**Model Question Paper - I with effect from 2021 (CBCS Scheme)**

USN | | | | | | | | | | |

**First/Second Semester B.E Degree Examination**

**Basic Electronics & Communication Engineering**

**TIME: 03 Hours** **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**

| **Module-1** (Power Supplies, Amplifiers, Operational amplifiers, Oscillators) | | | **Marks** |
|---|---|---|---|
| Q.01 | a | With neat block diagram explain the working of a DC power supply. Also mention the principal components used in each block. | 7 |
| | b | Mention advantages of negative feedback in amplifiers circuits. With relevant equations and diagram explain the concept of negative feedback. | 7 |
| | c | With circuit diagram and waveform show how operational amplifier can work as a comparator. | 6 |
| OR | | | |
| Q.02 | a | With neat circuit diagram and waveforms explain the working of bridge rectifier. | 8 |
| | b | Write a note on frequency response characteristics of an amplifier circuit, clearly mentioning the half power frequencies. | 6 |
| | c | List and explain conditions for sustained oscillations. Determine the frequency of oscillation of a three-stage ladder network in which C=10 ηF and R=10 kΩ. | 6 |
| **Module-2** (Logic Circuits, Data representation, Shift registers, Counters) | | | |
| Q. 03 | a | Discuss the design of a 3-bit asynchronous up-counter. | 6 |
| | b | With a neat block diagram show how typical input and output blocks are connected to a microcontroller unit. | 7 |
| | c | With the help of a timing diagram explain how D-type bistable circuit works. | 7 |
| OR | | | |
| Q.04 | a | Design a full adder using two half adders and an OR-gate. | 8 |
| | b | Design a 4-stage shift register using J-K bistables. | 7 |
| | c | Write a note on different data types mentioning the bit size and range of values supported. | 5 |
| **Module-3** (Embedded Systems, Sensors and Interfacing, Actuators, Communication Interface) | | | |
| Q. 05 | a | Explain the working, principle of operation and applications of stepper motor. | 8 |
| | b | Write a note on classification of embedded systems. | 6 |
| | c | Bring out the main features of UART and USB. | 6 |

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| | | OR | |
| Q. 06 | a | Give the classification of transducers with examples. | 6 |
| | b | Bring out the differences between RISC and CISC, Harvard & Von-Neumann. | 6 |
| | c | Define 'Actuator' and briefly describe the following actuators - relay, Piezo-buzzer | 8 |
| | | **Module-4** (Analog and Digital Communication) | |
| Q. 07 | a | Describe the blocks of the basic communication system. | 6 |
| | b | Define the following terms: (i) Modulation (ii) Carrier communication system (iii) Baseband communication system with neat and suitable waveforms. | 6 |
| | c | Explain the following with the help of waveforms. (i) PAM (ii)PWM (iii)PPM (iv) PCM | 8 |
| | | OR | |
| Q. 08 | a | Define sampling theorem and explain when aliasing can happen. Also mention the different ways in which aliasing can be avoided. | 6 |
| | b | Define the following terms: Multipath, Constructive and destructive interference, Coherence time, Coherence bandwidth, Delay spread | 10 |
| | c | Define an antenna and discuss different types of antennas. | 4 |
| | | **Module-5** (Cellular Wireless Networks, Wireless Network Topologies, Satellite Communication, Optical Fiber Communication, Microwave Communication) | |
| Q. 09 | a | Draw the schematic diagram of a cellular telephone system and define its basic components. | 6 |
| | b | Explain the optical fiber communication system with a block diagram. | 6 |
| | c | With the help of diagrams, discuss the following types of network topologies: Ad-Hoc Network Topology, Infrastructure Network Topology | 8 |
| | | OR | |
| Q. 10 | a | With the help of architecture figures explain the evolution from GSM to LTE. | 8 |
| | b | List the requirements identified for the 4G technology. | 4 |
| | c | Draw the block diagram showing the basic elements of a satellite communication system and briefly explain them. | 8 |