### SECTION A

**Multiple Choice Questions:**

<table>
<thead>
<tr>
<th>Q.No</th>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| 1.   | The magnetic field required to reduce the residual magnetization to zero is called | (a) Retentivity  
(b) Coercitivity  
(c) Hysteresis |
| 2.   | Inside a hollow conducting sphere                                         | (a) Electric field is zero    
(b) Electric field is non-zero constant  
(c) Electric field changes with the magnitude of the charge given to the conductor |
| 3.   | A series RLC circuit consisting of $R=10$ ohms, $X_L=20$ ohms and $X_C=20$ ohms is connected across an AC supply of 100 V(rms). The magnitude and phase angle (with reference to supply voltage) of the voltage across the inductive coil are respectively, | (a) 100V, 90°    
(b) 200V, -90°   
(c) 200V, 90° |
| 4.   | A network is said to be linear if and only if                            | (a) Principle of superposition applies  
(b) Principle of homogeneity applies  
(c) Both (a) and (b) |
| 5.   | A low-pass filter circuit is basically                                   | (a) A differentiating circuit with low time constant  
(b) A differentiating circuit with larger time constant  
(c) An integrating circuit with low time constant |
| 6.   | A 200/100 V, 50 Hz transformer is to be excited at 40Hz from the 100V side. For the exciting current to remain the same, the applied voltage should be | (a) 150 V  
(b) 100 V  
(c) 80 V |
7. At a slip of 4%, maximum possible speed of a 3 phase Squirrel cage induction motor is
   (a) 2880 rpm
   (b) 1500 rpm
   (c) 1440 rpm

8. In a DC transmission line,
   (a) It is necessary for the sending and receiving end to be operated in synchronism
   (b) There are no effects due to inductive and capacitive reactance
   (c) Power transfer capability is limited by stability considerations

9. If the excitation of the synchronous generator fails, it acts as a
   (a) Synchronous generator
   (b) Induction motor
   (c) Induction generator

10. The transfer function of the system is \( G(s) = \frac{100}{(s+1)(s+100)} \). For a unit-step input to the system, the approximate settling time for 2% criterion is
    (a) 100 sec
    (b) 4 sec
    (c) 0.01 sec

11. While designing the controller, the advantage of pole-zero cancellation is that
    (a) The system order is reduced
    (b) The system order is increased
    (c) The cost of the controller becomes low

12. A digital voltmeter measures
    (a) Peak value
    (b) Rms value
    (c) Average value

13. If a dynamometer type wattmeter is connected in an AC circuit, the power indicated by the wattmeter will be
    (a) Volt-Ampere Product
    (b) Average power
    (c) Instantaneous power
14. The MOSFET switch in its on-state may be considered equivalent to
   (a) Resistor
   (b) Inductor
   (c) Capacitor

15. The main reason for connecting a pulse transformer at the output stage of a thyristor triggering circuit is to
   (a) Amplify the power of the triggering pulse
   (b) Provide electrical isolation
   (c) Reduce the turn-on time of the thyristor

SECTION B

Answer any 3 from the following: 3x5=15

1. Derive the expression for resonant frequency and bandwidth for a series RLC circuit
2. Draw the block diagram of a system with observer based state feedback controller
3. Discuss the methods of improving the transient state stability of a power system
4. What are the advantages and disadvantages of an electric vehicle over an internal combustion vehicle?
5. What is decoder? Give the circuit for a 3:8 decoder

***************