



I Semester B.Sc. Examination, May 2022
(NEP – 2021-22 and Onwards)

ELECTRONICS

DSC – 1 : Electronic Devices and Circuits

Time : 2½ Hours

Max. Marks : 60

Instruction : Answer **any four** questions from **each Part**.

PART – A

Answer **any four** questions :

(4×2=8)

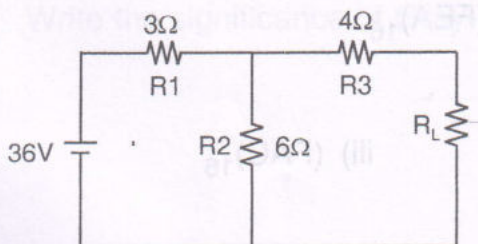
1. Draw the symbols of :
 - a) Practical voltage source.
 - b) Practical current source.
2. Write two differences between series resonant circuit and parallel resonant circuit.
3. For a diode define :
 - a) Static resistance
 - b) Dynamic resistance.
4. List the types of coupling used in multistage amplifiers.
5. Write the symbols of
 - a) Schottky diode
 - b) LED.
6. What is the significance of Gray code ?

PART – B

Answer **any four** questions :

(4×5=20)

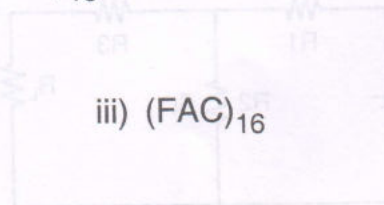
7. Determine the value of R_L for maximum power transfer in the following circuit. Also calculate the maximum power delivered to the load.



P.T.O.



8. A series RLC circuit has a sinusoidal input voltage of maximum value of 12V. If inductance $L = 20 \text{ mH}$, $C = 400 \text{ nF}$ and $R = 80\Omega$. Calculate :
- Resonant frequency
 - Quality factor.
9. An ac supply of 230 V, 50 Hz is applied to a half-wave rectifier through a transformer of turns ratio 8:1. Assume the diodes to be ideal. For a load resistance $R_L = 100\Omega$,
Find :
- average output voltage
 - dc output current
 - rectification efficiency.
10. A transistor has a current gain of 0.99 when used in common base configuration. What is the current gain of the transistor in :
- Common Emitter (CE) configuration
 - Common Collector (CC) configuration.
11. Find the difference of the following using 2's complement method :
- $(1101)_2 - (0110)_2$
 - $(0010)_2 - (1101)_2$.
12. A transistor is connected in common base configuration, $\alpha = 0.95$, $I_E = 1\text{mA}$. Calculate the values of :
- Collector current
 - Base current
 - Current gain β
 - Current gain γ
13. a) Write the one's complement of :
- $(1101101)_2$
 - $(FEA)_{16}$
- b) Write the numbers which come after :
- $(FEEE)_{16}$
 - $(A0B9)_{16}$
 - $(FAC)_{16}$





14. Simplify the following expressions using Boolean laws.

a) $C + \bar{C}B + B\bar{A}$

b) $ABC + ABC\bar{C} + \bar{A}\bar{B}C + \bar{A}BC$

PART – C

Answer **any four** questions :

(4×8=32)

15. a) Explain the procedure to convert voltage source to current source.

b) State Thevenin's theorem.

(3+2+3)

16. a) Explain the formation of depletion layer in a PN junction.

b) Compare zener breakdown and avalanche breakdown in a PN junction.

(4+4)

17. a) With a circuit diagram, explain the working of half-wave rectifier. Draw the necessary waveforms.

b) What is the effect of a shunt capacitor filter on the rectified output ?

(6+2)

18. a) What is thermal runaway in BJT ?

b) Draw the h-parameter equivalent circuit of a BJT.

c) Define :

i) Class A amplifier

ii) Class B amplifier.

(3+3+2)

19. a) Draw the diagram of common cathode configuration of LED 7-segment display.

b) Realize NOT gate, AND gate, OR gate using NAND gate.

(2+6)

20. a) With an example, explain the procedure to convert decimal numbers to binary numbers.

b) Write the significance of Gray-code.

(6+2)