5/12/2016

DOON UNIVERSITY, DEHRADUN

End Semester Examination, First Semester, 2016-17

School of Physical Sciences

MSc Physics two year programme

Course: PHC-405:Electronics

Time Allowed: 3 Hours *Maximum Marks: 50*

SECTION: A ***Attempt all questions.*** ***(Marks: 2X7=14)***

1. An opamp has a slew rate of 8V/μ sec. Find the full power band width for output sine wave of peak value 10V.
2. In an encoder to transform a decimal number into binary code, show the connections to the Y_1 or to the line W_6.
3. Describe programming methods of different types of ROM.
4. Draw circuit of 4 bit binary ladder digital to analog counter.
5. Draw circuit of a Hartley oscillator.
6. Define and give truth table of a tristate inverter circuit.
7. Draw block diagram of mod 6 synchronous (parallel) counter.

SECTION: B ***Attempt any three questions.*** ***(Marks: 5X3=15)***

8. Draw circuit of 3 bit shift counter and explain its working. What are illegal states?
9. Draw circuit of a regenerative comparator (Schmitt Trigger) and explain its operation and transfer characteristics.
10. A 10V zener diode along with a series resistance is connected across a 40 V supply. Calculate the minimum value of the resistance required, if maximum zener current is 50 mA.
11. Why is it desirable for an opamp to have a high CMRR? Calculate the output voltage of an opamp having CMRR= 10^3, it the two inputs are 1mV and 0.9 mV and the open loop gain is 10^5.

SECTION: C ***Attempt any three questions.*** ***(Marks: 7X3=21)***

12. Draw circuit of mod-10 counter in two ways and give their states.
13. Using a comparator and an integrator, draw the systems of triangular wave generator. Explain its working and derive an expression for its time period.
14. Draw block diagram of successive approx type A/D convertor and explain its working.

OR

Draw block diagram using opamp to solve the following differential equation:

$$\frac{d^2v}{dt^2} + K_1\frac{dv}{dt} + K_2v + K_3 = 0$$

15. State Barkhausen criteria for sustained oscillations. Draw circuit of Wien's bridge oscillator using opamp. Obtain its conditions of oscillation and frequency of oscillation.