Total page: 02

PG CBCS

M.Sc. Semester-IV Examination, 2022

PHYSICS

PAPER: PHS 404B

(APPLIED ELECTRONICS – SPL-II)

Full Marks: 40 **Time: 2 Hours**

Write the answer for each unit in separate sheet

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

PHS 404B.1 Analog

Marks: 20

GROUP-A

1. Answer any two question: **2×2=4**

a) Define aspect ratio. What is its standard value in TV scanning system?
b) Calculate the picture carrier and sound carrier frequencies for the channel 6 (181MHz-188MHz) of VHF band-III.
c) Why different modulation techniques are used for audio and video signals transmission?
d) What do you understand by interlaced scanning?

GROUP-B

2. Answer any two questions: **2×4=8**

a) Calculate the picture carrier and sound carrier frequencies for the channel 26 (510MHz-518MHz) of UHF band-IV. Sketch Channel bandwidth details and show loca-tion of Y, C and sound carrier frequency.
b) What is waveguide? Which modes of propagation of electromagnetic wave is possible through a wave guide and why? 1+3
c) Describe essential features of a Triniton colour picture tube. Why is it consid-ered superior both the delta-gun and P.I.L. picture tube? 2+2
d) Show that a total channel bandwidth of 11.25 MHz would be necessary if both side bands of the modulated picture signal are fully transmitted. Explain how the channel width is reduced to 7 MHz by allowing vestigial sideband transmission. 1+3

GROUP-C

3. Answer any one questions: **1×8=8**

a) What do you understand by vertical and horizontal resolution? Show that the highest modulating frequency that needs to be handled in the 625-line TV system is 5 MHz. What is the value of the highest modulating frequency in the 525-line American TV sys-tem? 3+4+1
b) For transverse electric waves perfectly propagating in a rectangular waveguide with perfectly conducting wall, find cut-off wavelength and magnetic field induction. 3+5

(Turn Over)

PHS 404B.2 Digital

Marks: 20

GROUP-A

1. Answer any <u>two</u> question: **2×2=4**

a) What is the main benefit of PCM over PAM, FM, and other modulation tech-niques?

b) Mention two reasons why a signal should be sampled for transmission through digital communication system.

c) Write is the result of the execution of the following two instructions:

MVI A, 28H

MOV B, A

d) What are the drawbacks of delta modulation?

GROUP-B

2. Answer any <u>two</u> questions: **2×4=8**

a) Define and describe pulse position modulation and explain with waveforms how it is derived from Pulse Width Modulation (PWM).

b) State and explain sampling theorem and aliasing effect.

c) Suppose you are to load the Hex number 89H in register B and then to display the number at the output port labeled PORT1. Write the corresponding assembly language programme in 8085 microprocessor.

d) Define and describe pulse code modulation.

GROUP-C

3. Answer any <u>one</u> questions: **1×8=8**

a) What do you mean by quantization error? Consider an audio signal as given $s(t)=3\cos(500\pi t)$ Volt, Find the signal to noise ratio (SNR) when s(t) is quantized using 10 bit PCM. How many bits of quantization is needed for achieving SNR of 40dB. 4+2+2

b) What do you mean by digital modulation techniques? Explain amplitude shift keying (ASK). How can you detect FSK signal using coherent arrangement. 2+3+3

*****