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3339 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION FEBRUARY 2013

(CUCSS)

Physics

PHY 1C 04 – ELECTRONICS

(2010 Admissions)

Three Hours Maximum : 36 Weightage

Section A

Answer **all** *questions.*

Each question carries weightage 1.

1. Explain why the phenomenon of thermal runaway is not encountered with FET.
2. Give a short account of MOSFET.
3. Explain the methods used to lower the magnitude of Threshold voltage.
4. Discuss the principle of semiconductor laser.
5. Explain the function of LDR.
6. List the characteristics of an ideal OP-AMP.
7. Draw the circuit of low frequency equivalent circuit of OP-AMP and explain the significance of virtual ground.
8. Define offset error voltages and currents.
9. Define common-mode voltage swing.
10. Explain the working of summing amplifier.
11. Write a short note on magnetic memories and give its advantages.
12. Distinguish between synchronous and asynchronous counters.

(12 × 1 = 12 weightage)

Section B

Answer any **two** *questions.*

Each question carries weightage 6.

13. With neat circuit diagram explain the function of FET and VVR and discuss its applications.
14. Explain the function of p-n junction solar cell and discuss the term short circuit current, fill factor and efficiency.

Turn over

15. With a neat circuit diagram explain the operation of regenerative comparator.

16. Explain in detail the minimization of functions using Karnaugh map.

(2 × 6 = 12 weight

Section C

Answer any **four** *questions.*

Each question carries weightage 3.

17. The JFET dual-input balanced-output differential amplifier uses the zener constant curr bias. Determine the voltage gain and the input resistance of the amplifier if R_D = 3.9 R_G = 1 MΩ, g_m = 4000 μs, and V_s = ± 9V.

18. Using the MF5, design a second-order Butterworth low-pass filter with a cutoff frequenc 500 Hz and a pass band gain of –2. Assume that a ± 5 V power supply and a CMOS c are used.

19. Draw the schematic diagram of a notch filter and explain its function.

20. Draw the flow chart for a counter with a delay.

21. Explain the difference between the peripheral I/O and the memory – mapped I/O.

22. Calculate the photon current and carrier transit time for a photoconductor with Quan efficiency = 80%, number of photons reaching per second = 1,000, mobility = 3,000 cm^2 / effective electric field = 5 KV/cm, L = 10 μm, carrier life time 0.7 ns.

(4 × 3 = 12 weight