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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**GATE QUESTION- BATCH 5**

Branch : ECE Subject : Analog Electronic

Year/Sem : II/ III Subject code : 1151EC103

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| 1 | For the circuit shown in the following figure, transistor *M*1 and *M*2 are identical *NMOS* transistors. Assume the *M*2 is in saturation and the output is unloaded | GATE – 2008  (CO4) |
| 2 | The amplifier circuit shown below uses a silicon transistor. The capacitors *CC* and *CE* can be assumed to be short at signal frequency and effect of output resistance *r*0 can be ignored. If *CE* is disconnected from the circuit, which one of the following statements is true    (A) The input resistance *Ri* increases and magnitude of voltage gain*AV* decreases  (B) The input resistance *Ri* decreases and magnitude of voltage gain *AV* increases  (C) Both input resistance *Ri* and magnitude of voltage gain *AV* decreases  (D) Both input resistance *Ri* and the magnitude of voltage gain *AV* increases | GATE – 2010  (CO1) |
| 3 | In the silicon BJT circuit shown below, assume that the emitter  area of transistor *Q*1 is half that of transistor *Q*2    The value of current *Io* is approximately  (A) 0.5 mA (B) 2 mA  (C) 9.3 mA (D) 15 mA | GATE – 2010  (CO4) |
| 4 | A small signal source *Vi* (*t*) = *A*cos 20*t+ B*sin106 *t*  is applied to a transistor amplifier as shown below. The transistor has β= 150 and *hie* = 3Ώ. Which expression best approximate *V*0(*t*) | GATE – 2010  (CO1) |
| 5 | For the BJT circuit shown, assume that the *b* of the transistor is  very large and *VBE* = 0.7 V. The mode of operation of the BJT is    (A) cut-off  (B) saturation  (C) normal active  (D) reverse active | GATE – 2010  (CO1) |
| 6 | In a voltage-voltage feedback as shown below, which one of the  following statements is TRUE if the gain *k* is increased?    (A) The input impedance increases and output impedance decreases  (B) The input impedance increases and output impedance also increases  (C) The input impedance decreases and output impedance also decreases  (D) The input impedance decreases and output impedance increases | GATE – 2013 (CO3) |
| 7 | The voltage gain *Av* of the circuit shown below is    (A) *Av* . = 200  (B) *Av* .= 100  (C) *Av* . = 20  (D) *Av* . = 10 | GATE – 2013 (CO1) |
| 8 | For the BJT, *Q*1 in the circuit shown below,  β = α ,*V*BEon = 0.7 V,*V*CEsat = 0.7 V. The switch is initially closed. At time *t* = 0, the switch is opened. The time *t* at which *Q*1 leaves the active region is    (A) 10 ms  (B) 25 ms  (C) 50 ms  (D) 100 ms | GATE – 2013 (CO1) |
| 9 | For a BJT, the common base current gain a = 0.98 and the collector base junction reverse bias saturation current *I*CO = 0.6 mA. This BJT is connected in the common emitter mode and operated in the active region with a base drive current *IB* = 20 mA. The collector  current *IC* for this mode of operation is  (A) 0.98 mA (B) 0.99 mA  (C) 1.0 mA (D) 1.01 mA | GATE – 2013 (CO1) |