Q.P. Code : 11124

First Semester B.Sc. Degree Examination,
November/December 2019

(CBCS Scheme – Freshers & Repeaters (Common))

Electronics

Paper I – BASIC ELECTRONICS

Time : 3 Hours] *[Max. Marks : 70*

Instructions to Candidates :

1) *Answer all questions from Part–A, any Five from Part–B and any Four from Part–C.*

2) *Answer all questions of Part–A in any one page, the same questions answered multiple times will not be considered for evaluation.*

PART – A

Answer all the sub-divisions : **(15 × 1 = 15)**

1. (a) In a step down transformer, the number of turns in the secondary coil is

(i) less than primary coil turns (ii) more than primary coil turns

(iii) equal to primary coil turns (iv) none of the above.

(b) Higher the Q factor of a resonant circuit

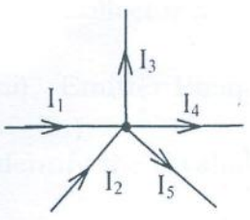
(i) Smaller the bandwidth

(ii) Larger the bandwidth

(iii) Smaller the resonant frequency

(iv) Larger the resonant frequency.

(c) When KCL is applied to the node shown in figure, the equation is



(i) $I_1 + I_2 - I_3 - I_4 - I_5 = 0$ (ii) $I_1 + I_5 + I_4 - I_2 - I_3 = 0$

(iii) $I_1 - I_2 + I_3 + I_4 - I_5 = 0$ (iv) $I_1 - I_2 - I_3 - I_4 - I_5 = 0$.

(d) Super position theorem can be applied only to circuits having

(i) Resistive elements (ii) Passive elements repeat

(iii) Non-linear elements (iv) Linear bilateral elements.

(e) A constant current source with a resistance in a parallel represents

(i) Norton's equivalent circuit (ii) Thevenin's equivalent circuit

(iii) Kirchhoff's equivalent circuit (iv) Millman's equivalent circuit.

(f) Third approximation of a diode is represented by

(i) dc source with a series ideal diode

(ii) only a series resistance

(iii) only an ideal diode

(iv) dc source with ideal diode and a resistance.

(g) Which of the following is not an essential element of a d.c. power supply

(i) filter (ii) rectifier

(iii) voltage regulator (iv) voltage amplifier.

(h) In a centre tapped Full wave Rectifier, if the peak voltage across each section in the secondary of the transformer is 100 V, PIV appearing across each diode is

(i) 100 V (ii) 200 V

(iii) 300 V (iv) 50 V.

(i) In a Bipolar Junction Transistor

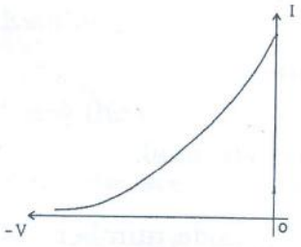
(i) Emitter is moderate in size and heavily doped

(ii) Emitter is larger in size and heavily doped

(iii) Emitter is smaller in size and heavily doped

(iv) Emitter is smaller in size and lightly doped.

(j) The which device exhibits the following transfer characteristics is



(i) Diode (ii) BJT

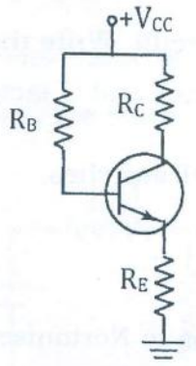
(iii) Zener diode (iv) JFET.

(k) When the collector-base junction in transistor is reverse biased and the emitter-base junction is forward biased, the transistor is said to be in the

(i) active region (ii) cut-off region

(iii) saturation region (iv) switching region.

(l) The biasing circuit shown here is ————



(i) Collector to base Bias (ii) Voltage divider Bias

(iii) Emitter Bias (iv) Fixed bias with emitter feedback.

(m) Identify the invalid BCD number in the following

(i) 1001 (ii) 1111

(iii) 1000 (iv) 0111.

(n) The code used in digital systems to represent decimal digits, alphabets and other special characters such as +, –, *, etc. is

(i) EBCDIC (ii) Gray

(iii) BCD (iv) Hexadecimal.

(o) Next consecutive number in the array of Gray code numbers 0000, 0001, 0011 is

(i) 0010 (ii) 0110

(iii) 0111 (iv) 1110.

PART – B

Answer any **FIVE** questions : **(5 × 7 = 35)**

2. (a) Explain the method of conversion of a voltage source into a current source.

(b) Explain with a circuit, growth of charge in a series RC circuit. Show it graphically and define 'time constant'. **(2 + 5)**

3. (a) Draw the circuit diagram of a parallel resonance circuit. Write the condition for Resonance and expressions for resonant frequency and Q factor.

(b) Draw the circuit symbols for SPDT, DPST and DPDT switches. **(4 + 3)**

4. (a) State Super position theorem.

(b) With the help of circuit diagrams, explain the steps to Nortonise a resistive network. **(2 + 5)**

5. (a) Draw the block diagram of a regulated power supply.

(b) With a circuit diagram, explain the working of a Zener diode as a voltage Regulator. **(2 + 5)**

6. (a) With a circuit diagram, explain the operation of a Shunt capacitor filter.

(b) Draw the circuit of a centre tapped full wave rectifier. **(5 + 2)**

7. (a) With a relevant diagram, explain the working of an NPN Transistor.

   (b) Establish the relation between 'α' and 'β' for a transistor. **(5 + 2)**

8. (a) Draw the circuit of a Darlington pair transistor and write its applications.

   (b) Write the need for biasing. Define the term "Stability factor". **(3 + 4)**

9. (a) Explain with example, method to convert a decimal number into its Hexadecimal Equivalent.

   (b) Write the Excess 3 and Gray code equivalents for all the Decimal digits. **(3 + 4)**

PART – C

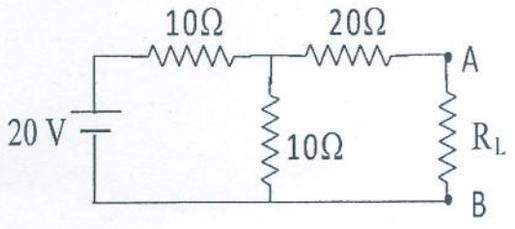
Answer any **FOUR** questions : **(4 × 5 = 20)**

10. A series resonance circuit has a capacitor of 220 pF, an inductor of 50 μH and a resistor of 10 Ω. Calculate :

    (a) resonant frequency

    (b) band width when Q factor is 200.

11. Determine value of R_L for Maximum power transfer in the following circuit. Also calculate the Maximum power delivered to the load.



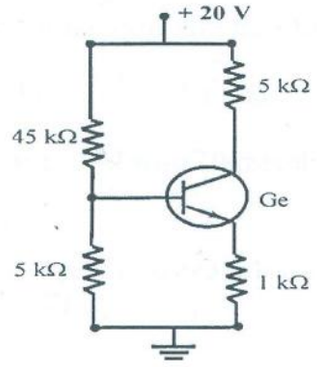
12. In a half-wave rectifier circuit the input voltage is 220 V and the transformer ratio is 10 : 1. Determine :

    (a) Dc output voltage and

    (b) PIV. Assume the diode as ideal.

13. Draw the D.C. load line and mark the operating point for the biasing circuit shown.

Given : $\beta = 200$.



14. (a) Subtract $3F_{(16)}$ from $2D_{(16)}$ using 2's complement method.

(b) Add $10001_{(2)}$ with $1001_{(2)}$ **(3 + 2)**

15. (a) Convert the following binary numbers into decimal

(i) $110101001_{(2)}$ (ii) $1100111_{(2)}$

(b) Subtract $C9_{(16)}$ from $FF_{(16)}$. Express the result in Binary. **(2 + 3)**