Total Number of Pages: 02   **<u>B.Tech</u>**
PCEC4201

3rd Semester Back Examination 2016-17
ANALOG ELECTRONICS CIRCUITS
BRANCH(S): AEIE, BIOMED, CSE, ECE, EEE, EIE, ELECTRICAL, ETC, IT, ITE
Time: 3 Hours
Max Marks: 70
Q.CODE: Y481
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:**   **(2 x 10)**
  a) Differentiate between DC Load line and AC load line.
  b) What do you mean by "pinch-off " voltage? write down the schokley's expression .
  c) If Beta=200, find out(i)Alpha (ii)Gamma
  d) Nine identical amplifiers are connected in cascade. Each one has lower cut off frequency of 30KHz.find out the overall bandwidth of the cascade.
  e) Write down two salient features of a voltage series feedback?
  f) Compare and contrast the difference between Passive filter and Active filter. .
  g) Draw the transfer characteristics of N-channel MOSFET and mention the different regions of operation?
  h) Define slew rate of an op-amp and write down its value for an ideal and practical op-amp?
  i) Draw the circuit Diagram of class-C power amplifier and mention the operating range and efficiency of it?
  j) Write down the Barkhaunsen criteria for oscillations of an oscillator?

Q2 What is power amplifier? Why power amplifier called large signal amplifier? **(2+8)**
Explain power amplifier with suitable block diagram.

Q3 **a)** An n-channel FET has V_P= -2.0V and I_{DSS}= 1.65 mA It is desired to bias the circuit at I_D= 0.8 mA at V_{DD} = 24V. Find V_{GS}, g_m, R_S , R_d and μ. **(5)**

  b) Draw and analyze a D-MOSFET configuration. why is it called so? **(5)**

Q4 a) Write various advantages of negative feedback? Draw the block diagrams of different topologies? **(5)**

b) An amplifier with negative feedback has voltage gain of 120. It is found that without feedback, an input signal of 60mVis required to produce a particular output, where as with feedback the input signal must be 0.5V to get the same output. Find the A_v and β of the amplifier. **(5)**

Q5 a) Draw the equivalent circuit of an op-amp and write down the characteristics of ideal op-amp. **(5)**

b) Explain square wave testing of an amplifier. what information does it provide? **(5)**

Q6 a) Compare the cascade and cascode amplifiers. What are their applications? **(5)**

b) Design a voltage divider bias circuit using a supply voltage of 24V,a transistor with a beta of 110 and an operating point of Icq=4mA and Vceq=8V.Choose Ve=(1/8)Vcc. **(5)**

Q7 What is instrumentation amplifier? Briefly explain the operation of an instrumentation amplifier using op-amp. **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**
a) Integrator and differentiator
b) Phase shift Oscillator
c) Voltage Divider Circuit
d) Darlington circuit