

16P109

(Pages:2)

Name: .....

Reg. No.....

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2016**

(Regular/Supplementary/Improvement)

(CUCSS-PG)

**CC15P PHY1 C04 – ELECTRONICS**

(Physics)

(2015 Admission Onwards)

Time: Three Hours

Maximum: 36 Weightage

**Part A**

*(Answer all questions. Each question has weightage 1)*

1. Explain the working of D MOSFET.
2. Explain the action of FET as a voltage variable resistor.
3. Explain the principle and operation of LED.
4. Discuss how lasing action is achieved in diode laser.
5. Explain the design and working of MOSFET AND gate.
6. What are the characteristics of an ideal OPAMP?
7. Discuss the OPAMP based differential amplifier.
8. Describe the working of analog integrator.
9. How a voltage can be converted into current using OPAMP?
10. Explain the working of a Schmidt trigger.
11. What are the advantages of K- map?
12. Explain the working of charge coupled devices.

**(12x1=12 Weightage)**

**Part B**

*(Answer any two questions. Each question has weightage 6)*

13. Discuss the operating principle and working of a solar cell by stating clearly what is meant by short circuit current, fill factor and efficiency.
14. Discuss the principle of Bode plot by explaining dominant pole, pole zero and lead compensation.
15. Discuss the working of low pass and high pass second order filter. Discuss the principle of active resonant band pass filter.
16. Draw the pin diagram of 8085 and explain the function of each pin.

**(2x6=12 Weightage)**

### Part C

(Answer any **four** questions. Each question has weightage 3)

17. Given that  $I_{DSS} = 5\text{mA}$  and  $V_p = -3.2\text{ V}$ . Determine  $I_D$  at  $V_{GS} = -2\text{V}$  and  $-3\text{V}$ . Also determine  $V_{GS}$  at  $I_D = 2.5\text{mA}$  and  $5.5\text{mA}$ .
18. Calculate the photon current and carrier transit time for a photoconductor from the following data. Quantum efficiency = 70%, number of photons reaching per second = 950, mobility =  $3000\text{cm}^2/\text{V-s}$ , effective electric field =  $5\text{kV/cm}$ ,  $L = 8\mu\text{m}$ , carrier life time =  $0.65\text{ns}$ .
19. Determine the output voltage of an OPAMP for input voltage  $V_1 = 150\mu\text{V}$  and  $V_2 = 140\mu\text{V}$ . The amplifier has a differential gain of  $A_d = 3000$  and value of CMRR is 90.
20. You are given with three voltage sources of e.m.f. 1.08V, 1.42V and 1.5V. How will you construct (a) unit gain summing amplifier and (b) averaging circuit.
21. A digital system has 4 bit input from 0000 to 1111. Draw the truth table of the system which has high outputs when equivalent decimal inputs are 1,2,3,7,9,10 and 13. Draw the K- map for the truth table and obtain simplified Boolean equation.
22. Compare and contrast synchronous and asynchronous counters.

**(4x3=12 Weightage)**

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