

[&] (A constituent unit of MAHE, Manipal)

THIRD SEMESTER B. TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATIONS, DECEMBER – 2018

SUBJECT: ANALOG ELECTRONIC CIRCUITS [ICE 2104]

TIME: 3 HOURS		MAX. MARKS: 50
	Instructions to candidates	
•	Answer ALL questions.	
•	Missing data may be suitably assumed.	

- 1A. With the help of mathematical expression, explain how JFET behaves like voltage controlled 2 resistor.
- **1B.** Explain the construction and working of n channel JFET.
- **1C** List any four difference between BJT and FET.
- **1D** Derive the biasing parameters for n-channel JFET voltage divider configuration.
- 2A Compute the following for the circuit shown in Fig. 2A. V_{GSQ}, I_{DQ}, V_{Ds}, V_D, V_S, V_G.





Fig. 2C

- **2B.** Derive the equation for input impedance, output impedance, and gain for a fixed bias **3** amplifier without considering the effect of load and signal resistance.
- 2C. Determine the amplifier parameters (Input impedance, Output impedance and gain) for the 3 circuit shown in Fig. 2C, and also represent the model of the same. Given: $V_{SGQ} = 6.4V$, $I_{DQ} = 2.75$ mA.
- **3A.** For the source follower configuration, derive the equation for input impedance, output **4** impedance, and amplifier gain.
- 3B. Explain miller effect in high frequency analysis and derive the expression for its input as well 3 as output capacitance.
- **3C** With neat sketch, analyse the frequency response of cascode amplifier.
- **4A** Determine the high frequency response characteristics for the circuit shown in Fig. 4A. Given: **4** $V_{SGQ} = -2.55V$, $I_{DQ} = 3.3$ mA.

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2

4



Fig. 4A

- 4B. With a circuit, explain the characteristics of a voltage series feedback amplifier. Determine 4 the expressions for gain, input and output impedance.
- 4C. Draw the practical feedback circuit for voltage shunt topology and write the expressions for β 2 and A_f.
- **5A.** Draw the circuit diagram for colpitts oscillator. Obtain the value of inductor, if $C_1 = 0.25 \mu F$, **3** $C_2 = 0.025 \mu F$ and frequency of the oscillator is 10kHz.
- **5B.** Construct and explain the working of RC phase shift oscillator.
- **5C.** Discuss the properties and the effect of ac load line on Class A and Class B type of power **4** amplifiers.

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