QUIZ – ANSWER KEY

QUIZ NO: 127

TOPIC: ELECTRICAL ENGINEERING

DATE: 24/11/2022

1. As the load is increased the speed of DC shunt motor will _____?

   [A] Reduce slightly

   [B] Increase slightly

   [C] Increase proportionately

   [D] Reduce rapidly

   Answer: A
   Explanation: As the load is increased, speed of the DC motor will reduce slightly, the change is so negligible that in many cases it is assumed that speed of the DC motor remains constant. Hence, characteristic is also called as shunt characteristic.

2. The armature torque of the DC shunt motor is proportional to ?

   [A] Field flux only

   [B] Armature current only

   [C] Field flux and armature current

   [D] Field current

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Answer: B

Explanation: Torque of the DC shunt motor is directly proportional to the armature current. It's almost a straight line if effect of armature reaction is neglected. If armature reaction is taken in consideration then torque will increase but non-linearly with armature current.

3. If a DC shunt motor is working at full load and if shunt field circuit suddenly opens ____?

[A] Will make armature to take heavy current, possibly burning it

[B] Will result in excessive speed, possibly destroying armature due to excessive centrifugal stresses

[C] Nothing will happen to motor

[D] Motor will come to stop

Answer: A

Explanation: At no load or lower loads, there is possibility of excess speed in such cases but here, when full load is given, armature circuit will draw very high current in order to maintain back emf. So, if fuses or circuit breakers are not used then, armature circuit may burn.

4. Speed of DC shunt motor is directly proportional to_____?

[A] Flux

[B] Back emf

[C] Terminal voltage

[D] Armature resistance drop

Answer: B

Explanation: The armature circuit equation for DC shunt motor is given by Ea = Vt -IaRa. But back emf is also equal to kϕn. Thus, kϕn= Vt -IaRa, which further gives n = (Vt -IaRa)/ kϕ. Hence, speed is directly proportional to back emf.

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5. Speed torque characteristic of DC shunt motor is _____?

   [A] Starting from origin

   [B] Starting from speed axis and increasing

   [C] Starting from speed axis and decreasing

   [D] Starting from speed axis and constant

   Answer: C
   Explanation: Speed-torque characteristic falls as torque increases, because armature reaction causes decrease in flux whose square is in inverse proportion with speed, causing decrease in speed rapidly compare to increase in torque.

6. For some percentage increase in the torque, which DC motor will have the least percentage increase of input current?

   [A] Series motor

   [B] Shunt motor

   [C] Cumulative compound motor

   [D] Separately exited motor

   Answer: A

   Explanation: The mechanical torque T is directly proportional to the product of flux per pole ϕ and armature current. In case of DC series motor, up to saturation point flux is proportional to field current because Ia = If. Now if small percentage increase in armature current (before saturation) will occur the same percentage of torque will increase. Whereas in DC series motor the torque is proportional to square of the armature current (before saturation).

7. DC Shunt Motor has a disadvantage _____?

   [A] Constant speed

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[B] Less expensive

[C] Not suitable for rapidly changing loads

[D] Cannot be determined

Answer: C

Explanation: In DC shunt motor, due to shunt characteristics speed variation depends not only upon the controlling resistance but on the load current also. This double dependence makes it impossible to keep the speed sensibly constant on rapidly changing load, which is in contrast with characteristic.

8. For which of the following operations a DC motor is preferred over an AC motor?

[A] Low speed operation

[B] High speed operation

[C] Variable speed operation

[D] Fixed speed operation

Answer: C

Explanation: Due to the various speed control techniques available and with the help of electrical brakes various speed levels can be obtained in DC motor. While in AC motor for same purpose we require frequency change which requires another complex circuitry.

9. Which motor is preferred in highly explosive atmosphere?

[A] Air motor

[B] Shunt motor

[C] Series motor

[D] Battery operated motor

Answer: A

Explanation: A pneumatic motor (Air motor) is a motor which does mechanical work by expanding compressed air. Air motors generally convert the compressed

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air energy to mechanical work through either linear or rotary motion, and are preferred in highly explosive atmosphere.

10. When an electric train is moving down a hill, the DC motor will operate as _____ ?

[A] DC series motor
[B] DC series generator
[C] DC shunt motor
[D] DC shunt generator

Answer: B
Explanation: Normally in electric traction purposes DC series motors are employed. At above condition the back emf is greater than supply voltage hence, it will operate as series generator which will provide energy back to the supply.