FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2022
(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P PHY1 C04 - ELECTRONICS
(Physics)

(2019 Admission onwards)

Time : 3 Hours   Maximum : 30 Weightage

Section A
Answer *all* questions. Each question carries 1 weightage.

1. The terminology 'Field Effect' is appropriate for the three terminal device FET. Explain

2. Explain what is VVR and give one application of it.

3. Drawing the static current voltage characteristic of the tunnel diode, marking the region of its working.

4. What are the essential differences between a tunnel diode and a semicunductor junction diode?

5. Why compensation techniques needed in Op- Amp?

6. What is the difference between open loop and closed loop gain of an Op- Amp?

7. What is butterworth filter?

8. Write a short note on charge coupled devices.

(8 × 1 = 8 Weightage)

Section B
Answer any *two* questions. Each question carries 5 weightage.

9. Draw the circuit diagram of Common source and Common drain amplifiers and their AC equivalent circuits at low frequencies. Derive expressions for voltage gain and output impedance.

10. Explain the principle, working and characteristics of (a) photoconductor and (b) photodiode.

11. Explain the working of a practical differentiator. Draw the frequency response curve.

12. With the help of a block diagram of an 8085 microprocessor, explain its operations.

(2 × 5 = 10 Weightage)

Section C
Answer any *four* questions. Each question carries 3 weightage.

13. Explain the working of a Digital MOSFET inverter circuit.

14. If the photon output of a laser diode is equal to the band gap energy, find the wavelength separation between adjacent resonant modes in GaAs(E_g=1.424eV) laser with L = 100μm.

15. The input resistance of a differential amplifier is measured using 25 kΩ resistor in series with an input voltage of 5V. What is the value of R_i, if the voltage into the amplifier is 1.5 V?

16. Design a second order high pass filter for a cut off frequency 5 kHz (take C = 0 .01 μf).

17. Explain the working of Wien bridge oscillator.

18. A digital system has a 4-bit input from 0000 to 1111. Draw the truth table of the system which has high outputs when the equivalent decimal inputs are 1, 2, 3, 7, 8, 9, 10 and 13. Draw the karnaugh map for the truth table and obtain the simplified Boolean equation of the system.

19. Draw the logical circuit of a synchronous decade counter.

(4 × 3 = 12 Weightage)

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