SSM INSTIUTE OF ENGINEERING AND TECHNOLOGY
Unit test – I (SET-A)

Department of Electrical & Electronics Engineering

Dept: **EEE** Date Time: **14.7.18 /9am to 9.50am**
Year/Sem: **IV/ VII** Maximum marks: **25**

EE 6703 – SPECIAL ELECTRICAL MACHINES
(Answer all questions)

1. **For which of the applications a reluctance motor is preferred**
   a) Electric shavers b) Refrigerators
   c) Signalling and timing devices d) Lifts and hoists
2. **Choose the wright one - A reluctance motor……..**
   a) Is self-starting b) Is constant speed motor
   c) Needs no D.C. excitation d) (b) and (c)
3. **Reluctance motors are**
   a) Singly excited b) Doubly excited
   c) Either of the above d) None of the above
4. **Which of the following motors is generally used for electric shavers**
   a) Universal motor b) Shaded-pole motor
   c) Reluctance motor d) Hysteresis motor
5. **Which of the following motors is generally used in toys**
   a) Reluctance motor b) Hysteresis motor
   c) Shaded-pole motor d) Two-value capacitor motor
6. **What is the angle between stator direct axis and quadrature axis?**
   a)90° b)0°
   c)45° d)any of the mentioned
7. **Space angle θ_r is measured between stator d-axis and _____**
   a)quadrature axis b)direct d-axis
   c)long rotor axis d)none of the mentioned
8. **How synchronous reluctance motor denoted**
   a) SRM b) SYREL Motor
   c) SYRM d) All the above
9. **The reluctance offered to the stator flux by two small air gaps in series with high permeability iron, in reluctance machine is minimum, when the space angle θ_r = _____**
   a) 0° b) 45°
   c) 90° d) 270°

Explanation: Only when θ_r= 0°, the long rotor axis is coincident with the stator d-axis, and thus reluctance is minimum

10. **Variation of reluctance with space angle θ_r depends on the shape of**
    a) stator poles b) rotor poles
    c) stator or rotor poles d) both stator and rotor poles
    Explanation: Also, the variation is assumed to be a function of space angle θ_r.
11. **Reluctance motor can produce torque at _____**
    a) any speed less than synchronous speed b) synchronous speed
    c) any speed greater than synchronous speed d) any of mentioned
    Explanation: $T_{e(av)}$=-1/4 □$_{max}^2$($Rl_q - Rl_d$)(1/2 sin (-2δ)), w= synchronous speed. if $w_r \neq w$ then $T_{e(av)}$=0 ,and if w_r=w then $T_{e(av)} \neq 0$, as the last term in the equation 1/2 sin (-2δ) does not vary with time, and hence average torque is not equal to zero.
12. **For a reluctance motor, the maxi average torque occurs when δ=…**
    a) 45° b) 90°
    c) 0° d) 180°
    Explanation: The equation for average torque is $T_{e(av)}$=1/8 □$_{max}^2$($Rl_q - Rl_d$)sin (2δ), and it is maximum when δ=45°.
13. **For a given reluctance motor, Rl_d and Rl_q are _____**
    a) constant b) varying
    c) zero d) any of the mentioned
    Explanation: Rl_d and Rl_q are constant for a given motor, as they depend on the geometry of the magnetic circuit.
14. **Single phase reluctance machine acts as generator when angle δ is…**
    a) positive b) negative
    c) zero d) any of the mentioned
    Explanation: If δ is positive, then the machine acts as a motor and if δ is negative, the machine acts as a generator
15. **In which applications 1Φ reluctance motors are extensively used**
    a) grinder applications b) driving electric clocks & timing devices
    c) welding applications d) lifts/ elevators
    Explanation: The single phase reluctance motors operate at constant synchronous speed, in case the supply frequency remains constant, and hence timing devices mostly use these motors.

16. Which of the following are applications of singly excited magnetic systems _____

a) electromagnets, relays
b) moving-iron instruments
c) reluctance motors
d) any of the mentioned

Explanation: All of the applications mentioned above needs singly excited magnetic systems

17. When synchronous reluctance motor called as unsymmetrical?

a) $X_d \leq X_q$
b) $X_d = X_q$
c) $X_d \neq X_q$
d) $X_d \geq X_q$

18. When the air gap is much greater in salient pole rotors?

a) Along the poles
b) Between the poles
c) On the pole faces
d) None of the above

19. Why the stability limit for synchronous motor occur by 45°

a) High speed motor
b) Low speed motor
c) No rotor winding
d) Salient pole rotor

20. How $P_{in} = P_{out}$ in synchronous reluctance motor.

a) Reactance losses are neglected
b) Resistance losses are neglected
c) Impedance losses are neglected
d) None of the above neglected

21. When does PM synchronous motor operate as a synchronous reluctance motor?

a) Magnets replaced by cage windings
b) Magnets replaced by symmetrical winding
c) Magnets replaced by unsymmetrical winding
d) None of the above

22. Define – Torque angle.

a) Angle between rotating magnetic field and rotor poles.
b) Lag angle between rotating magnetic field and rotor poles.
c) Lead angle between rotating magnetic field and rotor poles.
d) None of the above

23. Find the basic voltage equation for synchronous reluctance motor.

a) $\overline{V_f} = \overline{Vs} - j\overline{I_{ds}}X_{ds} + j\overline{I_{qs}}X_{qs}$
b) $\overline{V_f} = \overline{Vs} + j\overline{I_{ds}}X_{ds} + j\overline{I_{qs}}X_{qs}$
c) $\overline{V_f} = \overline{Vs} + j\overline{I_{ds}}X_{ds} - j\overline{I_{qs}}X_{qs}$
c) None of the above

24. Which rotor is most preferable for synchronous reluctance motor?

a) Cylindrical type rotor
b) skewed rotor
c) salient pole rotor
d) none of the above

25. What is the type of synchronous reluctance motor?

a) Induction motor
b) Servo motor
c) Universal motor
d) synchronous motor