.

(c) Explain briefly the structure and possible operation of A.L.U. 4+3+3

3. (a) Give the concept of D/A converter with proper circuit.

(b) Design 1 : 4 DeMux circuit with NAND gate.

(c) Give the meaning of the following instructions and identify the content of accumulator after execution of the programme.

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MVI  B  05
SUB  A
ANA  B
HLT
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3+3+4