

## FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCSS-PG)

Physics

PHY 1C 04—ELECTRONICS

[2012 Syllabus Year]

Time : Three Hours

Maximum : 36 Weightage

## Section A

*Answer all questions.**Each question carries a weightage of 1.*

1. Give the relation between the amplification factor for a FET and gate-source voltage.
2. Sketch a two input NAND gate using FET and verify whether it satisfies the Boolean NAND equation.
3. Define the quantum efficiency of a photo detector.
4. Write the relation between light intensity in a semiconductor and absorption co-efficient:- What is the significance of this relation ?
5. A 10 MHz clock frequency is applied to a cascaded counter consisting of a modulus 5 counter, a modulus- 8 and two modulus-10 counters. What is the lowest possible output frequency ?
6. In analogue computation, integrators are preferred to differentiators. Why ?
7. Which are the control and status signals of 8085 microprocessor ?
8. Sketch the timing diagram of a three stage ripple counter.
9. The summing amplifiers are used as mixers for mixing different signal voltages. Explain.
10. What is propagation delay time ? How is it related with the solution of racing problem in FFs ?
11. While executing a program, the 8085  $\mu$ P completes the fetching of the machine code located at the memory address 2057 H. What is the content of the program counter ? Why ?
12. Draw the frequency response curve for a first order LPF. What is the voltage gain at cut-off frequency,  $f_H$  and that above and below  $f_H$  ?

(12  $\times$  1 = 12 weightage)

Turn over

### Section B

Answer any **two** questions.

Each question carries a weightage of 6.

13. What is a voltage-variable resistor (VVR) ? How is a FET used as a voltage-variable resistance ? Explain.
14. Explain the principle of operation of the solar cell with the help of a schematic diagram.
15. Explain the circuit and working of a squaring circuit, if the input is a sine wave. Explain how it exhibits hysteresis.
16. Draw a master-slave JK FF. Explain its operation and show how the race round condition is eliminated.

(2 × 6 = 12 weightage)

### Section C

Answer any **four** questions.

Each question carries a weightage of 3.

17. The saturation drain current in a JFET is 8.6 mA when the gate voltage is zero. If the pinch off voltage is - 3V, calculate the drain current, when gate voltage is - 1V.
18. The bandgap of an alloy semiconductor GaAsP is 1.99 eV. Find the wavelength of radiation that is emitted when electron and holes in the material combine directly. Mention the colour of the radiation.
19. In a JK master slave FF, which  $J = K = 1$ , a clock pulse of frequency 1000 Hz drives the input. What is the frequency of the output wave form ? Sketch the sample input and output waveforms.
20. Using karunaugh map, simplify the logic funcyio  $L = \overline{XYZ} + \overline{XYZ} + \overline{XYZ} + \overline{XYZ}$ .
21. Design a BP filter for a lower cut-off frequency of 500 Hz and an upper cut-off frequency of 10 kHz and pass band gain is 4.
22. Write an assembly language programme for adding the contents of memory location 8000H and 8050H. store the results in 8100 H.

(4 × 3 = 12 weightage)