[Time: Three Hours]   **[Marks:80]**

Please check whether you have got the right question paper.

N.B: 1.   Question.No.1 is compulsory.
            2.   Attempt any three questions from the remaining.
            3.   Assume suitable data if required. Justify your assumptions.

Q.1   a)   Differentiate between JFET and MOSFET.   05
          b)   Derive torque Equation of DC Motor.   05
          c)   State applications of BLDC motor.   05
          d)   Forced and natural response of RLC network   05

Q.2   a)   In the network, switch is closed. Assuming all initial conditions as zero. Find i(t), di(t)/dt, d²i(t)/dt² at   10
               t=0+
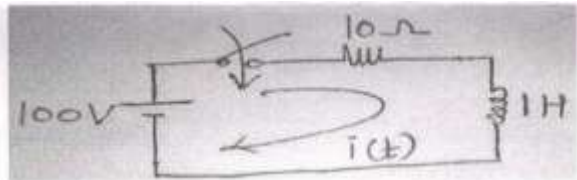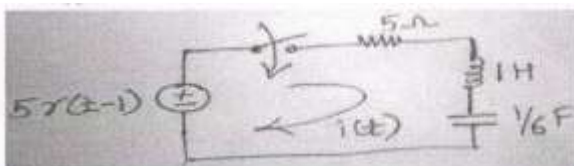

          b)   Explain working of BJT CE amplifier with neat circuit diagram and necessary equations.   10

Q.3   a)   Using the pole-zero plot, find magnitude and phase of the function.   10
               $F(s) = \frac{(s+1)(s+3)}{s(s+2)}$ at s = j4.

          b)   Explain characteristics for DC shunt and Series motor.   10

Q.4   a)   Determine the current i(t) in the network, when the switch is closed at t=0   10

          b)   Explain different methods of speed control for three phases Induction Motor.   10

Q.5 a) A 250 V, 4 Pole, DC shunt motor has armature resistance of 0.12Ω and field resistance of 125Ω. It has   10
960 lap connected conductors and flux of 20mWb per pole. If the input current is 30A, estimate speed
and torque developed.

b) Explain construction and working of squirrel cage induction motor.   10

Q.6 Write short notes on **<u>any three</u>**.   20
   a) Equivalent circuit for induction motor
   b) Capacitor start capacitor run IM
   c) 3-point starter
   d) Working of BJT as a Switch.

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