Total No. of Questions – [05]   Total No. of Printed Pages 04

G.R. No.	

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F. Y. B. TECH. (COMMON) (SEMESTER - I)
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) State and prove Demorgan's theorems, Draw the logical diagrams. [6]
b) Design half adder with the help of suitable logic gates. [6]
c) Prove the following [4]
i) $(A+B)(A+C) = A+BC$

ii) $\overline{A\overline{B} + \overline{C}D + EF} = (\overline{A} + B)(C + \overline{D})(\overline{E} + \overline{F})$

OR

Q.2 a) Convert binary number 110110.1011 to decimal number and convert [6] decimal number 82.625 to binary number.
b) Explain the working of 4:1 MUX and 1:4 De-MUX with block diagram [6] and truth table.
c) Explain D flip flop with truth table. [4]

Q.3 a) Draw and explain the block diagram of basic instrumentation system. [6]
b) Compare active and passive transducer. [4]
c) Explain any four characteristics of transducer. [4]

OR

Q.4 a) What is RTD? Explain its construction and working principle. Draw the [6] circuit diagram for measurement of temperature using RTD.
b) What is primary and secondary transducer? State two examples of each. [4]
c) Draw the construction diagram of thermistor and explain the working [4] principle of it.

Q.5) Attempt following multiple choice questions: [1x20=20 marks]

1. Peak inverse voltage for a diode is the [1]
   a) voltage corresponding to rated maximum voltage
   b) maximum voltage that can be applied across the diode in the conducting direction
   c) maximum voltage that can be applied across the diode in the non-conducting direction
   d) none of the above.

2. The output frequency of a full-wave rectifier is _____ the input [1] frequency.
   a) one-half
   b) equal to
   c) twice
   d) one-quarter

3. In photodiode ------------ current is proportional to light incident. [1]
   a) forward current
   b) reverse current
   c) reverse leakage current
   d) dark current.

4. Which diode(s) have a zero current and voltage drop in the ideal model? [1]
   a) Si
   b) Ge
   c) Neither Si nor Ge
   d) Both Si and Ge

5. In LED light is emitted because [1]

   a) Diode gets heated up
   b) Light falling on gets amplified
   c) Light gets reflected due to lens action
   d) Recombination of charge carriers take place

6. A transistor has a β_{dc} of 250 and a base current, I_B of 20 μA. The collector [1] current, I_c equals:

   (a) 500 mA   b) 5 A c) 50 mA   d) 5 mA

7. The phase difference between the input and output ac voltage signals of a **[1]** common-emitter amplifier is _____.
   a) 0°
   b) 180°
   c) 80°
   d) 360°

8. V_{CE} approximately equals _____ when a transistor is in cut off state. **[1]**
   a) V_B
   b) V_{CC}
   c) 0.2 V
   d) 0.7 V

9. In which region are both the collector-base and base-emitter junctions **[1]** Revese-biased?

   a) Active
   b) Cutoff
   c) Saturation
   d) All of the above

10. When transistors are used in digital circuits they usually operate in the: **[1]**
    a) active region
    b) breakdown region
    c) saturation and cutoff regions
    d) linear region

11. A BJT is a _____-controlled device. The MOSFET is a _____- **[1]** controlled device.
    a) voltage, voltage
    b) voltage, current
    c) current, voltage
    d) current, current

12. Which of the following devices does not have a cathode terminal? **[1]**

    a) SCR
    b) PN Junction Diode
    c) Triac
    d) Zener diode

13. Which of the following transistors can an SCR be represented as?   [1]

      a) npn, pnp
      b) npn, npn
      c) pnp, pnp
      d) None of the above

14. In the forward-blocking region, the SCR is   [1]
      a) in the *off* state
      b) reverse-biased
      c) in the *on* state
      d) at the point of breakdown

15. In E-MOSFET, there is no drain current until V_{GS} [1]

      a) reaches V_{GS}(th)
      b) is positive
      c) is negative
      d) equals 0 V

16. How many terminals do the 78XX series fixed positive voltage regulators   [1]
have?
      a) 2   b) 3   c) 4   d) 5

17. The 7912 regulator IC provides _____ .   [1]

      a) 5 V   b) -12V   c) 12V   d) -5V

18. With zero volts on both inputs, an op-amp ideally should have an output   [1]
equal to

      a) the positive supply voltage
      b) zero
      c) the negative supply voltage
      d) the CMRR

19. For an op-amp with negative feedback, the output is   [1]
      a) equal to the input
      b) increased
      c) fed back to the non-inverting input
      d) fed back to the inverting input

20. A voltage-follower   [1]
      a) has a gain of 1
      b) is non-inverting
      c) has no feedback resistor
      d) has all of these