## **GUJARAT TECHNOLOGICAL UNIVERSITY** PDDC - SEMESTER-III EXAMINATION - WINTER 2015

# Subject Code:X31101 **Subject Name: Advance Electronics** Time: 10:30pm to 01:00pm

Date:18/12/2015

### **Instructions:**

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Draw the hybrid- $\Pi$  model for a transistor in CE configuration. List out the 07 components in the model. Derive the expression for transistor Transconductance.
  - (b) Derive CE current gain for finite value resistive load using  $\Pi$  model and prove 07 that 3-dB bandwidth of this configuration is inversely proportional to the value of the resistive load.
- 1. Prove that the voltage gain of the complete cascade amplifier is equal to the Q.2 04 **(a)** product of the individual stages.

2. Classify distortion in an amplifier and explain each briefly. 03

(b) Obtain the expression for voltage gain, input and output impedance of Emitter 07 Follower amplifier using BJT.

#### OR

- (b) Given parameter for the Common Emitter Configuration shown in fig (1) are 07 **h**<sub>ie</sub>: 1k $\Omega$ , **h**<sub>fe</sub>=75 and **h**<sub>oe</sub>=**h**<sub>re</sub>=0. Calculate the values of
  - a) Desensitivity
  - b) Transconductance with feedback
  - c) Voltage gain with feedback
  - d) Input resistance with feedback
  - e) Output resistance with feedback
- Draw and explain the working principle of Colpitt's oscillator. Derive the 0.3 07 (a) expression for frequency of oscillation.
  - (b) 1. Explain briefly "Barkhausen Criteria". 04

2. Calculate the frequency of oscillations of a Colpitt's oscillator with 03 C1=C2=500pf and L=1mH.

#### OR

- (a) Describe the effect of negative feedback on amplifier bandwidth. 07 Q.3
  - (b) The parameters given for the FET follower circuit as shown in fig (2) are 07  $g_m=2mA/V$  and  $r_d=40k\Omega$ . Calculate values of  $A_{vf}$ ,  $R_{if}$ ,  $R_{of}$  and  $R_{of'}$ .
- **Q.4** (a) Define following terms:
  - 1. CMRR
  - 2. Slew Rate
  - 3. PSRR
  - 4. Input Bias Current
  - 5. Input Offset Voltage
  - (b) State and explain any seven characteristics of an ideal Op-amp.

07

07

Q.4	(a) (b)	Write short notes on: Measurement of OP-AMP Parameters. Explain Pole-Zero Compensation Techniques.	07 07
Q.5	<b>(a)</b>	Explain with suitable circuit the two input TTL-NAND Gate using Totem Pole output. Also mention advantages and disadvantages of TOTEMPOLE.	07
	<b>(b</b> )	Classify the logic family. Compare each of them. Also mention advantages and disadvantages of each logic families.	07
OR			
Q.5	<b>(a)</b>	Explain working principle of Successive Approximation ADC with neat circuit diagram. Mention advantages, disadvantages and application of it.	07
	<b>(b)</b>	A 5-bit R-2R ladder network with logic 0=0V and logic 1=10V. find	07
		1. Analog output due to LSB change	

- Full scale output voltage
  Analog output for digital input 1 1 0 0 0.



Fig. (1)



Fig. (2)