Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 - 19 Examination

Semester: 3 **Date: 28/05/2019**
Subject Code: 03107201 **Time: 02:00pm to 04:30pm**
Subject Name: Advanced Analog Electronics **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions** - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) **(15)**

1. State various resistances and capacitances in the hybrid π model.
2. What is the maximum efficiency of a class B circuit?
   a) 90 %
   b) 78.5 %
   c) 50 %
   d) 25 %
3. Which type of power amplifier is biased for operation at less than 360º of the cycle?
4. The gate of JFET is _____ biased.
   a) forward
   b) reverse
   c) forward
   d) reverse as well as forward
   e) none of above
5. A JFET has three terminals, namely…..
   a) cathode, anode, grid
   b) source, gate ,drain
   c) emitter, base, collector
   d) none of the above
6. Draw symbol of P Channel E - MOSFET
7. State type of feedback used in the oscillator circuits?
8. Write the formula of Gain with feedback for voltage shunt feedback connection
9. Draw the symbol of N Channel D - MOSFET
10. Define Pinch-off voltage with reference to JFET
11. What is the main difference between E-MOSFET and D-MOSFET?
12. Write the drain current equation for JFET.
13. A MOSFET is sometimes called ……. JFET
    a) many gate
    b) open gate
    c) insulated gate
    d) shorted gate
14. Which of the following oscillator is RC type:
    a) Clapp
    b) Hartley
    c) Colpitt's
    d) Phase Shift
15. The expression for frequency of oscillations of a RC phase shift oscillator is
    a) $f = 1 / (2\pi\sqrt{RC})$
    b) $f = 1 / (2\pi\sqrt{R(C1 + C2)})$
    c) $f = 1 / (2\pi RC\sqrt{6})$
    d) none of the above

Q.2 **Answer the following questions.** (Attempt any three) **(15)**

A) Obtain trans conductance value for Ic equal to 10 mA.

B) (i) A class A transformer-coupled class A amplifier uses a 25:1 transformer to drive a 4 ohm load. Calculate the effective ac load. (ii) What transformer turns ratio required to match 16 ohm speaker load so that effective resistance seen at the primary is 10K ohm.

C) Draw the AC equivalent circuit for JFET. What is the value of constant 'k ' in E-MOSFET when $V_{GS(ON)}$ = 8 V, $I_{D(ON)}$ = 10 mA, $V_{GS(TH)}$ = 2 V.

D) Derive the formula for trans-conductance g_m in FET using mathematical approach and shockley's equation.

Q.3 A) Draw the voltage series feedback connection. Also derive the input impedance & output impedance . **(07)**

B)State & Derive BarkHausen criterion required for oscillation **(08)**

B) A transistor has following parameters at Ic = 10mA, hie = 1KΩ, hre = $2*10^{-4}$, hfe = 100, hoe = $4*10^{5}$ A/V. Calculate (i) gm (ii) rb'e (iii) rbb' (iv) rb'c **(08)**

Q.4 A) Explain the operation of class B Push Pull amplifier with circuit. **(07)**

A) Draw the VDB circuit for JFET. Also find Z_I, Z_O and A_V **(07)**

B) Determine the following parameters for the network given in the following figure. **(08)**

V_{GSQ}, I_{DQ}, V_{DS}, V_D, V_G, V_S