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Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCSS—PG)

Physics

PHY 1C 04—ELECTRONICS

(2017 Syllabus Year)

Time : Three Hours

Maximum : 36 Weightage

Section A

Answer **all** questions.

Each question carries weightage 1.

1. Define the threshold voltage of MOSFET.
2. Draw the circuit diagram of CMOS inverter, and explain its operation.
3. Explain the working of a tunnel diode.
4. Differentiate between visible and IR LEDs.
5. Explain the working of p-n junction solar cell.
6. What are the characteristics of an ideal operational amplifier ?
7. What is CMRR? What is its importance ?
8. Explain the action of a voltage follower.
9. What are the advantages of active filters over passive filters ?
10. Distinguish between dynamic and static RAM.
11. Explain the operation of JK flipflop.
12. Briefly explain the working of a ring counter.

(12 × 1 = 12 weightage)

Section B

Answer any **two** questions.

Each question carries weightage 6.

13. Explain the construction and working of N-channel JFET. Discuss the static and transfer characteristics. Obtain the expressions for drain resistance, amplification factor and transconductance.

Turn over

14. Explain the construction and operation of semiconductor laser.
15. Discuss the working of an emitter coupled differential amplifier and hence obtain the expressions for common mode and differential gain.
16. With the help of a block diagram explain the architecture of 8085 microprocessor.

(2 × 6 = 12 weightage)

Section C

Answer any four questions.

Each question carries weightage 3.

17. Sketch the cross section of an n-channel enhancement MOSFET. Draw the drain characteristics and the transfer curve.
18. What is a photoconductor? Obtain the expression for photocurrent.
19. For an op amp used as an inverting amplifier, determine the maximum output offset voltage $V_{I_{io}}$, caused by the input offset current I_{io} . Given $R_F = 100 \text{ K}\Omega$, $R_1 = 1 \text{ K}\Omega$, $I_{io} = 200 \text{ nA}$.
20. The input to the differentiator circuit is a sinusoidal voltage of peak value 5mV and frequency 1KHz. Find the output if $R = 100 \text{ K}\Omega$ and $C = 1 \mu\text{F}$.
21. Design a low pass filter at a cut off frequency of 1kHz with a pass band gain of 2.
22. $F = \bar{A}C + \bar{A}B + A\bar{B}C + BC$ is a logic equation. Make truth table and simplify using K map.

(4 × 3 = 12 weightage)