Roll No.:.....

National Institute of Technology, Delhi December 2018

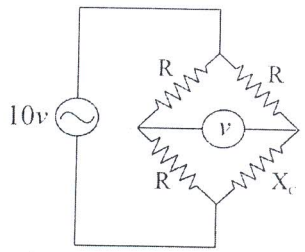
Name of the Examination: B.Tech.

Branch	**: EEE & ECE**	**Semester**	**: I**
Title of the Course	**: Introduction to Electrical and Electronics Engineering**	**Course Code**	**: EEB100**
Time: 3 Hours		**Maximum Marks: 50**	

Section A (10x01 = 10)

Answer all the questions

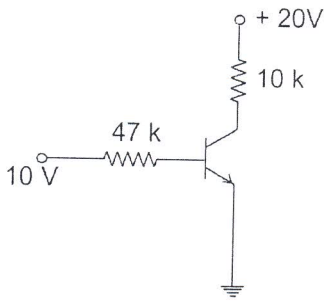
1. In the bridge circuit shown in fig. when $\frac{X_c}{R} = 1$ the voltmeter reads;



(a) 5 v (b) 0 v (c) 2.5 v (d)10 v

2. In the p & n regions of the p-n junction the _____ & the _____ are the majority charge carriers respectively.
(a) holes, holes (b) electrons, electrons (c) holes, electrons (d) electrons, holes

3. In a transistor circuit shown in figure below collector to ground voltage is +20 V. Which of the following is the probable error?
(a) Collector emitter terminals shorted
(b) Emitter to ground connection open.
(c) 10 KΩ resistor open
(d) Collector base terminal shorted.



4. If α=0.98. I_{CO} = 6μA and I_β = 100 μA for a transistor, then the value of I_C will be:

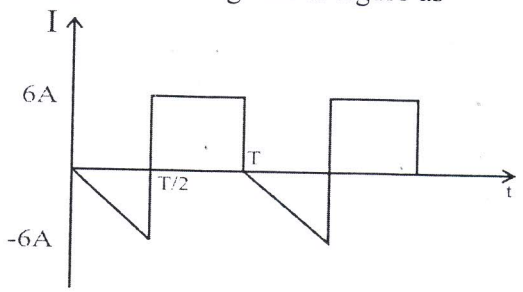
(a) 23 mA (b) 3.1 mA (c) 4.6 mA (d) 5.2 mA

5. The inputs of a NAND gate are connected together. The resulting circuit is .....

(a) OR gate (b) AND gate (c) NOT gate (d) None of the above

6. The hexadecimal equivalent of decimal number 10767 is
(a) 2A3F (b) 2A1F (c) 2A0F (d) 2A00

7. The rms value of the periodic waveform given in figure as



(a) $2\sqrt{6}$ A (b) $6\sqrt{2}$ A (c) $\sqrt{4/3}$ A (d) 1.5 A

8. No load current in a transformer:
   (a) lags the applied voltage by 90°
   (b) lags the applied voltage by somewhat less than 90°
   (c) leads the applied voltage by 90°
   (d) leads the applied voltage by somewhat less than 90°

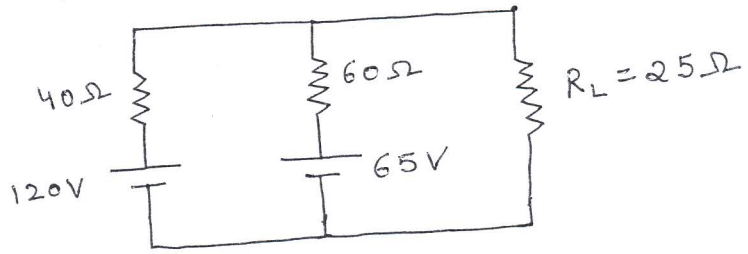
9. A 4–pole, DC generator has a simplex wave-wound armature containing 32 coils of 4 turns each. Its flux per pole is 0.04 Wb. The machine is running at 280 rpm. The induced armature voltage is
   (a)96 V (b) 98 V (c)384 V (d) 95.57 V

10. If A and B are the inputs of a half adder, the sum is given by
   (a) A AND B (b) A OR B (c) A XOR B (d) A EXOR B

Section A (04x05 = 20)

Answer any four questions

11. Find the current in the $R_L = 25\ \Omega$ resistor of the network shown in below figure by using Norton's theorem.



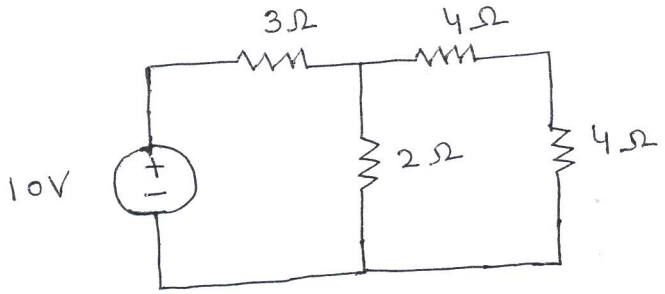
12. For the circuit shown in above Q-11, what is the maximum power that can be absorbed by the load if it is varied? Find the efficiency of the system. What is the efficiency at $R_L = 25\ \Omega$?

13. Find the minimum number of 2 input NAND gates required to implement the following function,

$$F = (\overline{X} + \overline{Y})(Z + W)$$

14. Represent the EMF equation of Transformer using phasor diagram.

15. Find the currents in each branch of the below given figure



Section C (02x10 = 20)

Answer any two questions

16. Minimize/Simplify the following Boolean expression using Boolean identities:

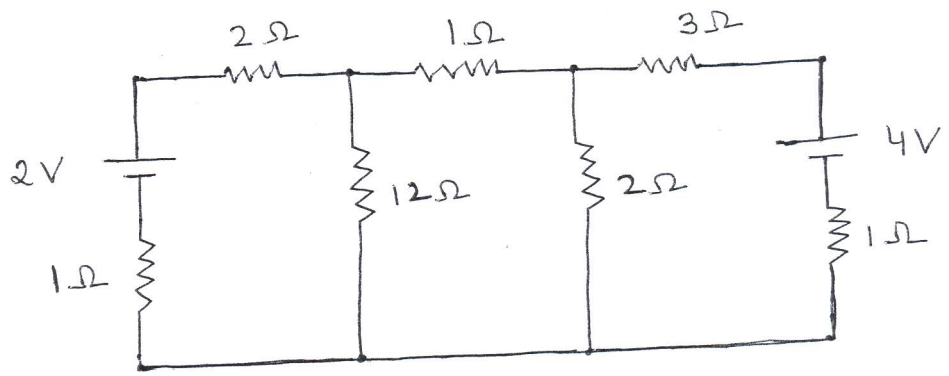
(a) F (A, B, C)= A'B+BC'+BC+AB'C' (b) F (A, B, C)= (A+B) (B+C)

17. Discuss the constructional features and working principle of DC Machine with the help of neat diagrams.

18. Find the current in the 2 Ω resistor of the network shown in figure by the following methods:

a) Thevenin's theorem

b) Superposition theorem



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