

M. SC. (PHYSICS)

(MSCPH)

Term-End Examination

December, 2024

MPH-005 : ELECTRONICS

Time : 2 Hours

Maximum Marks : 50

Note : Attempt any **five** questions. You can use calculator. Symbols have their usual meanings.

1. Explain the complete switching ON and OFF cycle of a power diode using appropriate diagrams. State the differences between normal diode and power diode. 6+4

2. (a) Explain the construction and working of a varactor diode. Write its *two* applications. 4+1

- (b) Draw and explain the circuit of BJT amplifier as light indicator using an LDR. 5
3. (a) Prove that the high frequency response (beyond $f = 10 f_c$) of transistor amplifiers decreases by 6 dB per octave. 5
- (b) Draw the lead-lag network of Wien bridge oscillator and obtain the expression for its oscillation frequency. 5
4. (a) Design an op-amp. based circuit to solve the following simultaneous equations : 5
- $$2x + 3y = 13$$
- and $-x + y = 1.$
- (b) Explain the use of UJT as a relaxation oscillator. How can it be used as a variable frequency sawtooth generator ? 4+1

5. Explain with the help of a circuit diagram the working of a series regulator. How can constant current limit implemented in this regulator ? What is the difference between a constant current configuration and fold back configuration ? 4+4+2
6. (a) Explain the terms lock range and capture range with reference to PLL. Why is the capture range smaller than the lock range ? 3+2
- (b) With the help of a circuit diagram, explain the working of op-amp. based monostable multivibrator. 5
7. (a) Draw a circuit of 4-bit R-2R ladder network DAC using an op-amp. State its advantages over weighted resistor DAC. 2+3
- (b) Explain the software techniques used for improving the signal-to-noise ratio of an electronic system. 5

8. (a) Explain with the block diagram organization of a typical microprocessor based system. 5
- (b) Write an assembly language program for microcontroller 8051 to compute the average to 5 bytes of data stored from RAM location 40H and store the result at RAM location 35H. 5

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