NRT/KS/19/2026

Bachelor of Science (B.Sc.) Semester—I Examination
ELECTRONICS
(Electronic Components, Network Theorems)
Optional Paper—1

Time : Three Hours]   [Maximum Marks : 50

N.B. :— (1) **All** questions are compulsory and carry equal marks.

(2) Draw well labelled diagrams wherever necessary.

EITHER

1. (A) What is relay ? State any four applications of relay.

What is an inductor ? Explain different types of inductor. What are the factors affecting inductance of inductor ?   3+7

OR

(B) Draw the block diagram of CRO and explain the function of each block in brief.   3+7

EITHER

2. (A) State Thevenin's theorem and explain the procedure to Thevenize the circuit with suitable network.

Explain Kirchoff's voltage law and Kirchoff's current law.   6+4

OR

(B) State and explain Maximum Power Transfer Theorem. Calculate the current flowing through 2Ω resistance in the following circuit using Norton's theorem.   5+5
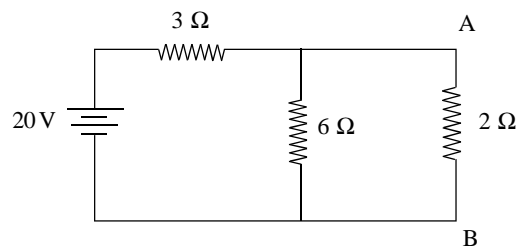
EITHER

3. (A) Explain the V-I characteristics of PN junction diode and define reverse saturation current and cut in voltage.

Explain Avalanche and Zener breakdown mechanism.   6+4

OR

(B) Explain Intrinsic and Extrinsic Semiconductors. Explain the construction and working of LED.
                                                                                          5+5

EITHER

4. (A) Draw and discuss the input and output characteristics of transistor in CE mode.

Define α and β of transistor and obtain relation between them.   5+5
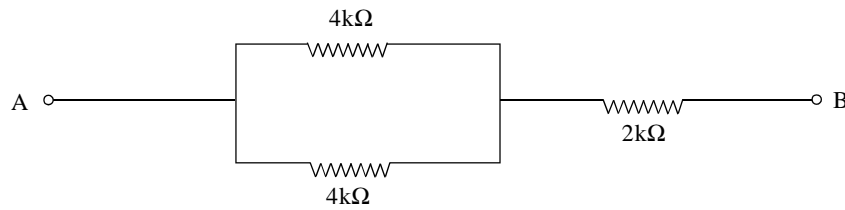
OR

(B) Explain in detail the potential divider method of biasing of transistor. Explain the action of transistor as switch with the help of neat circuit diagram.   5+5

5. Solve any **TEN** questions :

(A) What is transformer ?

(B) Find equivalent resistance in the following circuit :

4kΩ

A   B
                                                    2kΩ
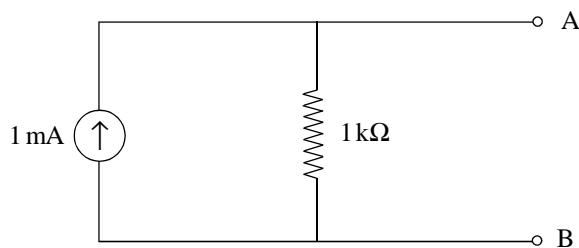
4kΩ

(C) State two applications of CRO.

(D) What is an ideal voltage source ?

(E) State superposition theorem.

(F) Draw the equivalent voltage source for the given circuit :

A

1 mA   1 kΩ

B

(G) Define Conductor and Insulator.

(H) State the effect of biasing on the width of depletion region.

(I) What is stability factor ?

(J) State different types of configuration of BJT.

(K) Draw the symbol of pnp and npn transistor.

(L) In CE mode transistor, $\beta = 100$, and $I_B = 50\ \mu A$. Calculate I_C and I_E. 1×10