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B.TECH. III SEM MAIN/BACK (NEW SCHEME)
ACADEMIC SESSION 2023-24
ELECTRONICS AND COMMUNICATION ENGINEERING

3EC4-01 - Electronic Devices & Circuits

Common to EC, EI

Time : 3 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part-A : Short Answer Type Questions (up to **25** words) 10 × 2 = 20 marks. All 10 questions are compulsory.

Part-B : Analytical/Problem Solving questions 5 × 4 = 20 marks. Candidates have to answer 5 questions out of 7.

Part-C : Descriptive/Analytical/Problem Solving questions 3 × 10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of the following supporting materials is permitted during examination. (Mentioned in form no. 205).

1__Nil_____

2__Nil_____

Part-A

10×2=20

Q. 1. Explain diffusion current for a semiconductor [2]

Q. 2. Define fermi level. [2]

Q. 3. Give the mechanism of hole current flow in a semiconductor [2]

Q. 4. Explain why a bridge rectifier is preferred over a centre-tap-rectifier. [2]

Q. 5. Define Stability factor. [2]

Q. 6. Explain the need for biasing a transistor. [2]

Q. 7. Describe the difference between enhancement and depletion mode of MOSFET. [2]

Q. 8. Define amplification factor μ of an FET. [2]

Q. 9. What is a multistage amplifier circuit ? [2]

Q. 10. Why is the CC configuration also known as the emitter follower ? [2]

Part-B

5×4=20

Q. 1. Explain continuity equation with suitable diagram and mathematical relation. [4]

Q. 2. In a p-type semiconductor, the fermi level lies 0.3 eV above the valance band at 27°C, Determine the new Position of the fermi level if the temperature is increased to 57°C. [4]

Q. 3. Explain V-I characteristics of a P-N junction diode. [4]

Q. 4. Derive relationship between α and β for a BJT. [4]

Q. 5. Explain the transfer characteristics of N-Channel JFET with the help of neat diagram. [4]

Q. 6. Draw and explain small signal model of BJT. [4]

Part–C

3×10=30

Q. 1. Write short note on the the fermi-dirac distribution function. [10]

Q. 2. What is clipping and clamping ? Discuss their applications. [10]

Q. 3. Find out expression of s, s' and s'' for potential divider bias circuit (for CE configuration). [10]

Q. 4. Explain the construction, characteristics and working principle of depletion type MOSFET. [10]

Q. 5. In a two-stage RC coupled amplifier, deduce midband gain, low frequency gain and high frequency gain in terms of circuit component. What is the effect of emitter bypass capacitor on frequency response ? [10]

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