

MANIPAL
(A constituent unit of MAHE, Manipal)

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

END SEMESTER DEGREE EXAMINATIONS, NOVEMBER - 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. Sketch and explain the transfer characteristics of JFET.
- **1B.** Explain the construction and working of n channel depletion type MOSFET.
- **1C** List any four difference between BJT and FET.
- 1D Construct a JFET drain fixed bias circuit and derive the relation for gate source voltage (V_{GS}) 2 and drain current (I_D).
- 2A Compute the following for the circuit shown in Fig. 2A. V_{GSQ} , I_{DQ} , V_{Ds} , V_{D} , V_{S} .



- **2B.** Derive the equation for input impedance, output impedance, and gain for a common gate **4** 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: $V_{SGQ} = -2.6v$, $I_{DQ} = 2.6mA$ and $Y_{OS} = 20\mu s$.
- 3A. Derive the equation for input impedance, output impedance, and gain for the drain feedback 4 configuration amplifier.
- **3B.** Plot the high frequency response characteristics of the circuit shown in Fig. 3B. **4**
- **3C** Analyse the construction and frequency response of cascode amplifier. **3**
- **4A** Determine the low frequency response characteristics for the circuit shown in Fig. 4A.

2

4

2

3



- **4B.** With the block diagram discuss the effect of feedback on current series and voltage shunt **4** topologies in terms of gain, input impedance and output impedance.
- 4C. Draw the practical feedback circuit for voltage series topology and write the expressions for $\beta = 2$ and $A_{f.}$

5A.	In a Hartley oscillator, two inductances of $2mH$ and 20μ H are used. Calculate the range of	3
	capacitor to be used to vary the frequency from 950kHz to 2050kHz.	
5B.	Construct and explain the working of crystal oscillators.	3
5C.	Discuss the features of Class A, Class B and Class AB type of power amplifiers.	4
