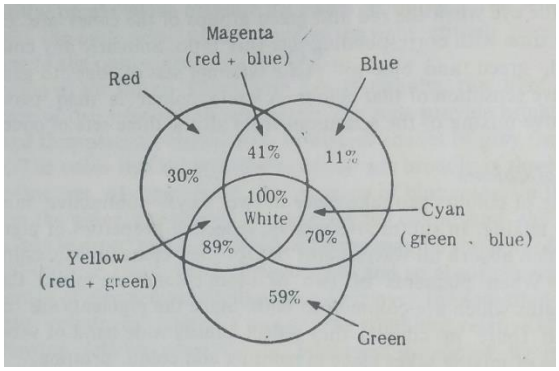
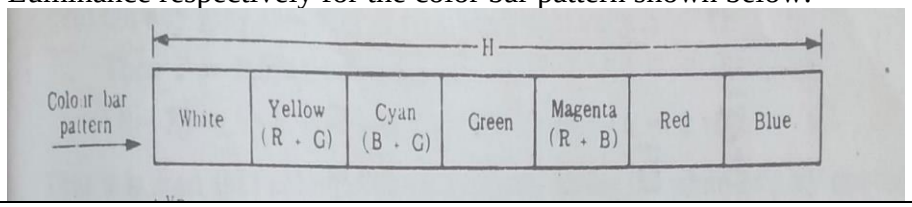
Sardar Patel Institute of Technology
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)
Academic year 2023-2024
Department of Electronics and Telecommunication Engineering
MSE paper

Subject : Consumer Electronics (OE) **Time : 1 hr.**
Date : 07/03/2024 **Max marks : 30Marks**

Note : 1. All questions are compulsory.

2. Assume suitable data wherever necessary.

Q. No.	Question	CO	Marks
1	**A)** With the neat diagram and graph, show how a textile electrostatic clutch with high force density is used in a kinesthetic feedback glove?	**CO1**	**5**
	B) Compare LCD and LED Displays.	**CO1**	**5**
2	**A)** With a neat diagram explain the I2C protocol for data transmission.	**CO3**	**5**
	B) What are the key features of USB?	**CO3**	**5**
	OR		
2	**A)** If a ZigBee network operates at a symbol rate of 250 ksymbols/s using O-QPSK modulation, and each symbol represents 2 bits of data, what is the effective data rate in bits per second?	**CO3**	**2**
	B) In a ZigBee network, the transmitted signal power is 5 mW, and the received signal power at a distance of 10 meters is measured to be 50 µW. What is the path loss in decibels (dB)?	**CO3**	**2**
	C) In a ZigBee network with 16 available channels operating in the 2.4 GHz ISM band, if each channel has a bandwidth of 5 MHz, how much total bandwidth is available for communication?	**CO3**	**2**
	D) In a ZigBee network, if the PER is measured to be 0.01, meaning that 1% of transmitted packets are received with errors, and the network sends 100 packets per second, how many packets are received successfully per second?	**CO3**	**2**
	E) If the speed of propagation of electromagnetic waves in air is approximately 3×10^8 meters per second, and a ZigBee signal travels a distance of 100 meters, what is the propagation delay in microseconds?	**CO3**	**2**
3	**A)** What is compatibility in TV transmission? What are the requirements to be met to make color system fully compatible?	**CO4**	**5**

3	**B)** Diagram shows the additive color mixing, the effect of projecting green, red and blue beams on a white screen in such a way that they overlap.  Draw the waveforms for V_R, V_G, V_B and V_Y for red, green, blue and Luminance respectively for the color bar pattern shown below.  	**CO4**	**5**