

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Supplementary Exam-August 2023
 B.Tech Program: Electronics and Telecommunication
 Examination: SY Semester: III DSE
 Course Code: **EXC303** Course Name: **Electronic Devices and Circuits**
 Date of Exam: 26/08/2023 Duration: 2.5 Hours Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

| | | Max. Marks | CO | BT level |
|-------|---|------------|----|----------|
| Q 1 | Solve any six questions out of eight: | 12 | | |
| i) | Define CMRR | 2 | 1 | U |
| ii) | Define the saturation and linear region of MOSFET. | 2 | 2 | U |
| iii) | State diode equation. | 2 | 3 | AP |
| iv) | Show Forward biased and reversed bias region in Diode characteristic. | 2 | 4 | U |
| v) | For 1 μ F capacitor find reactance at 10Hz, 100Hz, 1KHz, 10KHz, 100KHz | 2 | 5 | AP |
| vi) | What is transfer function? Explain by example. | 2 | 6 | U |
| vii) | Describe what is meant by, i) Drain-to-source saturation voltage. ii) Process conduction parameter. | 2 | 1 | U |
| viii) | Define Differential gain. | 2 | 2 | U |
| Q.2 | Solve any four questions out of six | 16 | | |
| i) | Derive transfer function of RC low pass filter and draw its bode plot. | 4 | 1 | U |
| ii) | Explain effect of Miller capacitance. | 4 | 2 | U |
| iii) | Express output V_o of Differential amplifier in terms of CMRR. | 4 | 4 | U |

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| iv) | Describe the channel length modulation effect and define the parameter λ . | 4 | 3 | AP |
| v) | Define all the inherent resistance and capacitances in high frequency equivalent nmos structure/model with neat sketch. | 4 | 6 | U |
| vi) | Explain current source circuit using MOSFET. | 4 | 3 | AP |
| Q.3 | Solve any two questions out of three. | 16 | | |
| i) | Discuss, using the concept of a load line superimposed on the transistor characteristics, how a simple common-source circuit can amplify a time-varying signal. | 8 | 1 | AP |
| ii) | Explain Construction of E-MOSFET. | 8 | 2 | U |
| iii) | Explain DC load line for fixed bias MOSFET circuit. Show change Q points for case (i) Power supply changes/ii) value of R_D changes | 8 | 3 | AP |
| Q.4 | Solve any two questions out of three. | 16 | | |
| i) | Draw small signal equivalent circuit of CS amplifier and derive the equation of voltage gain, input and output resistance. | 8 | 4 | U |
| ii) | Discuss, using the concept of a load line superimposed on the transistor characteristics, how a simple common-source circuit can amplify a time-varying signal. | 8 | 5 | AP |
| iii) | Explain construction of PN Junction Diode. | 8 | 6 | U |
