

DMRC Placement-Paper Question-Paper Electronics and Electrical -12 Aug 2012

DMRC-Delhi Metro Rail Corporation Ltd. Latest Selection pattern for Assistant Manager post, DMRC Written test will be held on 26/08/2012 for Graduate Engineers-Civil, Electronics, Electrical, Mechanical, MBA, LLb Qualified Graduate with 75% mark, DMRC Latest Company Profile, Selection Procedure, Previous year Technical, Aptitude Questions paper with Answer, Interview pattern with General Tips, Group discussion Tips , DMRC Latest Recruitment details for Assistant Manager, Junior Engineer , DMRC Frequently asked Technical Questions, General Awareness, English, Logical Ability, Quantitative Aptitude

DMRC Latest EEE,CSE,Mech Enggquestions

1. The ability of a material to remain magnetized after removal of the magnetizing force is known as
Permeability
reluctance
hysteresis
retentivity

Ans:D

2. When a solenoid is activated, the force that moves the plunger is
an electromagnetic field
a permanent magnetic field
a varying voltage
a steady current

Ans:A

3. Which of the following capacitors is polarized
mica
ceramic
plastic-film
electrolytic

Ans:D

4. In a series resonant band-pass filter, a lower value of Q results in
a higher resonant frequency
a smaller bandwidth
a higher impedance
a larger bandwidth

Ans:D

5. A steady-state condition is reached when the output voltage reaches the average value of the input voltage the output voltage reaches the input voltage the output voltage reaches approximately 63% of the input voltage the output voltage reaches the effective value of the input voltage

Ans:A

6. An RC differentiator acts as a
low-pass filter
high-pass filter
band-pass filter
band-stop filter

Ans:B

7. A balanced three-phase, 50 Hz voltage is applied to a 3 phase, 4 pole, induction motor. When the motor is delivering rated output, the slip is found to be 0.05. The speed of the rotor m.m.f. relative to the rotor structure is

1500 r.p.m.
1425 r.p.m.
25 r.p.m.
75 r.p.m.

Ans:D

Explanation: $N_s = \frac{120f}{P} = \frac{120 \times 50}{4} = 1500 \text{ rpm}$
 $N = N_s (1-s) = 1500 (1-0.05) = 1425$
relative speed = $1500 - 1425 = 75$ rpm

8. A ceiling fan uses
split-phase motor.
capacitor start and capacitor run motor.
universal capacitor start motor.
capacitor start motor.

Ans:D

9. The drive motor used in a mixer-grinder is a
dc motor.
induction motor.
synchronous motor.
universal motor.

Ans:D

10. A 1:5 step-up transformer has 120V across the primary and 600 ohms resistance across the secondary. Assuming 100% efficiency, the primary current equals

0.2 Amp.
5 Amps
10 Amps.
20 Amps.

Ans:A

Explanation: $I_1 = \frac{V_1}{R_1} = \frac{120}{600} = 0.2$ (h = 100%, losses are zero $V_1 = V_2$
= $I_1 R_1$)

11. A 50 Hz, 3-phase induction motor has a full load speed of 1440 r.p.m. The number of poles of the motor are

- 4.
- 6.
- 12
- 8.

Ans:A

Explanation: $N = \frac{N_s}{(1-S)} = \frac{N_s}{1-S} \times S$
 $1440 = \frac{N_s}{1-S} \times S$
 $N_s = \frac{1440}{S} \times (1-S)$
 $N_s = (120 \times f / p) = 120 \times 50 / p = 6000 / p$
 N_s will be closer to N i.e. 1440
 When $P=2$; $N_s = 3000$ rpm , not close to N
 When $P=4$; $N_s = 1500$ rpm , it is closer to N
 Therefore $P = 4$ for $N = 1440$

12. In a 3-phase synchronous motor

the speed of stator MMF is always more than that of rotor MMF.
 the speed of stator MMF is always less than that of rotor MMF.
 the speed of stator MMF is synchronous speed while that of rotor MMF is zero
 rotor and stator MMF are stationary with respect to each other.

Ans:D

Explanation: Because, Motor is magnetically locked into position with stator, the rotor poles are engaged with stator poles and both run synchronously in same direction
 Therefore, rotor & stator mmf are stationary w.r.t each other.

13. In a three phase transformer, if the primary side is connected in star and secondary side is connected in delta, what is the angle difference between phase voltage in the two cases.

delta	side	lags	by	-30°.
star	side	lags	by	-30°.
delta	side	leads	by	30°.
star	side	leads	by	-30°.

Ans:C

Explanation: This is vector group and has +30° displacement. Therefore, delta side leads by +30°.

14. Slip of the induction machine is 0.02 and the stator supply frequency is 50 Hz. What will be the frequency of the rotor induced emf?

- 10 Hz.
- 50 Hz.
- 1 Hz.
- 2500 Hz.

Ans:C

Explanation: Given : $s = 0.02$; $f = 50$ Hz

Therefore, frequency of rotor induced emf = s f
 = 0.02 x 50 = 1.0 Hz

15. A 4 pole lap wound dc shunt motor rotates at the speed of 1500 rpm, has a flux of 0.4 mWb and the total number of conductors are 1000. What is the value of emf?

- 100 Volts.
- 0.1 Volts.
- 1 Volts.
- 10 Volts.

Ans:D

Explanation: Given N = 1500 rpm, F = 0.4 mWb, Z = 1000, P = 4, & A = 4
 Therefore, $E_b = \frac{N P Z}{60 A} \times 10^{-3}$
 = $\frac{1500 \times 0.4 \times 4 \times 1000}{60 \times 4} = 10$ volts

16. A 3 stack stepper motor with 12 numbers of rotor teeth has a step angle of _____.

- 120
- 8°
- 24°
- 10°

Ans:D

Explanation: Step angle = $\frac{360}{m \times Nr} = \frac{360}{3 \times 12} = 10^\circ$

17. Oil-filled cable has a working stress of _____ kV/mm

- 10
- 12
- 13
- 15

Ans:D

Explanation: This is defined by dielectric strength of mineral oil i.e. 15 kV/mm.

18. The rotor frequency for a 3 phase 1000 RPM 6 pole induction motor with a slip of 0.04 is _____ Hz

- 8
- 4
- 6
- 2

Ans:D

Explanation: Given: N=1000 rpm ; P= 6; s= 0.04;
 and $f = \frac{N \cdot P}{120}$
 = $\frac{1000 \cdot 6}{120}$
 = 50 Hz
 Rotor frequency $f_r = s \cdot f = 0.04 \cdot 50$
 = 2.0 Hz

19. The synchronous speed for a 3 phase 6-pole induction motor is 1200 rpm. If the number of poles is now reduced to 4 with the frequency remaining constant, the rotor speed with a slip of 5% will be _____.

- 1690 rpm
- 1750 rpm
- 1500 rpm
- 1710 rpm

Ans:D

Explanation: Given : $N_{s1} = 1200$, $P_1 = 6$,
 $P_2 = 4$, $s = 0.05$,
Frequency $f = \frac{N_{s1} P_1}{120} = \frac{1200 \times 6}{120} = 60$ Hz
rotor frequency $f_r = s \cdot f = 0.05 \times 60 = 3.0$ Hz
Now, $N_{s2} = \frac{120 \times 60}{4} = 1800$ and $N = N_{s2} - N_r = 1800 - 90 = 1710$
Therefore, $N = N_{s2} - 120 \cdot f_r / P_2 = 1800 - 120 \cdot 0.05 \cdot 60 / 4 = 1800 - 90 = 1710$

20. The efficiency of a transformer is mainly dependent on
 core losses.
 copper losses
 stray losses.
 dielectric losses.

Ans:A

21. A synchronous motor is operating on no-load at unity power factor. If the field current is increased, power factor will become

- Leading & current will decrease
- Lagging & current will increase.
- Lagging & current will decrease
- Leading & current will increase.

Ans:A

Explanation: Initially synchronous motor is operating at no load and unity power factor. When field current increases, the excitation will increase. Therefore, p.f will be leading and current will be $I \cos \phi < I$

22. If the phase angle of the voltage coil of a directional relay is 50° , the maximum torque angle of the relay is

- 130
- 100
- 50
- 25

Ans:C

Explanation: Torque \propto Power Voltage
Therefore, It has same angle as 'V' has

23. A 220/440 V, 50 Hz, 5 KVA, single phase transformer operates on 220V, 40Hz supply with secondary winding open circuited. Then

- Both eddy current and hysteresis losses decreases.
- Both eddy current and hysteresis losses increases.
- Eddy current loss remains the same but hysteresis loss increases.
- Eddy current loss increases but hysteresis loss remains the same.

Ans:A

Explanation: $W_h = k_h f B_m$
 1.6 and $W_e = k_e f^2 B_m$

2.k

Therefore, hysteresis and eddy current losses will be decreased when frequency decreases.

24. Electric ovens using heating elements of _____ can produce temperature upto 3000°C.

- Nickel
- Graphite
- Chromium
- Iron

Ans:C

Explanation: Chromium has high melting point.

25 Electric resistance seam welding uses _____ electrodes.

- Pointed
- Disc.
- Flat
- Domed

Ans:B

Explanation: Disc type electrodes are used for electric resistance seam welding.

11. The line trap unit employed in carrier current relaying:

- offers high impedance to 50 Hz power frequency signal
- offers high impedance to carrier frequency signal
- offers low impedance to carrier frequency signal
- Both (A) & (C)

Ans:B

Explanation: The line trap unit employed in carrier current relaying offers high impedance to

carrier frequency signal.
 Because carrier frequency range is 35 km - 500 kHz
 $X_L = \frac{2\pi f L}{1}$
 Where f increases X_L will also increase

26 The temperature of resistance furnaces can be controlled by changing the:

applied number of heating elements
circuit configuration
All of the above

Ans:D

Explanation: Temperature of resistance furnaces can be controlled by changing either applied voltage or by number of heating elements or by circuit configuration.

27 A single phase Hysteresis motor

can run at synchronous speed only
can run at sub synchronous speed only
can run at synchronous and super synchronous speed
can run at synchronous and sub synchronous speed

Ans:A

Explanation: The rotor revolves synchronously because the rotor poles magnetically lock up with the revolving stator poles of opposite polarity

28. The armature of a dc machine is laminated to reduce:

Eddy current loss
Hysteresis loss
copper losses
friction and windage losses

Ans:A

Explanation: Thinner the laminations, greater is the resistance offered to the induced e.m.f., smaller the current and hence lesser the I²R loss in the core.

29. For LV applications (below 1 kV), _____ cables are used.

Paper insulated.
Plastic.
Single core cables.
Oil filled.

Ans:C