QUSTION BANK

UNIT IV - CONVENTIONAL & SOLID STATE SPEED CONTROL OF D.C. DRIVES

PART – A

1) What are the factors on which the speed of a dc motor depends?

Flux in the air gap
Resistance in the armature circuit
Voltage applied to the armature circuit

2) What are the advantages of field control?

The regulating resistance, which has to carry only a small current
Power wasted in regulating resistance is very small

3) What are the methods on which speed of a dc motor be controlled?

Flux control
Armature resistance
Armature voltage

4) What will be the effect of change in supply voltage on the speed of dc shunt motor?

The reduction of supply voltage to the armature of dc shunt motor causes reduction of back-emf of the motor which inturn reduces the speed as the speed is directly proportional to the back emf

5) List the different methods of speed control to 3 phase squirrel cage induction motor?

Speed control by changing supply frequency
Speed control by changing no. of poles
Speed control by changing slip

6) What is meant by speed control?

The initial change of drive speed to a value required for performing the specific work process is called as a speed control.

7) What are the advantages of field control method?

Conventional and easy method
Since, the shunt field current Ish is small the power wasted in the field rheostat also small
Independent of load on the motor
Economical and efficient method

8) What are the disadvantages of field control method?

There is a maximum limit of speed that can be obtained with this method. It is due to fact that flux per pole is too much weakened commutation becomes poorer.

9) What is the application of ward- Leonard system speed control?

This method normally adopted in very sensitive speed control like electric excavators, elevators, coillery winders, main drives in steel mills and paper mills.

10) What are the advantages of Ward-Leonard speed control?

Wide range of speed control is possible
Full forward and reverse speed can be achieved
Power is automatically regenerated to the ac line through the motor generator set which speed is reduced.
Short time over load capacity is large
The armature current of the motor is smooth

11 Define slip

The difference between the synchronous speed and the actual speed of the motor is called slip.

12) What is Slip-Power recovery system?

The slip power can be recovered to the supply source can be used to supply an additional motor which is mechanically coupled to the main motor.This type of drive is known as slip-power recovery system

13) In which type of control the field current and armature current control?

i).For armature control method (or) voltage control method the field current is kept constant

ii).For field control (or) flux control the armature current kept constant

14) What are the advantages of slip-power recovery system?

i).The slip power from the slip-rings can be recorded and fed back to the supply.

ii).The overall efficiency also improved

15) What is meant by frequency control?

The speed of the induction motor can be controlled by varying the supply frequency, because the speed is directly proportional to frequency.

16) What is meant by flux control (or) field control method?

By varying the field flux the speed can be controlled is called flux control. This method can be used for increasing the speed of the motor is inversely proportional to the field flux

17) Write the advantage of flux control method

Convenient and easy method
In this method is independent of load on the motor
Economical and efficient method

18) What is meant by armature control?

The armature having controller resistance in series during the speed control. By varying the controller resistance R, the potential drop across the armature is varied. Hence the speed of the motor also varied. This method of speed control is applicable for speed less than no load speed.

19).What is meant by voltage control in induction motor? and where it is applicable?

In Induction motor speed can be controlled by varying the stator voltage. This can be done by using transformer. This method is called voltage control.

This is suitable only for controlling the speed below rated value.

20).What is static Ward – Leonard drive?

Controlled rectifiers are used to get variable dc voltage from an ac source of fixed voltage. Controlled rectifiers fed dc drives are known as “static Ward – Leonard drive”.

21) What is meant by V/F control?

When the frequency is reduced the input voltage must be reduced proportionally so as to maintain constant flux. Otherwise the core will get saturated resulting in excessive iron loss and magnetizing current. This type of induction motor behaviour is similar to the working of dc series motors.

PART- B BIG QUESTION

1) What is meant by armature control method?

2) List out the methods of speed control in Dc motors?

3) Explain the working of following methods with neat circuit diagram

i).Kramer system ii).Scherbius system

4) Explain in details rotor resistance method of speed control of a slip ring induction motor.

5) Explain any one of the slip power recovery method of speed control