Higher Secondary Revision Examination - 2018-19 – Unit:9

PHYSICS

N.B.  

i) Answer all the following.

ii) Choose and write the correct answer with option.  

10 x 1 = 10

1. The electrons in the atom of an element which determine its chemical and electrical properties are called
   a) valence electrons   b) revolving electrons c) excess electrons   d) active electrons

2. The colour of light emitted by a LED depends on
   a) its reverse bias b) the amount of forward current   c) its forward bias   d) type of semiconductor material

3. The emitter base junction of a given transistor is forward biased and its collector-base junction is reverse biased. If the base current is increased, then its
   a) $V_{CE}$ will increase  b) $I_C$ will decrease   c) $I_C$ will increase               d) $V_{CC}$ will increase

4. In a Colpitt’s oscillator circuit
   a) capacitive feedback is used b) tapped coil is used   c) no tuned LC circuit is used d) no capacitor is used

5. The relation between $\alpha$ and $\beta$ of a transistor is
   a) $\beta = \frac{1}{1 + \alpha}$  b) $\alpha = \frac{\beta}{1 - \beta}$   c) $1/\alpha - 1/\beta = 1$ d) $\alpha = 1 + \beta / \beta$

6. In multimeter, __________ is used to convert a.c components into d.c components
   a) transformer b) rheostat c) rectifier d) capacitor

7. A tank circuit consists of inductance $(1/4\pi^2)$ H and capacitance 1 pF. The resonant frequency of the circuit is
   a) $10$ MHz b) $1$ KHz   c) $10$ KHz d) $1$ MHz

8. A logic gate for which there is an output only when both the inputs are zero is
   a) NAND   b) NOR                  c) EX-OR   d) AND

9. Forbidden energy gap for the semiconductors Ge and Si respectively
   a) 1.1 eV and 0.7 eV  b) 0.7 eV and 1.1 eV  c) 4 eV and 0.7 eV d) 1.1 eV and 7 eV

10. The truth table of the logic circuit given below is

II. Answer for any four of the following. Question No.15 is compulsory: 4 x 2 = 8

11. Define band width of an amplifier.

12. Differentiate between linear IC’s and digital IC’s.

13. What are universal gates? Why are they called so?

14. What is an intrinsic semiconductor? Give two examples.

15. When there is no feedback the gain of the amplifier is 100. If 5% of the output voltage is fed back into the input through a negative feedback network, find out the voltage gain after feedback.

III. Answer for any four of the following. Question No. 20 is compulsory: 4 x 3 = 12


17. a) Give the Barkhausen criteria for oscillations. b) Write the different methods of doping a semiconductor.

18. Distinguish between Avalanche breakdown and Zener breakdown (any three points).

19. State and prove de Morgan’s theorems.

20. Prove the following logic expression: \((A \bar{B} + B) = B\)

IV. Answer all the following: 2 x 5 = 10

21. a) Describe the Valence band, Conduction band and Forbidden energy gap with the help of energy level diagram.
   (or)
   b) Explain the working of Bridge rectifier with diagram. Draw input and output signals.

22. a) Sketch the circuit of Colpitt’s oscillator. Explain its working.
   (or)
   b) i) Describe the construction of Zener diode.
   ii) Distinguish between analog signal and digital signal.