الجمهورية اليمنية
جامعة صنعاء

| قائمة الاسئلة |
| اختبار النهائي للعام الجامعي 2024/2025م-كلية الهندسة :: الات كهربائية 2- كلية الهندسة - قسم الميكاترونكس - المستوى الثالث - 3ساعات - در |
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1) A 480-V, 60 Hz, 0.8-PF-lagging, Δ connected, four-pole synchronous generator has a synchronous reactance and an armature resistance of 0.15 and 0.015 Ω/ phase respectively. If the generated voltage (Ea) equal to 1.4 percent of its terminal voltage, find the maximum power that can be developed by the generator:

   1)   +   7186 KW
   2)   -   5964.33 KW
   3)   -   1988.11 KW
   4)   -   2395.4 KW

2) A 1200-KVA 480-V, 60 Hz, 0.8-PF-lagging, Δ connected, four-pole synchronous generator has a synchronous reactance and an armature resistance of 0.15 Ω/ phase and negligible armature resistance. The generator has full load efficiency of 96 percent at 0.8 lagging factor power. Find the generator efficiency at half load 0.8 lagging P.F.

   1)   -   48 percent
   2)   +   92.31 percent
   3)   -   94.1 percent
   4)   -   98 percent

3) A 0.5 Hp, 220 V, 60 Hz, capacitor start single phase induction motor has the following parameters:
Main winding Z_m = 4.5 +j3.7
Auxiliary winding, Z_{au} =9.0 +j3.5,
Find the value of capacitance of the capacitor to be connected in series of auxiliary winding to make the angle between the main and auxiliary current equal 80 degree

   1)   -   344.16 microfarad
   2)   -   284.05 microfarad
   3)   -   412.99 microfarad
   4)   +   236.71 microfarad

4) A 200 KVA, 460 V, 60 Hz, 0.8-PF-lagging,3-phase, Y connected synchronous machine has a synchronous reactance of 0.523 Ω /phase and negligible armature resistance If $E_A = 220 \angle 12^0$ and $V_\phi = 265.58 \angle 0^0$. the machine:

   1)   -   The machine consumes reactive power of 25.6 KVAR
   2)   +   The machine consumes reactive power of 76.8 KVAR
   3)   -   The machine supplies reactive power of 25.6 KVAR
   4)   -   The machine supplies reactive power of 76.8 KVAR

5) A 2300-V,1000-Hp,08-PF-leading, 60 Hz, four-pole, delta connected synchronous motor has a synchronous reactance of 2.8 Ω/phase and negligible armature resistance. if the motor supplies 600 Hp at .8-PF leading and efficiency of 88, then the armature current will be:

   1)   +   92.14
   2)   -   73.78
   3)   -   64.87
   4)   -   159.6

6) A 2300-V,1000-Hp,08-PF-leading, 60 Hz, four-pole, star connected synchronous motor has a synchronous reactance of 2.8 Ω/phase and negligible armature resistance. if the line current is 80 A with 0 .8-PF lagging, then the induced emf and torque angle will be:

   1)   -   1473.25V, - 6.97 degree
   2)   -   1473.4 V, 6.97 degree
   3)   -   1206.9 V, 8.54 degree
   4)   +   1206.9 V, -8.54 degree

7) A 480-V three-phase, 60-Hz induction motor is running at 1152 revolutions per minute, find the number of poles if the rotor frequency is 2.4 Hz

    1)   -   2
    2)   -   4
    3)   +   6
    4)   -   8

8) A 50-HP, Y-connected, 60-Hz, six- pole induction motor has the following circuit parameters on per phase basis referred to the stator $Z_{th} = 0.344 + J\ 0.498\ \Omega$, and $R_2' = 0.147\ \Omega$, $X_2' = 0.224\ \Omega$ The rotational losses are 1.5 KW. voltage if the motor supplies it rated power and running at 1140 rpm find the thevinin's voltage of the equivalent circuit

    1)   -   396.31 V
    2)   +   228.81 V
    3)   -   347.52 V
    4)   -   200.65 V

9) A, 50-HP, Y-connected, 60-Hz, six- pole induction motor has the following circuit parameters on per phase basis referred to the stator $Z_{th} = 0.344 + J\ 0.498\ \Omega$, and $R_2' = 0.147\ \Omega$, $X_2' = 0.224\ \Omega$ The rotational losses are 1.5 KW. voltage if the motor supplies it rated power and running at 1140 rpm find the air gap power torque that can be developed by the motor

    1)   +   40.842 KW
    2)   -   39.263KW
    3)   -   38.800KW
    4)   -   37.300 KW

10) A 220 V, Y-connected, 60-Hz,4-pole induction supplies a load of 20 Hp at speed of 1755 rpm. If the developed torque is increased by 50 percent, what will be the new speed. Ignore the rotational losses

    1)   -   2632.5 rpm
    2)   -   1170 rpm
    3)   +   1732.5 rpm
    4)   -   1135 type equasion here 5rpm

11) A 220 V, Y-connected, 60-Hz,4-pole induction supplies a load of 20 Hp at speed of 1755 rpm. If the developed torque is doubled, what will be the new output power. Ignore the rotational losses.

    1)   -   41.05 Hp
    2)   -   40 Hp
    3)   +   38.975 Hp
    4)   -   None of mentioned

12) the frequency of generated voltage of synchronous machine of 8-pole generator rotates at 1500 rpm is

    1)   +   100 Hz
    2)   -   50 Hz
    3)   -   25Hz
    4)   -   200 Hz

13) A 50-HZ,4-pole, 3-phase induction motor, its rated speed is 1440 rpm, the slip speed is:

    1)   -   4%
    2)   -   4.17%
    3)   +   60 rpm
    4)   -   Zero pm

14) A three phase transformer has a vector symbol of Dy11, then

    1)   -   The high voltage side leads the low side by 30 degree
    2)   +   The low voltage side leads the high side by 30 degree
    3)   -   The primary voltage side leads the secondary side by 30 degree y
    4)   -   The secondary voltage side leads the primary side by 30 degree

15) A 60-HZ,4-pole, 3-phase induction motor, when it turns with a slip of 4 percent. the speed of air gap field

with respect to rotor at rated condition is
  1) + 72 rpm
  2) - 1800 rpm
  3) - 1728rpm
  4) - zero

16) A 132/11 KV, three-phase transformer has a phase shift of – 30 degrees, what is the possible connection of transformer
  1) + Delta -star
  2) - Delta-delta
  3) - Star- star
  4) - Any one of the mentioned

17) A 100 KVA, 400V, 3-phase, star connected synchronous generator has synchronous reactance of one Ohm. The generator operates at constant field current and constant unity power factor. at certain load the terminal voltage was 400V if the load increased by 20 percent. The terminal voltage will be:
  1) + Less than 400-V
  2) - More than 400-V
  3) - Equal to 400-V
  4) - None of the mentioned

18) A three-phase wound rotor induction motor has maximum torque of 100 N.m. if the rotor circuit resistance is doubled, then, the maximum torque will be:
  1) - doubled
  2) - Decreased
  3) - Increase but not doubled
  4) + Not changed

19) A 132/11 KV, three-phase transformer connected in star/ delta.The turns ratio of the transformer:
  1) - 12
  2) - 20.785
  3) + 6.928
  4) - 0.0833

20) if the set point of Automatic Voltage Regulator for the alternator connected to infinite bus bar is changed, then:
  1) - only the terminal voltage will be changed
  2) - both the terminal voltage and reactive power will be changed
  3) + only the reactive power will be changed
  4) - none of the mentioned

21) For two synchronous generators operating in parallel, changing the set point of A.V.R of one generator leads to change…….
  1) - the active and reactive power sharing between the generators
  2) - only the system voltage
  3) + Both the system voltage and reactive power sharing
  4) - Only the reactive power sharing between the generators

22) For a power system having induction motor loads, an overexcited synchronous motor is also attached. Then overall power factor:
  1) + improves
  2) - degrades
  3) - becomes unity.
  4) - unchanged

23) When 60 Hz, generator operates at rated KVA with power factor less than the rated power factor, then:
  1) - The armature current will be more than its rated value

2)   +   The field current will be more than its rated value
3)   -   Both of field and armature currents will be less than their rated values
4)   -   Both of field and armature currents will be more than their rated values

24) The synchronous motor with Zs = Ra +J Xs, developed its maximum power when the torque angle equals:
1)   -   -90
2)   -   The angle of Zs
3)   +   – the angle of Zs
4)   -   90

25) In operating zone of induction motor slip :
1)   +   Increase as the load increase
2)   -   Decrease as the load increase
3)   -   Un affected by the load change
4)   -   May be decreased or increased

26) For three phase bank transformer compared to three phase unit transformers, state winch of the following statement is false
1)   +   It is less reliable
2)   -   Has more volume
3)   -   expensive
4)   -   Required more space

27) the synchronous motor supplies reactive power to the electric system if:
1)   +   E cos (δ) is greater than V
2)   -   E cos (δ) is less than V
3)   -   E cos (δ) is equals V
4)   -   none of the mentioned

28) A synchronous generator supplies a constant load power at unity power factor, if the excitation is decreased then:
1)   +   The armature current increased and its angle increased
2)   -   The armature current increased and its angle decreased
3)   -   The armature current decreased and its angle increased
4)   -   The armature current decreased and its angle decreased

29) In synchronous motor, the speed of air gap magnetic field with respect to rotor:
1)   +   Equals zero
2)   -   Equals to synchronous speed
3)   -   Less than synchronous speed
4)   -   More than synchronous speed

30) An induction motor operates at a power factor of 0.8. if the mechanical load increased, then the power factor will be:
1)   -   Equal to 0.8
2)   -   Less than 0.8
3)   +   More than0.8
4)   -   No relation between the mechanical load and power factor

31) The field's windings of synchronous motor are in more danger of overheating when the motor operating with:
1)   -   Lagging pf
2)   -   Unity pf
3)   +   Leading pf
4)   -   No relation with the pf

32) Statement I: Speed of an isolated alternator can be altered Statement II: Speed of an alternator connected to IBB can be also altered.

1)   <u>+</u>   Statement I is true, Statement II is false
2)   -   Both the statements are true
3)   -   Statement I is false while Statement II is true
4)   -   Both of Statements are false

33) For speed control of wound rotor induction motor, witch of the following is not used
1)   -   varying the frequency of the supply
2)   <u>+</u>   changing the number of poles
3)   -   varying the amplitude of input voltage
4)   -   varying the external resistance added to the rotor circuit

34) T-connected transformer transform:
1)   -   Three phase system to two phase system
2)   <u>+</u>   Three phase system to three phase system
3)   -   Two phase system to three phase system
4)   -   Three phase system to single phase system