LNMIIT
The LNM Institute of Information Technology

Electronics I

Lab Written Test

Name: **Roll No:** **Section:**

Date: 4th November 2016 **Time: 60 Minutes** **Max Marks. 30**

Notes: All questions are compulsory and each question carries 1 mark.
Assumptions made/clarifications should be written clearly.

1. CRO is an analog or Digital instrument?

   Analog

2. Mention the colour sequence of rings for 85kΩ resistor with 5% tolerance and having 4 rings?

   Gray, Green, Orange, Gold

3. What is the minimum voltage/division in the CRO present in the lab?

   5 mV

4. What is the power rating of for most of the common resistors in our lab?

   0.25 W

5. Why do we use bulky (power) resistor for few of the experiments?

   If the power absorbed by the resistor would be more than 0.25W.

   → This protects the circuit from blowing because of excessive heat

6. What is the purpose of X-Y mode in CRO?

   To get Lissajous figure for a component. For capacitor, it is circle, and elipse for RC.

7. What is written on the body of 10nF ceramic capacitor?

   103

8. If you have four 1kΩ resistors in parallel and one of them is blown, then what is the effective resistance offered by the combination?

   Now we have 3 resistors in parallel.

   ∴ R_{eff} = 333 Ω

9. If three different resistors are placed in series with a voltage source, which resistor have the greatest power loss?

   The one with highest resistance

   ∵ each will have equal current.

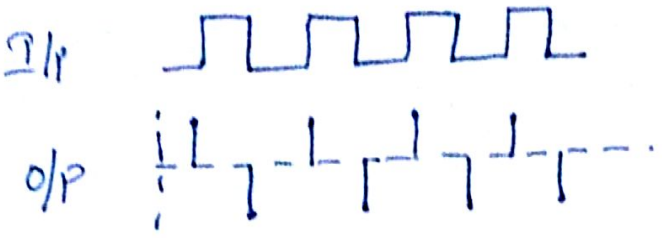
   and $P = I^2R$

10. Typical Resistance of Voltmeter should be:

Ideal = ∞

Typical ~~50Ω~~ ≥ 100 MΩ

11. When a square pulse is given as input to Op-Amp differentiator, draw the input and output waveforms.



12. In an Op-Amp integrator what combination of R and C will make sure that input and output signals have same amplitude?

Product of R and C should be 1.

or $R = 1/C$

13. Minimum number of bits required to represent binary numbers 31 to 45 are?

Total numbers to be represented are 15

$\therefore$ Min bits = 4

14. A system have 3 inputs (x, y, z) and one output (P). P is '1' if there are more number of 1's in the input vector. Write down the truth table to representing this system.

x y z	P
0 0 0	0
0 0 1	0
0 1 0	0
0 1 1	1
1 0 0	0
1 0 1	1
1 1 0	1
1 1 1	1

15. Find out the Optimized SoP for Question. 14

P \ yz	00	01	11	10
x = 0			1	
x = 1		1	1	1

$P = xy + yz + xz$

16. Obtain the Maxterms of the function $f(A,B,C) = (A + B)C$

$= AC + BC$

A \ BC	00	01	11	10
0	0	0	1	0
1	0	0	1	1

$\therefore$ Maxterms are (0, 1, 2, 4, 5)

or

$(A+B+C)$, $(A+B+\bar{C})$, $(A+\bar{B}+C)$

$(\bar{A}+B+C)$ and $(\bar{A}+B+\bar{C})$

17. If you have Norton equivalent of a circuit, then how to find the Thevenin equivalent of the same?

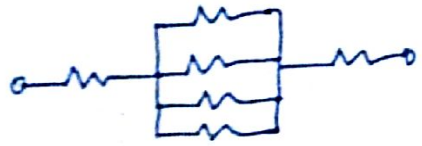
If I_{NO} and R_{NO} are named norton equivent.
Then series Combination of R_{NO} and $V_{TH} = (I_{NO} \times R_{NO})$ is Thevenin equivalent.

18. Convert $(348A)_{16}$ into quaternary number system (base = 4)

$(348A)_{16} = (0011,0100,1000,1010)_2$

$= (03102022)_4$

19. You have only 100Ω resistors with you. How would you obtain 225Ω using minimum number of such transistors?



each $R = 100\Omega$.

20. Why can't we measure current in parallel?

∵ Ammeter have ~~infinite~~ zero resistance and thus all the current will flow through it and none through the element.

21. How can we improve power factor of an inductive load (like AC motor)?

By connecting a capacitor in parallel to the load.

22. Why can't the output of Op-Amp be less than -Vcc?

∵ The internal BJT's can't produce an output below the minimum voltage supplied which is $-V_{CC}$.

23. Define Superposition Theorem.

Theorm states that, for a linear system, the response in any branch is algebraic sum of responses caused by all independent sources present in the circuit.

24. Define Super-node.

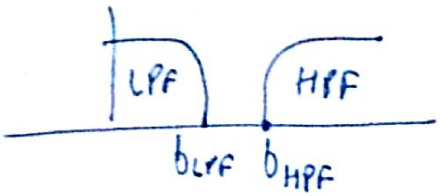
In KCL super node represents a surface, inwhich ~~Can be~~ all the nodes can be represented by a single variable along with some constant values.

25. What does Bode plot show?

Bode plot represents the frequency response of a circuit.
It's a plot of Amplitud/gain Vs freqrency.

26. The cut off frequencies of a Band stop filter are f_{HPF} and f_{LPF} which one is higher?

f_{HPF} would be higher



27. How to calculate the energy stored in an inductor?

$$E = \frac{1}{2} L I^2$$

28. Define active and passive elements in a circuit.

Passive Element: Those Components which doesn't generate power, but dissipates, store/release it. (R, L, C)

Active Element: Those Components which generates power.

29. What is the average value of a pure sinusoidal wave with peak amplitude 10V, and frequency 10 kHz.

Avg Value = 0.

30. Write the names of lab superintendent, 1 faculty member and 4 TAs associated with the lab.

Lab Superintendent: Kushmakar Sharma

FACULTY MEMBER:
NIKHIL SHARMA, JOYEETA SINGHA
SOVAN MUKHERJEE, SANTOSH SHAH

TAs.
1. Shobit Agarwal
2. MONIKA JAIN
3. Vaidehi Sharma
4. Mohita Jaiswal
5. Sarthak Soni
6. Samyak Dutt Gupta
7. Shourya Shubham
8. Kritika Tohari
9. Himanshu Jain
10. Ruchi Gupta
11. Harshit Somani
12. Shriya Rai
13. Meenakshi Modi
14. Mithin Nair
15. Anusha Agarwal
16. Ankit Puri
17. Aastha Bhardwaj
18. Deepa Daga
19. Bharti Sharma
20. Himanshi Khandelwal
21. Riddhi Gupta
22. Nishita Gupta
23. Shivansh Bhatnagar
24. Shivani Manhas
25. Priyansh Jain
26. Sparsh Gupta
27. Samyak Jain
28. Saumya ~~Jain~~ Mishra
29. Deeksha Gupta.