

15P109

Name:.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXTERNAL EXAMINATION FEBRUARY 2016

(2015 Admission)

CC15P PHY1 C04 – Electronics

(Physics)

Time: 3 hours**Total weightage: 36****Part A***(Answer all questions. Each question has weightage 1)*

1. What is transconductance? Give the relation between transconductance and gate source cut off voltage .
2. Sketch the CMOS inverter and explain its operation.
3. Explain the design and working of MOSFET NOR gate.
4. Explain the working of tunnel diode.
5. Explain the working of LDR.
6. Draw the circuit diagram of emitter coupled differential amplifier and briefly explain it.
7. Discuss the dominant pole compensation.
8. Show how an OPAMP can be used to perform analog differentiation.
9. Write a note on pole zero and lead compensation.
10. How an OPAMP work as a scale changer?
11. Draw the gate diagram of JK flip flop and explain how it works.
12. What are the differential flags in 8085?

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

13. What are the transferred electron devices? Describe, with theory, tunneling and impact ionization processes occurring in TEDs. How are negative differential resistance regions formed in a TED?

14. Define open loop gain, CMRR, Output offset current and voltage and Slew rate of an OPAMP. How are they measured?
15. Draw the circuit diagram of OPAMP based astable and monostable multivibrators and discuss their working. Obtain expression for the frequency and duty cycle of the output waveforms.
16. Explain the architectural features of microprocessor with reference to 8085.

Part C

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

17. If V_{GS} of a FET amplifier changes from $-4.3V$ to $-4.1V$, the drain current changes from $1mA$ to $3mA$. Find the voltage amplification if the load resistance $R_d = 5k\Omega$. Assume $r_d \gg R_d$.
18. A solar cell under an illumination of $600Wm^{-2}$ has a short circuit current I_{sc} of $16.1mA$ and an open circuit output voltage $V_{oc} = 0.485V$. What are short circuit current and open voltage when the light intensity is doubled?
19. The slew rate of an OPAMP is $2V/\mu s$. What is the maximum closed loop voltage gain that can be used when the input signal varies by $0.5V$ in $10\mu s$.
20. Design a second order low pass filter with cutoff frequency $2.5kHz$.
21. A truth table has low outputs for inputs 0000 to 0110 , a high output for 0111 and low output for 1000 to 1001 and don't care states for 1010 to 1111 . Using K- map find the simplest logic circuit.
22. Draw the logic diagram, truth table and waveform for a mod-3 counter using two flip flops and explain how it works.
