



SN – 390

I Semester B.Sc. Examination, November/December 2017
(CBCS) (2014 – 15 and Onwards) (F+R)
ELECTRONICS – I
Basic Electronics

Time : 3 Hours

Max. Marks : 70

- Note :** 1) Answer **all** questions from Part – A, **any five** from Part – B and **any four** questions from Part – C.
- 2) Answer **all** questions from Part – A in **any one** page, the same question answered multiple times will **not** be considered for evaluation.

PART – A

Answer **all** the sub divisions.

(15×1=15)

1. i) We need a resistor of value $47\text{ K}\Omega$ with $\pm 5\%$ tolerance. The sequence of the color band on this resistor should be
- a) yellow, violet, yellow and gold b) yellow, violet, orange and gold
c) yellow, violet, orange and silver d) yellow, violet, brown and gold
- ii) In a step up transformer, the number of turns in the secondary coil is
- a) Less than primary coil turns b) More than primary coil turns
c) Equal to primary coil turns d) None of the above
- iii) Thevenin's equivalent circuit consists of a
- a) constant voltage source with a resistance in parallel
b) constant voltage source with a resistance in series
c) a current source with an voltage source
d) current source in series with a resistance
- iv) According to Kirchhoff's current law, the algebraic sum of the currents meeting at a point is always
- a) zero b) positive
c) negative d) equal to unity
- v) In order to obtain a maximum power from the terminals of a network, the load resistance should be
- a) greater than the circuit resistance b) equal to the circuit resistance
c) less than the circuit resistance d) double the circuit resistance

XORBB
1001
02
B

P.T.O.



- xiv) The principal characteristic feature of gray code is
 - a) It changes by only one bit between two consecutive numbers
 - b) It has more number of ones
 - c) It has more number of zeros
 - d) It changes by two bits between two consecutive numbers
- xv) Invalid numbers in BCD are
 - a) 1001, 1000, 0111, 0000, 0010 and 0011
 - b) 0001, 0010, 0111, 0110, 0010 and 0011
 - c) 1010, 1011, 1100, 1101, 1110 and 1111
 - d) 1000, 1001, 0111, 0010, 0011 and 0111

PART - B

8421
1010
1011

Answer **any five** questions.

(5x7=35)

- 2. a) Explain the method of conversion of a voltage source into a current source.
b) Draw the circuit diagram of series RC circuit. Write the expressions for charging and discharging of the circuit. Show it graphically. (2+5)
- 3. a) Draw a series RL circuit excited by an a.c. source. Write the equations for voltage, impedance and phase angle.
b) Draw the circuit symbols for SPDT, DPDT and SPST switches. (4+3)
- 4. a) State Maximum power transfer theorem.
b) State Norton's theorem. With suitable circuit diagrams, explain the steps to Nortonise a resistive network. (2+5)
- 5. Draw the circuit diagram of full wave bridge rectifier and explain its working. Draw the input and output wave forms. Mention its advantages and disadvantages. 7
- 6. a) What is a filter ? Draw the circuit diagram of capacitor filter.
b) With the circuit diagram, explain working of Zener diode voltage regulator. (2+5)
- 7. a) Define α and β of a transistor.
b) Draw the experimental circuit to study CE characteristics of a transistor. Plot the input and output characteristics graphs and indicate the different regions. (2+5)
- 8. a) Draw the diagram of voltage divider biasing circuit. Write the expressions for Q point.
b) With necessary diagram, explain the working of JFET. (3+4)
- 9. a) Explain with numerical example, method to convert a decimal number into its binary equivalent. Consider the integer and fractional parts of decimal number.
b) Write the BCD and Excess 3 code for all the decimal digits. (4+3)

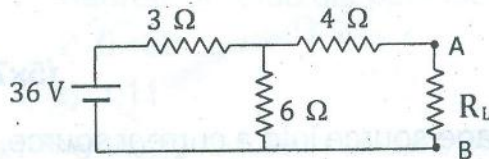


PART - C

Answer any four questions.

(4x5=20)

10. A series resonance circuit has a capacitor of 100 pF, an inductor of 100 μH and a resistor of 5 Ω. Calculate.
 - i) Resonant frequency
 - ii) Band width when Q factor is 200.
11. Using Thevenin's theorem, find the current in $R_L = 10\ \Omega$ in the following circuit. Also write Thevenin's equivalent circuit.



2.718
2.718

12. Calculate efficiency and PIV of a half wave rectifier circuit with an input voltage of 220 V rms and load R_L of 100 Ω. Given $r_d = 5\ \Omega$ and turns ratio of the transformer is 10 : 1.
13. Following observations have been recorded in an experiment to plot the characteristics of an NPN transistor in CE mode. Determine, r_i , r_o and the current amplification factor β_{ac} .

V_{BE} (volt)	I_B (μA)	V_{CE} (volt)	I_C (mA)
0.65	50	6	5
0.70	100	6	10
0.70	100	11	10.5

8421
0.729
6.729
7.387
0.7295

14. Subtract the following numbers using 2's complement method

- i) $(BF)_{16} - (FB)_{16}$
- ii) $(10010)_2 - (1001)_2$

$1 + 4 + 16 + 32 + 64 + 128$ (3+2)

15. a) Convert the following Gray numbers in to equivalent binary numbers.

- i) 1001010
- ii) 11001100

- b) Express the $(F5)_{16}$ in binary and decimal number.

16 | 24 | 16 | 80
1.5
214
1570
(3+2)