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BTECH
(SEM V) THEORY EXAMINATION 2018-19
INTEGRATED CIRCUITS

Time: 3 Hours *Total Marks: 70*
Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION – A

1. Attempt all the questions: **7 x 2 =14**

(a) What is full power bandwidth?
(b) How the effect of input bias current in non-inverting amplifier is compensated?
(c) Write the advantage of active filter over passive filter.
(d) What is PDN and PUN?
(e) Write the advantage of a voltage follower circuit.
(f) What is the advantage of precision diode rectifier circuit over ordinary rectifier?
(g) An 8 bit DAC has an input of 10011011 and 10V reference, Find the corresponding output voltage.

SECTION – B

2. Attempt any three questions of the following questions: **3 x 7 = 21**

(a) Discuss wilson current mirror and widlar current source. What the advantage of widlar current source over wilson current mirror?

(b) Classify active filter. Design second order low pass filter with fh = 2KHz and passband gain of 3.

(c) (i)Sketch the CMOS logic circuit realization of the expression
$$Y = \overline{A(B + C) + DE}$$
(ii)Draw the D flip flop using CMOS.

(d) Write short note on the following.
(i)Analog multiplier.
(ii) Logarithmic amplifier.

(e) (i)Draw the function block diagram of IC 555 and explain its working.
(ii)Write a short note on Ex-OR as a phase detector.

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SECTION – C

3. Attempt any one question: 1X 7 = 7

(a) (i)How the short circuit protection is achieved in the output stage of 741 op-amp?
(ii) Draw and explain the frequency response of IC 741.

(b) What do you understand by the base current mirror. How does it provide improvement over simple current mirror circuit? Explain with the help of a neat circuit diagram

4. Attempt any one question: 1X 7 = 7

(a) Design a wide bandpass filter with f_L = 500Hz and f_H = 1500Hz and passband gain of 5,draw the frequency response of the filter and find value of Q.

(b) Draw and explain I-V and V-I converters and derive its output.

5. Attempt any one question: 1 X 7 = 7

(a) Give CMOS implementation of a clocked SR flip-flop and explain its working.

(b) Derive the formula for V_{IL} and V_{IH} of CMOS inverter.

6. Attempt any one question: 1X 7 = 7

(a) (i) Describe the schmitt trigger with help of proper circuit diagram and transfer characteristics.

(ii) Explain the working of peak detectors.

(b)Draw the circuit diagram of full wave precision rectifier and find expression for output voltage for both positive and negative half cycle of input sinusoidal waveform.

7. Attempt any one question: 1X 7 = 7

(a) Draw the functional block diagram of IC 555 and explain its working. Draw the circuit diagram of a monostable multivibrator using 555 and find expression for quasi state period.

(b) (i) Write short note on analog to digital converter.

(ii) Explain the working of PLL with suitable block diagram.

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