## Important questions

## UNIT 1

1. A separately excited motor of 220V, 960rpm, 80A with an armature resistance of
0.06ohms is coupled to an over hauling load with a toque of 100 Nm. Compute the speed at which the motor can hold the load by regenerative braking. Source voltage is 220V. Neglect the motor rotational losses.

2. A separately excited DC motor is fed from a 230V, 50Hz supply via a single-phase half controlled bridge rectifier. Armature parameters are: inductance 0.06H, Resistance
0.3ohms. Motor voltage constant is $K_a$ = 0.9 V/A rad/s and the field resistance is $R_f$
104ohms. The field current is controlled by a semi converter and is set to max. possible
value. The load torque is 50Nm at 800 rpm. The inductances of armature and field circuit are sufficient enough to make the armature and field currents continuous and ripple free. Compute (i) The field current $I_f$ (ii) The firing angle of converter in armature circuit. (iii) The input power factor of the armature circuit converter. Neglect the system losses.

## Important questions

## UNIT II

1. Explain the operation of a three-phase semi converter fed DC separately excited motor in continuous current mode and derive the equation relating speed and torque and also draw their speed torque characteristics.
2. Explain the operation of a three phase semi converter fed DC series motor in continuous current mode and derive the equation relating speed and torque and also draw their speed torque characteristics.
3. Explain the operation of a three phase full converter fed DC separately excited motor in continuous current mode and derive the equation relating speed and torque and also draw their speed torque characteristics.
4. Explain the operation of a three phase full converter fed DC series motor in continuous current mode and derive the equation relating speed and torque and also draw their speed torque characteristics.
5. A 80KW, 440V, 800rpm, DC motor is operating at 600rpm and developing 75% rated torque is controlled by 3-phase, 6-pulse thyristor converter. If the back emf at the rated speed is 410V, determine the triggering angle of converter. The input converter is 3- phase, 415V, 50Hz,AC supply?

## Important questions

## Unit III

1. Explain the regenerative braking method used for DC series and separately excited motors with neat circuit diagrams.

2. Explain the dynamic braking method used for DC series and separately excited motors with neat circuit diagrams.

3. Explain the plugging method used for DC series and separately excited motors with neat circuit diagrams.

4. The AC supply volt is 230V. The motor voltage constant is K 0.172 V/rpm. Assume that sufficing inductance is present in the armature circuit to make the motor continuous and ripple free. (a) Rectifier operation (Motoring action) for firing angle alpha = $45^0$ and rated motor armature current, Determine (i) Motor torque (ii) Speed of the motor (iii) the supply power factor (b) Inverter operation. Reversing the field excitation reverses the motor back emf polarity.
Determine (i) The firing angle to keep the motor current at its rated value. (ii) The power feed back to the supply

5. A 210V, 1200rpm, 10A separately exited motor is controlled by a single phase fully controlled converter with an AC source voltage of 230V, 50Hz. Assume that sufficient inductance is present in the armature circuit to make the motor current continuous and ripple free for any torque greater than 25% of rated torque. $R_a$ = 1.5ohm.

10. What should be the value of the firing angle to get the rated torque at 800rpm?
Compute the firing angle for the rated braking torque at –1200rpm.
Calculate the motor speed at the rated torque and alpha =$165^0$ for the regenerative braking in the second quadrant?

## Important questions

## UNIT IV

1. Explain the operation of single quadrant chopper fed DC series and separately excited motor in both circulating current and non-circulating modes and also draw their speed torque characteristics.

2. Explain the operation of two-quadrant chopper fed DC series and separately excited motor in both circulating current and non-circulating modes and also draw their speed torque characteristics.

3. Explain the operation of four-quadrant chopper fed DC series and separately excited motor in both circulating current and non-circulating modes and also draw their speed torque characteristics

4. A DC chopper is used to control the speed of DC shunt motor. The supply voltage to the chopper is 220V. The on time and the off time of the chopper are 10 ms and 12ms, respectively. Assuming continuous conduction of the motor current, and neglecting the armature inductance, determine the average load current when the motor runs at a speed of 146.60 rad/ sec and has a voltage constant $K_a$ of 0.495 V/ A rad/sec.
and the armature resistance is $R_a$ is 0.25 ohms.

5. Explain the principle of closed-loop control scheme of dc drive using suitable block diagram.

## Important questions
## UNIT V .

1. A 440 volts, 3phase 50Hz, 6pole 945rpm delta connected Induction motor has the following parameters referred to the stator Rs=2ohms, Xs=3ohms, X1=4ohms.
   When driving a voltage, it runs at rated speed. The motor speed is controlled by stator voltage control Determine motor terminal voltage, current and torque at 800 rpm.

2. Explain why stator voltage control is suitable for sped control induction motor in fan and pip drives. Draw a eat circuit diagram for speed control of scheme of 3-phase induction motor using Ac Voltage controller.

3. Using 3-phase solid state AC Voltage Controllers explain clearly how it is possible to achieve 4 quadrant operation of 3 phase induction motors.

4. Explain why stator voltage control is suited for speed control of induction motors in driving fan loads.

5. Give the applications of stator voltage control of induction motor

6.. Give the applications of stator voltage control of induction motor

7. List the various methods of speed control from stator side of a three phase Induction motor and complete their merits and limitations.

## Important questions

## UNIT VI

1. A 5 H.P., 4 pole 50Hz, 3 phase induction motor is fed through a cyclo-converter of frequency f/3 calculate speed of the motor at a slip of 5 percent.

2. A pole changing method of speed control is not popular in case of induction motors why.

3. plot the speed torque characteristics of a centrifugal pump.

4. For speeds below synchronous speed v/f ratio is kept constant in variable frequency control of inductor motor why.
5. Explain a speed control scheme for a three-phase inductor motor, which uses a cycloconverter.

6. Explain the operation of PWM inverter fed three phase induction motor. Bring out its merits

## Important questions

## UNIT VII

1. What are the advantages of static rotor resistance control (using diode bridge and switch controlled resistor) over conventional methods or rotor resistance control?

2. Why is the power factor of the slip power recovery scheme of speed control of indication motor low?

3. Why a resistance starter is generally required for the induction motor drive employing slip-power recovery? Can you use a semiconductor switch controlled resistance connected after the diode bridge to avoid resistance starter?

4. Why has the static Kramer Drive a low range of speed control?

5. Explain the principle of and an application of variable speed and constant frequency generation schemes.

6. Compare the various types of single phase induction motors in terms of performance and explain where they are employed.

## Important questions

## UNIT VIII

1. Write short notes on the following (i) 3-phase semi controlled converters (ii) Cyclo converters (iii) Static Kramer drives

2. In a self-controlled synchronous motor fed from a variable frequency inverter (i) The rotor poles invariably have damper windings (ii) There are stability problems (iii) The speed of the rotor decides stator frequency. (iv) The frequency of the stator decides the rotor speed.

3. In self-control mode drive of syn. Motors, damper windings are not needed. Why?

4. What are different types of rotor position sensors used in self-controlled synchronous motor drive?

5. Explain steady state and torque angle characteristics of synchronous motion.

6. Derive expressions for no of revolutions made by the motor from rated speed to rest.

7. A 400V 8 pole 3-pha se synchronous motor and its load have a total moment of inertia of 630Kg-m2. Determine the time and the number of revolutions made by it to come to stand still if theocratic braking is employed which gives and initial electric braking torque of 690Kg-m2.Assume a frictional torque of 1.4Kg-m.