Question Paper Code: 54B01

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Biomedical Engineering

15UBM401-ANALOG AND DIGITAL INTEGRATED CIRCUITS
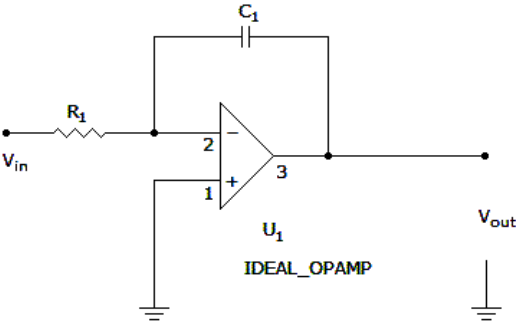
(Regulation 2015)

Duration: One hour   Maximum: 30 Marks

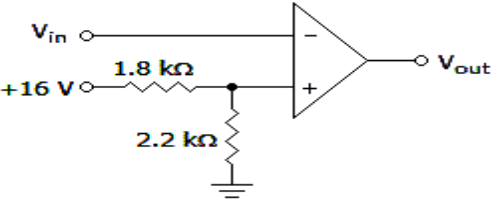PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. What is the output waveform?   CO1-R

    (a) Sine wave   (b) Square wave   (c) Saw tooth wave   (d) Triangle wave

2. An op-amp circuit in which the output voltage is equal to the   CO1-R
    difference between the two input voltages is called a(n) _____

    (a) Integrator   (b) Differentiator

    (c) Differential amplifier   (d) Voltage regulator

3.   CO2-R
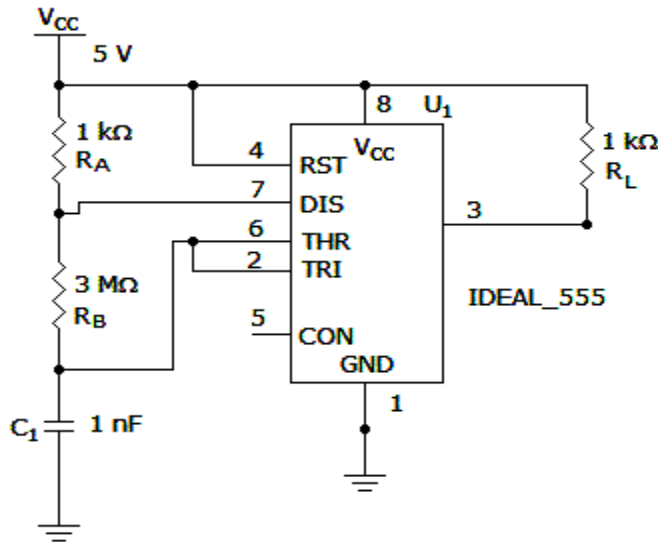

    The reference voltage for the comparator in the given circuit equals
    _____.

    (a) 0 V   (b) +8.8 V   (c) +16 V   (d) +7.2 V

4. The practical use of binary-weighted digital-to-analog converters is limited to: CO2-R

(a) R/2R ladder D/A converters

(b) 4-bit D/A converters

(c) 8-bit D/A converters

(d) Op-amp comparators

5. What is the frequency of this 555 astable multivibrator? CO3-R

(a) 278 Hz

(b) 178 Hz

(c) 78 Hz

(d) 8 Hz

6. In a PLL, to obtain lock, the signal frequency must: CO3-R

(a) come within the lock range

(b) be less than the capture frequency

(c) come within the capture range

(d) be greater than the capture frequency

7. How many NAND circuits are contained in a 7400 NAND IC? CO4-R

(a) 1

(b) 2

(c) 4

(d) 8

8. Which output expression might indicate a product-of-sums circuit construction? CO4-R

(a) $Y = \bar{A}.\bar{B} = \overline{A + B}$

(b) $Y = \bar{A}.\bar{B} = \overline{A.B}$

(c) $Y = A\bar{B} + C\bar{D}E$

(d) $Y = (\bar{A} + \bar{B}).(A + B)$

9. A basic S-R flip-flop can be constructed by cross-coupling which basic logic gates? CO5-R

(a) AND or OR gates

(b) XOR or XNOR gates

(c) NOR or NAND gates

(d) AND or NOR gates

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10. The evolution of PLD began with $\qquad$ CO5-R

   (a) EROM   (b) RAM   (c) PROM   (d) EEPROM

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Derive the expression for the output voltage of a three stage   CO1 -App   (8)
   instrumentation amplifier and discuss its applications.

12. Design a Schmitt trigger for UTP = 0.5 V and LTP = -0.5 V.   CO2 -App   (8)

13 Draw the circuit diagram of an A-stable multivibrator to generate the   CO3- Ana   (8)
   output signal with frequency 2kHz and duty cycle of 75%.

14. Using K-map, Find minimum SOP expression for the function   CO4-U   (8)
   $F=\sum m(2,5,7,10,11,14)+\sum d(1,4,15)$

15. A sequential circuit with two JK flip flops and one input X is   CO5-U   (8)
   described by the following input equation $J_A = B, \quad J_B = \bar{X},$

   $K_A = B\bar{X}, K_B = \bar{A}X + A\bar{X}$ Draw state table and determine state
   equation of it.

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