Total No. of Questions – [05]   Total No. of Printed Pages [2]

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F. Y. B. TECH. (COMMON) (SEMESTER - II)

COURSE NAME: Basic Electronics Engineering

(2017 PATTERN)

Time: [2 Hours]   [Max. Marks: 50]

(*) Instructions to candidates:
1) Answer Q.1 OR Q.2, Q.3 OR Q.4 and Q.5
2) Figures to the right indicate full marks.
3) Use of scientific calculator is allowed
4) Use suitable data wherever required

Q.1 a) Construct NOT, OR and AND gates using only NAND gates. [6]
b) Write truth table of Ex-NOR gate. Develop Ex-NOR gate logic [6] expression using De-Morgan's theorem.
c) Prove the following [4]
i) $A + AB + A\bar{B}C = A$
ii) $(\bar{A} + B)C + ABC = C(\bar{A} + B)$

OR

Q.2 a) Convert binary number 110010.1011 to decimal number and convert [6] decimal number 69.625 to binary number.
b) Draw the block diagram of full Adder using two half adders. Explain its [6] working with proper expression along with sum and carry.
c) What are the advantages of Digital Electronics over Analog Electronics? [4]

Q.3 a) Explain the working of LVDT using circuit diagram. State any two [6] advantages and disadvantages of LVDT.
b) Define linearity ,accuracy, sensitivity and repeatability of transducer [4]
c) Draw the construction diagram of strain gauge and explain working [4] principle of it.

OR

Q.4 a) Define Instrumentation. What are the various blocks involved in [6] instrumentation system?
b) Using primary and secondary transducers, explain how to measure [4] pressure in industrial systems.
c) List any four important factors used in selection of transducers. [4]

Q.5) Attempt following multiple choice questions:[2x10=20 marks]

1. The average output voltage in the circuit shown in figure is [2]
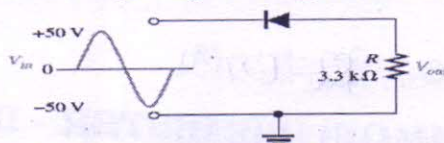
   a) -15.7 V   b) 15.7 V   c) 31.4 V   d) -31.4 V

2. When the reverse current in particular Zener diode increases from 20mA [2] to 30mA, the Zener voltage changes from 5.6V to 5.65 V. The resistance of Zener diode will be

   a) 1 Ω b) 5 Ω c) 0.5 Ω d) 10 Ω

3. In a given single stage transistor amplifier collector resistance is 2.2KΩ [2] and r_e is 20 Ω and supplied with 10 mV, the output voltage will be

   a) 1V   b) 1.2 V   c) 1.1V   d) -1V

4. If I_E=5.34mA , I_B= 475 μA, current gain beta of BJT will be [2]

   a) 10.24   b) 9.24   c) 10.48   d) 11.24

5. For n channel E-MOSFET, if V_{GS}=5V, Vth=1V and K=6.17mA/V^2 the [2] drain current is

   a) 95mA   b) 90.18mA   c) 98.7mA   d) 101.24mA

6. For SCR with firing angle of α=90, the DC voltage at the output of full [2] wave controlled rectifier is

   a) Vm/π b) 2Vm/π c) Vm/2π d) 0

7. The specified value holding current for SCR means that ----- [2]
   a) the device will turn on when the anode current exceeds this value
   b) the device will turn off when the anode current falls below this value.
   c) the device may be damaged if the anode current exceeds this value.
   d) the gate current must equal or exceed this value to turn the device on.

8. A certain non-inverting amplifier has an R_1=1KΩ and RF=100KΩ. The [2] close loop gain is

   a) 100,000   b) 1000   c) 101   d) 100

9. If $A_{v(d)}$=3500 and A_{cm}=0.35, the CMRR is [2]

   a) 1225   b) 10,000   c) 80dB   d) answer (b) and (c)

10. The output of a particular op-amp increases 8V in 12μs. The slew rate is [2]

   a) 96V/μs   b) 0.67V/μs   c) 1.5V/ μs   d) none of these