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Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2014

(CUCSS)

Physics

PHY 1C 04—ELECTRONICS

(2012 Admission onwards)

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. How is Digital switching done using MOSFET ?
3. What are the essential differences between a tunnel diode and a semiconductor junction diode?
4. Give the basic principle of the working of LDR. Mention its application.
5. Give the principle of working of an IR emitter. Mention two uses.
6. List the main characteristics of an ideal op-amp.
7. Give two characteristics of a non-inverting amplifier.
8. Draw the circuit of an op-amp as an adder.
9. What is a flip-flop ? Give two uses.
10. What are ripple counters ? Give its disadvantages.
11. What are the merits of CMOS ? Where are they used ?
12. Distinguish between active filters and Passive filters.

(12 × 1 = 12 weightage)

Part B

Answer any **two** *questions.*
Each question carries 6 *weightage.*

1. With the help of a circuit describe the working og a JFET common source amplifier. Derive expressions for the DC drain current I_D and DC drain voltage V_D.
2. Describe the construction and working of an emitter coupled differential amplifier. What are its limitations ? Explain why CMMR $\rightarrow \infty$ for a symmetrical circuit.

Turn over

3. Describe the operation of a Schmitt trigger. Draw its transfer characteristic. How is a slow varyi input voltage converted into an output voltage having abruptly varying wave forms using a Schm Trigger.

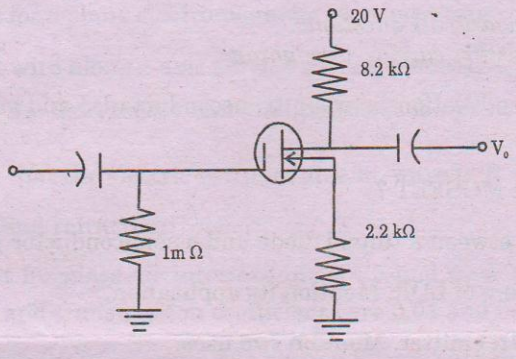
4. Explain CMOS Logic. Discuss the working of (a) CMOS Inverter ; (b) CMOS NAND Gate.

(2 × 6 =12 weightag

Part C

Answer any **four** *questions.*
Each question carries 3 *weightage.*

1.



If ID_{SS} = 8mA, Vp = – 8V Determine I_{DQ} and V_{GSQ} and V_D (Q is operating point)

2. A solar cell is realized in a material with the band gap of 1.3eV. What will happen to its efficie if its temperature is increased by 40 % ?

3. Determine the output voltage of an op-amp integrator when a 5mV, 1KHz sinusoidal signa applied (R = 100K, C = 1μF).

4. Draw the circuit of a square wave generator using op-amp. Obtain the equation for freque oscillation.

5. Explain how an active resonant band pass filter is constructed using op-amp. What is characteristics ?

6. Explain the working of a static RAM. Where are they used ?

(4 × 3 = 12 weight