U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 21EC1ESBEC / 21EC2ESBEC **Max Marks: 100**
Course: Basic Electronics and Communication Engineering **Date: 13.05.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Explain the working of Half - Wave Rectifier with capacitor filter with circuit diagram and wave form. **08**

b) An amplifier with negative feedback applied has an open-loop voltage gain of 50, and one-tenth of its output is fed back to the input (i.e. $\beta = 0.1$). Determine the overall voltage gain with negative feedback applied. If, the amplifier's open-loop voltage gain increases by 20%, determine the percentage increase in overall voltage gain. **06**

c) The following data were obtained during a test carried out on a d.c. power supply: **06**

(i) Load test
Output voltage (no-load) = 12 V
Output voltage (2 A load current) = 11.5 V
(ii) Regulation test
Output voltage (mains input, 220 V) = 12 V
Output voltage (mains input, 200 V) = 11.9 V

Determine (a) the equivalent output resistance of the power supply and (b) the regulation of the power supply.

OR

2 a) With a neat block diagram explain positive feedback of an amplifier and derive the expression for overall gain. **10**

b) A wideband operational amplifier has a slew rate of 15 V/μs. If the amplifier is used in a circuit with a voltage gain of 20 and a perfect step input of 100 mV is applied to its input, determine the time taken for the output to change level. Determine the percentage change in time taken if the op-amp with a slew rate of 25 V/μs is used. **05**

c) Determine the upper and lower threshold voltage, time period and frequency of the output waveform generated from Single-stage Astable oscillator with supply voltage of 15V, R1= 2KΩ and R2=1KΩ. **05**

UNIT - II

3 a) Implement Exclusive-OR and Exclusive-NOR function using basic gates. **10**

b) Design an Asynchronous sequential circuit to get the square wave of frequency 12.5Hz from the input frequency of 100 Hz. Represent the same using waveform. **10**

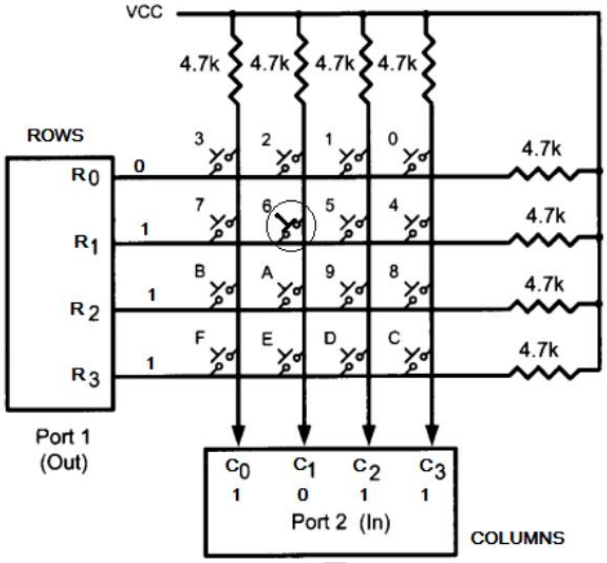
UNIT - III

4 a) Describe the elements of embedded system with a neat diagram. What are the major application areas of Embedded Systems. **10**

b) Explain the different configurations of 7-segment LED Display. Describe the interfacing of 7 segment display with microcontroller. **10**

OR

5 a) For the key pressed i.e., key '6', illustrate the detailed procedure adapted by a microcontroller to identify the key pressed. What is the problem often faced in reading the key when a keypad is interfaced with a microcontroller? Propose a solution for the same. **10**



b) Explain the external communication interfaces: i) USB and ii) Wi-Fi **10**

UNIT - IV

6 a) With a schematic diagram explain the various multiplexing technologies used to transmit information over a communication channel. List the advantages of multiplexing technologies. **10**

b) The initial SNR measured at the transmitter was 20 db. In order to combat the channel conditions, the signal power was doubled prior to transmission. What is the new SNR at the transmitter? **05**

c) When the modulating frequency in FM is 600 Hz and the modulating voltage is 3V, the modulation index is 60. Calculate the maximum deviation. What is the modulation index when the modulation frequency is reduced to 400 Hz and the modulating voltage is simultaneously raised to 4v? **05**

UNIT - V

7 a) What is sustainability and List all sustainable development goals. **05**

b) Discuss different types of WSNs with reference to smart agriculture applications. **10**

c) Explain closed loop control of a personal lighting system. **05**

******