17P111A   (Pages:2)   Name...............................

Reg. No..............................

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2017
(Regular/Supplementary/Improvement)
(CUCSS-PG)
CC17P PHY1 C04 – ELECTRONICS
(Physics)
(2017 Admission)

Time : Three Hours   Maximum : 36 Weightage

Part A
Answer all questions. Each question carries 1 weightage.

1. What is transconductance? Give the relation between transconductance and gate source cutoff voltage.

2. Explain the working of MOSFET NAND gate.

3. Explain the characteristic curve of tunnel diode.

4. Write a note on Semiconductor lasers.

5. What is Butterworth response?

6. Draw the circuit diagram of emitter coupled differential amplifier. Write down the expression for common mode gain and differential gain.

7. Distinguish between Dominant Pole and Pole zero compensation.

8. Draw the circuit diagram of an analog differentiator and explain how it works.

9. Describe the working of V – I converter.

10. Explain the working of Notch filter.

11. Distinguish between synchronous and asynchronous counters.

12. Describe briefly the working of a D/A Converter.

                                                          (12×1 = 12 Weightage)

Part B
Answer any two questions. Each question carries 6 weightage.

13. Discuss the working principle of semiconductor lasers. What are the semiconducting materials used for the construction of lasers? Explain how population inversion is achieved?

14. Define open loop gain, CMRR, input offset current and voltage, output offset voltage, slew rate of an OPAMP. Describe the working of OPAMP a stable multivibrator.

15. Discuss with theory the working of first order and second order low pass fitter. Explain the principle of band pass filter with multiple feed back.

16. Draw the pin diagram of 8085 and explain the functions each pin. Describe the classification of 8085 instruction depending on length.

(2 × 6 = 12 Weightage)

Part C

Answer any four questions. Each question carries 3 weightage.

17. Discuss the low frequency small signal FET circuit. Write down the expression for voltage gain and output resistance.

18. Calculate the photon current and carrier transit time for a photoconductor from the following data. Quantum efficiency = 50%, number of photons reaching per second = 1010, mobility = 3000 cm^2/ V-s, effective electric field = 5 kV/cm, L = 10μm, carrier life time 0.65 ns.

19. An OPAMP has a CMRR value of 50 dB and differential gain of 1000. Find the common mode gain.

20. Design an averaging circuit with an OPAMP which averages four voltages 1V, 2V, 3V and 4V.

21. Design a second order high pass filter for a cut of frequency 10 kHz.

22. 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 input are 4, 5, 6, 9, 10, 11 and 13. Draw the Karnaugh-Map for the truth table and obtain the simplified Boolean equation of the system.

(4 × 3 = 12 Weightage)

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