

**Electrical Machines – MCQ**

**Induction Motor**

1) Why 3-phase induction motor is widely used in the industry?

Absence of commutator

Good power factor and speed regulation

Rugged construction

All of the above

2) Under stationary condition of single phase motor the slip is

zero

one

negative

none of the above

3) The frame of an induction motor is usually made of

Silicon steel

Cast iron

Aluminium

Bronze

4) In an induction motor, rotor speed is always

Less than the stator speed

More than the stator speed

Equal to the stator speed

None of these

5) The efficiency of an induction motor is about

100%

80-90%

50-60%

Less than 50%

6) A 4-pole three-phase induction motor has a synchronous speed of 25 rev/s. The frequency of the supply to the stator is:

500 Hz

100 Hz

25 Hz

50 Hz

7) The slip speed of an induction motor depends upon

Armature current

Supply voltage

Mechanical load

Eddy currents

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

2 pole

4 pole

6 pole

8 pole

9) The frequency of the induced emf in an induction motor is

Greater than the supply frequency

Lesser than the supply frequency

Same as the supply frequency

None of these

10) Mechanically air gaps in induction motor are kept very low to avoid

lower power factor

lagging nature

magnetising current

all of the mentioned

MCQ #11 to #20

11) In an induction motor, rotor speed is always

Less than the speed RMF induced in the stator

More than the speed RMF induced in the stator

Equal to the speed RMF induced in the stator

None of these

12) Which of the following motor has high starting torque?

Slip ring Induction motor

Squirrel cage induction motor

Both 1 & 2

None of the above

13) The condition for maximum running torque is  $R$  is equal to

$S \cdot X/2$

$X/2$

$X \cdot S$

$X$

14) The shaft of an induction motor must be of

Hollow

Flexible

Solid

Any of the above

15) Slip ring of an induction motor is usually made up of

Copper

Aluminium

Carbon

Phosphorus Bronze

16) A three phase, 50 Hz induction motor has a full load speed of 1440 rpm. The full load slip will be

3 %

4 %

5 %

2 %

17) The crawling in the induction motor is caused by

Low Voltage supply

High Loads

Improper design of machine

Harmonic developed in the motor

18) In three-phase squirrel-cage induction motors rotor conductors are kept open.

short-circuited through slip rings.

connected to insulation.

short-circuited at ends through end rings.

19) The field of an induction motor rotor rotates relative to the stator at

Rotor speed

Synchronous speed

Slip speed

Very low speed

20) Starters are used in induction motor because

starting torque is high

It is run against heavy load

It can not run in reverse direction

starting current is five times or more than its rated current

21) The speed control of single-phase induction motor is done by \_\_\_\_\_

reducing the voltage applied to the stator winding

using high rotor resistance

employing tapped exciting winding

all of the above

22) Why Interpoles or commutating poles are provided in ac series motors?

improving commutation

limit high starting current

produce high starting torque

start the motor

23) In ac series motor the mechanical power developed is the product of \_\_\_\_\_

counter emf and the armature current

counter emf and supplied voltage

supply voltage and the armature current

none of the above

24) The maximum torque developed in an induction motor is called

breakdown torque

Pull out torque

starting torque

Both A or B

25) The total magnetizing current of induction motor is \_\_\_\_ as compared to transformer.

very small

low

large

same

26) In induction motor the rotor core losses are high at

starting

during acceleration

during running condition

Both A and B

27) Which of the following loss is vary with rotor frequency?

stator core loss

friction loss

rotor core loss

windage loss

28) The purpose of starter used in induction motor are to reduce

the heavy starting current

undervoltage protection

overload protection

all of the above

29) The efficiency of the motors can be found by performing

no-load test

blocked rotor test

Both A and B

regenerative test

30) Which test performed to separate the friction and windage losses?

- open circuit test
- blocked rotor test
- regenerative test
- all of the above

31) Which of the following motor is not self start motors?

- 3-phase induction motor
- single phase motor
- DC motors
- reluctance motor

32) In single phase induction motors

- the axis of rotor mmf wave coincides with that of the stator field
- at starting torque angle is zero
- no torque is developed at starting
- all of the above

33) Under stationary condition of single phase motor the slip is

- zero
- one
- negative
- none of the above

34) The rotor of three phase motor is built up of

- thin lamination of same material as brushes
- thick laminations of same material as stator
- thin laminations of same material as commutator
- thin lamination of same material as stator

35) Why the rotor of squirrel cage rotor is skewing?

- it offers more uniform torque produced
- the locking tendency of the rotor is reduced
- it reduced the noise during operation
- all of the above

36) In wound rotor the open ends of star circuit are connected to

brushes

slip rings

commutators

any of the above

37) The slip rings are mounted on the shaft with

commutator

resistors

brushes

supply

38) Three phase motor the windings are displaced by

90°

270°

30°

120°

39) The difference between the synchronous speed and the actual rotor speed is called

slip speed

rotor speed

rotating magnetic field speed

drive rotational speed

40) In induction generator the slip is

positive

zero

negative

unity

41) The output of the induction generator is maximum when the slip is

positive

zero

negative

unity

42) If the alignment torque is greater than accelerating torque motor will

fail to start

start with slowly

rotor blocked

start with very high speed

43) In wound rotor motors the cogging and crawling is less prominent because

higher starting torque

higher starting current

lower starting torque

higher speed at starting

44) In autotransformer starter the starting current is limited to reduce the

initial stator current

initial stator voltage applied

field current

initial load current

45) The friction and windage losses can be separated from

open circuit test

blocked rotor test

regenerative test

any of the above

46) The stator voltage control method of speed control is suitable for applications where load torque

decrease with speed

increase with speed

remains constant with speed

double with speed

47) The flux in the shaded pole induction motor is \_\_\_\_\_ the flux in the main part of the pole.

leads

in phase

lagging behinds

out of phase



48) In shaded pole motor, the direction rotation of motor is depends on the magnitude of excitation current

position of shading coil

polarity of the supply mains

all of the above

49) The speed of the shaded pole motor can be varied by varying

voltage applied across its rotor winding

voltage applied across its stator winding

number of shaded ring

excitation

50) The voltage applied to shaded pole motor can be varied by using

a tapped reactance coil

an auto-transformer

tapped exciting winding

all of the above

51) The circle diagram of an induction motor is

useful to study the performance under all operating conditions

its construction is based on approximate equivalent circuit

both a and B

its construction is base on vector diagram

52) In an induction motor with two rotor windings is used for obtaining

lower starting torque at high starting current

higher starting current at high starting current

higher starting current at low starting current

lower starting current with lower starting current

53) In double cage rotor induction motor the inner winding has a \_\_\_\_\_.

higher resistance

greater self inductance

greater conductance

none of the above

54) Under normal operating conditions of double cage rotor motor the torque is developed mainly by the

low resistance outer cage

high resistance outer cage

low resistance inner cage

high resistance inner cage

55) In which type of starter, a induction motor is directly connected to the full supply voltage

star-delta starter

direct online starter

autotransformer

all of the above

56) The torque slip characteristic of three phase induction motor, the curve is straight line when slip is

high

small

medium

any of the above

57) The maximum torque developed in an induction motor is called

breakdown torque

Pull out torque

Both A or B

starting torque

58) The equivalent circuit of induction motor is very similar to

transformer

transformer with tapings

auto transformer

all of the above

59) Which of the losses is zero at start of induction motor?

friction and windage

windage and copper losses

friction and iron losses

windage and iron loss

60) The friction and windage losses are

decreases with increase in speed

increases with decrease in speed

increases with increase in speed

remains same at all speed range

61) Which of the following loss is vary with rotor frequency?

stator core loss

rotor core loss

friction loss

windage loss

62) In wound rotor motors the cogging and crawling is less prominent because

higher starting torque

lower starting torque

higher starting current

higher speed at starting

63) A star-delta starter is used for \_\_\_\_\_ designed to run normally on \_\_\_\_\_ winding.

wound rotor motor; delta connected rotor

cage rotor motor; delta connected stator

wound rotor motor; delta connected stator

cage rotor motor; delta connected rotor

64) In autotransformer starter the starting current is limited to reduce the initial

stator current

stator voltage applied

initial load current

field current

65) The friction and windage losses can be separated from

open circuit test

blocked rotor test

regenerative test

any of the above

66) Why Inter poles or commutating poles are provided in all ac series motors?

improving commutation

limit high starting current

produce high starting torque

start the motor

67) A capacitor starts single phase induction motor the capacitor is connected in

parallel with main winding

series with main winding

series with starting winding

parallel with auxiliary winding

68) What is the value of slip when rotor is blocked?

1

0

0 to 1

0.5

69) The main winding of single-phase induction motor is of \_\_\_\_\_.

thinner wire

thicker wire

large number of turns

large number of fine wires

70) Why the rotor of squirrel cage rotor is skewing?

it offering more uniform torque produced

the locking tendency of the rotor is reduced

it reduced the noise during operation

all of the above

71) Linear induction motor is used in

mechanical workshop

magnetic attraction

traction

textile mills

72) If an induction motor hums during starting up, the possible cause could be

unequal phase resistance

open circuit

inter turn short circuit on rotor

any of the above

73) The no-load current of a single-phase induction motor is around \_\_\_\_\_ % of the full load current.

10

20

40

80

74) When the induction motor runs faster than the synchronous speed, the induction motor runs as

Induction generator

Synchronous motor

Asynchronous generator

Such a condition is not possible

75) In a slip ring induction motor, the rotor resistance is \_\_\_\_\_ starting and \_\_\_\_\_ normal operating speed.

Remains same during, low at

Low, high at

High during, low at

None of these

76) If the number of poles increased, the speed of the induction motor is \_\_\_\_\_.

Increased

Decreased

Unchanged

Insufficient data

77) Which of the following is different in case of squirrel cage and wound rotor induction motor?

Operating principle

Stator construction

Rotor construction

All of the above

78) If the load is increased, the speed of the induction motor is \_\_\_\_\_.

Increased

Decreased

Remain constant

None of the above

79) At normal load the slip of induction motor is \_\_\_\_\_.

2-5%

8-10%

0%

More than 10%

80) At no-load the slip of induction motor is?

3%

0.5%

8%

15%

81) Find a slip of induction motor. A 6-pole induction motor working on 50 Hz supply and its running speed is 950 rpm.

0.5

0.05

0.03

0.3

82) A 6-pole induction motor is supplied by 12-pole alternator. An alternator is driven at 600 RPM. If the motor is running at 1140 RPM. To calculate the percentage slip.

2%

5%

8%

12%

83) A 3-phase induction motor has 2 poles, 50 Hz and 400V supply. Slip of the motor is 3%. To calculate rotor emf frequency.

2 Hz

5 Hz

1.5 Hz

3.5 Hz

84) The torque developed by rotor of induction motor is depends on?

Rotor current

Stator flux per pole

Power factor of rotor circuit

All of the above

85) Why usually rotor slots are designed in skewed in an induction motor?

To obtain uniform torque

Reduced magnetic locking

Reduced magnetic humming while running

All of the above

86) When an induction motor runs at rated load and speed, the iron losses are

Negligible

Very heavy

Independent of supply voltage

Independent of supply frequency

87) The EMF induced in the rotor of an induction motor is proportional to

Voltage applied to stator

Relative velocity between flux and rotor conductors

Both A and B

Slip

88) The starting torque of an induction motor is maximum when rotor resistance is \_\_\_\_\_ the rotor reactance.

Equal to

Twice of

Half of

R2 times of

89) Wattmeter reading in no-load test of induction motor gives

Copper losses in the stator

Friction and windage losses

Sum of A and B

Total losses in the rotor on no load

90) The slip frequency of an induction motor is

Frequency of rotor currents

Frequency of stator currents

Difference of the frequencies of the stator and rotor currents

Sum of frequencies of the stator and rotor currents

91) The field of an induction motor rotor rotates relative to the stator at

Rotor speed

Synchronous speed

Slip speed

Very low speed

92) Starters are used in induction motor because

Its starting torque is high

It is run against heavy load

It cannot run in reverse direction

Its starting current is five times or more than its rated current

93) Three-phase induction motor is mainly suitable for running

Different machine tools where several speeds are required

Paper machine requiring exact speed control

Electric vehicle

Rolling mills needing exact speed control

94) The field winding of three-phase synchronous machine is excited by

Single-phase AC supply

Three-phase AC supply

DC supply

Supply obtained from an inverter



95) The synchronous speed of an induction motor is defined as

Natural speed at which a magnetic field rotates

Speed of synchronous motor

Speed of induction motor at no load

None of the above

96) Synchronous induction motors are mostly used for driving

Lathe machine

Cranes

Rotary compressors

None of the above

97) Number of different speeds that can be obtained from two induction motor in cascade is

2

3

4

5

98) Which of the following motor is used for traction purpose?

Induction motor

DC shunt motor

DC series motor

Synchronous motor

99) Maximum power developed in a synchronous motor occurs at a coupling angle of \_\_\_\_\_ degree.

0

60

90

120

100) Squirrel cage induction motor has \_\_\_\_\_ starting torque.

Zero

Vary small

Medium

Very high

101) Which of the following motor rotor resistance is used?

Squirrel cage induction motor

Wound rotor induction motor

Slip-ring induction motor

Both B and C

102) Which of the following motor rotor bars used?

Squirrel cage induction motor

Wound rotor induction motor

Slip-ring induction motor

All of the above

103) Which of the following single-phase motor's rotor and stator are electrically connected?

Split-phase motor

Shaded-pole motor

Repulsion motor

All of the above

104) Which induction motor has high starting torque and better speed control?

Slip-ring induction motor

Wound rotor induction motor

Both A and B

Squirrel cage induction motor

105) Slip of the induction motor can be expressed in \_\_\_\_\_?

RPM

radians per second

Both of above

None of these

106) Find synchronous speed of induction motor. A 4-pole induction motor working on 50 Hz supply.

3000 rpm

1500 rpm

1000 rpm

750 rpm

107) A 6-pole induction motor is supplied by 10-pole alternators. Alternator is driven at 600 rpm. If the motor is running at 950 rpm. To calculate the slip.

0.05

0.02

0.01

0.08

108) A 3-phase induction motor has 2 poles, 50 Hz and 400V supply. Slip of the motor is 3%. To calculate rotor emf frequency.

2 Hz

5 Hz

1.5 Hz

3.5 Hz

109) The torque developed by rotor of induction motor is depends on?

Rotor current

Stator flux per pole

Power factor of rotor circuit

All of the above

110) At starting of Induction motor, the slip is?

1

0

0.61

0.2

111) An induction motor can be said analogous to

transformer

synchronous motor

universal motor

stepper motor

112) Which of the following motor has high starting torque?

Slip ring Induction motor

Squirrel cage induction motor

Both 1 & 2

None of the above

113) At standstill condition the value of slip is

0

Infinity

One

None of the above

114) The condition for maximum running torque is

$$R = S \cdot X/2$$

$$R = X/2$$

$$R = X \cdot S$$

$$R = X$$

115) The condition for maximum starting torque is

$$R = S \cdot X/2$$

$$R = X/2$$

$$R = X \cdot S$$

$$R = X$$

116) A 4 pole 50 Hz induction motor is running at 1300 RPM. Find the speed of the stator magnetic field with respect to the rotor?

1500 RPM

200 RPM

1300 RPM

3000 RPM

117) Blocked rotor test in an induction motor is used to determine

Leakage impedance

Copper loss

Both 1 & 2

None of the above

118) If an induction machine is run at above the synchronous speed it acts as

Synchronous Motor

Synchronous Generator

Induction Generator

None of the above

119) What happens if a fifth harmonic is given to the induction motor?

Short-circuit the motor

A motor will rotate in a reverse direction

A motor will rotate in the same direction

None of the above

120) Rotor resistance speed control method is not applicable in

Synchronous motor

Squirrel cage induction motor

Slip Ring induction motor

None of the above

121) The frame of an induction motor is usually made of

Silicon steel

Cast iron

Aluminum

Bronze

122) The frequency of the induced emf in an induction motor is

Greater than the supply frequency

Lesser than the supply frequency

Same as the supply frequency

None of these

123) In an induction motor, the rotor speed is always

Less than the stator speed

More than the stator speed

Equal to the stator speed

None of these

124) The efficiency of an induction motor is about

100%

80-90%

50-60%

Less than 50%

125) In an induction motor, greater the number of poles

Lesser the frequency

Greater the speed

Lesser the speed

All of these

126) A 4-pole three-phase induction motor has a synchronous speed of 25 rev/s. The frequency of the supply to the stator is

500 Hz

100 Hz

25 Hz

50 Hz

127) The slip speed of an induction motor depends upon

Armature current

Supply voltage

Mechanical load

Eddy currents

128) An induction motor can be said analogous to

transformer

synchronous motor

universal motor

stepper motor

129) Mechanically air gaps in an induction motor are kept very low to avoid

lower power factor

lagging nature

magnetizing current

all of the mentioned

130) A 50 Hz, 3-phase induction motor has a full load speed of 1440 RPM The number of poles in the motor is

2 pole

4 pole

6 pole

8 pole

131) The shaft of an induction motor is made of \_\_\_\_\_ material.

flexible

stiff

hollow

any of the above

132) In an induction motor, no-load the slip is generally

less than 1%

1.5%

2%

4%

133) In squirrel cage induction motors, the rotor slots are usually given slight skew to reduce

windage losses

eddy currents

accumulation of dirt and dust

magnetic hum

134) \_\_\_\_\_ method is easily applicable to control the speed of the squirrel-cage induction motor?

By changing the number of stator poles

Rotor rheostat control

By injecting EMF in the rotor circuit

By operating two motors in cascade

135) The auto-starters (using three autotransformers) can be used to start \_\_\_\_\_ type of cage induction motor.

delta connected only

star connected only

none of the above

(a) and (b) both

136) It is advisable to avoid line-starting of induction motor and use starter because

it will pick-up very high speed and may go out of step

motor takes five to seven times its full load current

starting torque is very high

it will run in a reverse direction

137) Rotor rheostat control method of speed control is used for

squirrel-cage induction motors only

slip ring induction motors only

both (a) and (b)

none of the above

138) If any two phases for an induction motor are interchanged, the motor will

run in a reverse direction

burn

run at a reduced speed

not run

139) In three-phase squirrel-cage induction motors, rotor conductors are

short-circuited through end rings

short-circuited through slip rings

kept open

connected to the insulation

140) DOL (Direct Online) starting of induction motors is usually restricted to

low horsepower motors

high-speed motors

variable speed motors

high horsepower motors

141) Which of the following motor has high starting torque?

Squirrel cage induction motor

Slip ring Induction motor

Both Slip ring and squirrel cage induction motor

None of the above



142) At stand still condition the value of slip is

0

Infinity

One

None of the above

143) The condition for maximum running torque is when the Resistance R is equal to

S times  $X/2$

$X/2$

X times S

X

144) Rotor resistance speed control method is not applicable in

Synchronous motor

Slip Ring induction motor

Squirrel cage induction motor

None of the above

145) A 4 pole 50 Hz induction motor is running at 1300 rpm. Find the speed of stator magnetic field with respect to the rotor?

1500 rpm

1300 rpm

200 rpm

3000 rpm

146) The condition for maximum starting torque is when the Resistance R is equal to

S times  $X/2$

X times S

$X/2$

X

147) Blocked rotor test in an induction motor is used to determine

Leakage impedance

Copper loss

Both Leakage impedance and Copper loss

None of the above

148) If an induction machine is run at above the synchronous speed it acts as

Synchronous Motor

Synchronous Generator

Induction Generator

None of the above

149) Induction motors have the advantage of

Less Maintenance

Simple in construction

Less cost

All of the above

150) What happens if fifth harmonics is given to induction motor?

Short-circuit the motor

Motor will rotate in the same direction

Motor will rotate in reverse direction

None of the above

#### DC Machines

1) In a D.C. generator, the ripples in the direct EMF generated are reduced by using

filters

commutator with large number of segments

carbon brushes of superior quality

using equalizer rings

2) In a d.c. machine, the form of armature reaction mmf is

Triangular

Sinusoidal

Saw tooth

Rectangular

3) A 120 V shunt generator running at 850 rpm has its armature and shunt field resistance of 0.15 ohm and 60 ohms respectively. It supplies 250 lamps each rated at 60 W, 120 V. The friction and windage and core loss of the machine is 400 W. its armature copper loss on full load and shunt field loss is

2419.35 W, 240 W

2156.7 W, 200 W

2156.7 W, 240 W

2232.6 W, 240 W

4) A machine operating as motor, this machine may work in regenerative braking mode, if its speed becomes sufficiently

high to make back emf greater than supply voltage

low to make back emf greater than supply voltage

high to make back emf half of the supply voltage

low to make back emf half of the supply voltage

5) The torque constant ( $K_m$ ), of a permanent magnet DC motor is  $0.25 \text{ V sec / radian}$  and armature resistance is  $2 \text{ ohms}$ . If the applied armature voltage is  $90 \text{ V}$ , then its zero-speed torque is

10.45 N-m

13.65 N-m

15.56 N-m

11.25 N-m

6) A shunt generator can self-excite

Only if the resistance of the field circuit is greater than critical value

Irrespective of the value of the resistance in the field circuit

Only if the resistance of the field circuit is less than critical value

None of the above

7) D.C. generator generally preferred for charging automobile batteries is

Series generator

Shunt generator

Long shunt compound generator

Any of the above

8) If the no load speed of DC motor is  $1350 \text{ rpm}$  and full load speed is  $1150 \text{ rpm}$ , then its voltage regulation is

11.56 %

15.36 %

17.39 %

19.39 %

9) A 220 V, DC motor draws an armature current of 20 A. Its armature resistance is 0.6 ohm. Then the induced emf in the motor will be

195 V

202 V

215 V

208 V

10) In DC machines, equalizer connections are provided in

Only wave winding

Only lap winding

Both wave winding and lap winding

None of these

11) A 240 V, 17 kW DC shunt motor draws an armature current of 80 A at full load. The armature and shunt field resistances are 0.2 ohm and 195 ohms respectively. The rotational losses and efficiency of motor at full load is

87.20 %

89.32 %

89.67 %

90.03 %

12) A 4 pole DC shunt generator having a wave winding supplies 45 lamps, each of 50 W at 100 V. The armature and field resistance are 0.15 ohm and 50 ohms respectively. The current in armature conductor is

11.25 A

11.50 A

12.25 A

13.50 A

13) Which of the following rule is used to determine the direction of rotation of D.C motor?

Fleming's Left-hand Rule

Coulomb's Law

Lenz's Law

Fleming's Right-hand Rule

14) D.C. generators are normally designed for maximum efficiency around

full-load

rated RPM

rated voltage

all of the above

15) For the parallel operation of two or more D.C. compound generators, we should ensure that

Voltage of the incoming generator should be same as that of bus bar

Polarity of incoming generator should be same as that of bus bar

All the series fields should be run in parallel by means of equalizer connection

Series fields of all generators should be either on positive side or negative side of the armature

(16) In small dc machine, the armature resistance usually in order of?

10  $\Omega$

1  $\Omega$

5  $\Omega$

50  $\Omega$

(17) Magnetic characteristics also known as?

Internal characteristic

No load saturation characteristic

External characteristic

Total characteristic

(18) Magnetic characteristic gives relation between?

Generated emf  $E_0$  in armature on no load and field current  $I_f$

Terminal voltage  $V$  and load current  $I$ .

Torque and speed

Emf generated in armature  $E$  and armature current  $I_a$ .

(19) A 1500 kW, 600 V, 8-pole separately excited dc generator runs at 300 rpm. It has 2500 lap-connected conductors and full load copper losses are 30 kW. Calculate the useful flux per pole.

73.2 mWb

56.6 mWb

35.7 mWb

48.8 mWb

(20) What is the equation of terminal voltage in series wound generator?

$$V = E_g + I (R_a + R_{se})$$

$$E_g = V + I (R_a + R_{se})$$

$$V = E_g - I (R_a - R_{se})$$

$$E_g = V + I (R_a - R_{se})$$

(21) How many values of the resistance of series winding is?

0.5  $\Omega$

20  $\Omega$

3.5  $\Omega$

50  $\Omega$

(22) How many values of the resistance of shunt winding is?

40  $\Omega$

2  $\Omega$

75  $\Omega$

100  $\Omega$

(23) A dc generator whose field winding is excited from an independent external dc source, such generator is known as?

Series excited generator

Separately excited generator

Series wound generator

Shunt wound generator

(24) External characteristic gives relation between?

Generated emf  $E_0$  in armature on no load and field current  $I_f$

Emf generated in armature  $E$  and armature current  $I_a$ .

Terminal voltage  $V$  and load current  $I$ .

Torque and speed

(25) Internal characteristic gives relation between?

Generated emf  $E_0$  in armature on no load and field current  $I_f$

Emf generated in armature  $E$  and armature current  $I_a$ .

Terminal voltage  $V$  and load current  $I$ .

Torque and speed

(26) Application of separately excited dc generator is?

War Leonard system of speed control

Arc lighting

Regenerative braking of dc locomotive

booster

(27) Application of differential compound wound dc generator is?

Lighting

Arc welding

power supply

Charging of batteries

(28) Which of the following used as generator during electric braking?

DC series motor

DC shunt motor

Both

DC compound motor

(29) When load on generator is increase, speed will?

Increase

Decrease

Remain unchanged

no indirect relation between speed and load.

(30) Which of the method(s) use for changing generated emf of two generators?

By change in speed of the generators

By change in excitation of the generators

a and b

By change in supply voltage of the generators

31) When a current carrying conductor is placed in magnetic field which force is produced?

linear force

mechanical force

electrostatic force

Magnetostriction

32) When mechanical force is applied on the ferromagnetic material, there is change in the magnetic properties. This phenomenon is called

piezoelectric effect

magnetostriction

magnetic field

electrostatic field

33) The direction of force produced due to current carrying conductor placed in magnetic field is found out by

Fleming's left hand rule

Fleming's right hand rule

Faraday's law

Screw rule

34) In single layer winding, number of slots equal to the number of \_\_\_\_\_.

coil

conductors

coil side

poles

35) The efficiency of large dc machines is about

50 to 80%

70 to 90%

90 to 98%

85 to 95%

36) Classify the dc motor according to connection of field winding.

series motor

shunt motor

compound motor

all of the above

37) The field winding is connected in parallel with the armature is known as \_\_\_\_\_.

compound motor

series motor



shunt motor

brushless motor

38) In series dc motor the field winding is connected in \_\_\_\_\_.

parallel with the armature winding

series with the stator winding

series with the armature winding

parallel with the load

39) Sparking at the brushes is due to

fast commutation

delay in commutation

issue of bearing

all of the above

40) The inter poles in dc motors is connected in

series with the armature winding

series with the stator winding

series with the terminal

parallel with the stator winding

41) Which part of DC generator rectified AC into DC?

Armature

Field Winding

Commutator

Yoke

42) Permanent magnets are used in \_\_\_\_\_ DC machines?

Very small rating of

Large rating of

Small and large rating of

Insufficient data

43) Permeability of cast steel is \_\_\_\_\_ then permeability of cast iron.

2 times

3 times

4 times

5 times

44) While designing of small dc machine on which parameters more focused?

Cost

Weight

appearance

Losses

45) In design of DC generator, the number of poles depends on?

Speed of armature

Output of the machine

Slip of the machine

Speed of armature and Output of the machine

46) If number of poles is increase, which of the parameter will not be increases?

Weight of core and yoke

Overall diameter and length

Length of commutator

Flux

47) If number of poles is decrease, which of the parameter will not be increases?

Labor cost

Flux

Cost of copper in field and armature

Tendency of flash-over between brush arms

48) The shape of brush of the DC machine?

Square

Circular

Rectangular

Cylindrical

49) What are the functions of armature in dc machine?

rotate the conductor

provide low reluctance path

rotate the conductor and to provide low reluctance path

provide high reluctance path

50) When one or more turns are connected in series and two ends of it are connected to adjacent commutator segments in lap winding it is known as?

Conductor

Coil

Inductor

51) The \_\_\_\_\_ winding is stationary which does not move at all and the \_\_\_\_\_ winding is movable winding.

Armature, Field

Field, Armature

Lap, Wave

Wave, Lap

52) Fleming's right-hand rule, first finger point in the direction of \_\_\_\_\_.

Lines of force

Conductor motion

Induced EMF

53) In Fleming's right-hand rule, the second finger indicates the direction of \_\_\_\_\_.

Lines of force

Conductor motion

Induced EMF

54) In Fleming's right-hand rule, the outstretched thumb point direction of \_\_\_\_\_.

Lines of force

Conductor motion

Induced EMF

55) \_\_\_\_\_ is an iron body which provides the path for the flux.

Field winding

Brushes

Yoke

Poles

56) Which material is used for Yoke?

Copper

Carbon

Silicon steel

Aluminum

57) The field winding is also known as \_\_\_\_\_ winding.

Auxiliary

Magnetizing

Exciting

58) \_\_\_\_\_ provides a low reluctance path to the flux produced by the field winding.

Armature winding

Armature core

Pole shoe

Yoke

59) \_\_\_\_\_ is connected to the external circuit (load) through the commutator and brushes.

Field winding

Armature winding

Armature core

Pole shoes

60) For \_\_\_\_\_ winding the number of parallel paths is exactly equal to the number of poles P.

Lap

Wave

Field

Exciting

61) \_\_\_\_\_ provides a low reluctance path to the flux produced by the field winding.

Armature winding

Armature core

Poles shoes

Yoke

62) \_\_\_\_\_ are used for the armature core.

Copper

Cast iron

Carbon

Both copper and carbon

63) The laminated construction is used to produce the armature core to minimize the \_\_\_\_\_.

Core loss

Hysteresis loss

Eddy current loss

Stray loss

64) \_\_\_\_\_ is connected to external circuit (load) through the commutator and brushes.

Field winding

Armature winding

Armature core

Pole shoes

65) Armature winding should be made up of a conducting material such as \_\_\_\_\_.

Cast steel

Cast iron

Copper

Mica

66) A \_\_\_\_\_ is a cylindrical drum mounted on the shaft along with the armature core.

Pole

Brush

Commutator

Yoke

67) Commutator is made up of a large number of wedge-shaped segments of \_\_\_\_\_.

Hard-drawn copper

Cast iron

Cast steel

Carbon

68) \_\_\_\_\_ collects the current from the armature conductors.

Pole

Brush

Commutator

Yoke

69) For DC motors, commutator helps to produce a \_\_\_\_\_ torque.

Bidirectional

Unidirectional

Shaft

Gross

70) Current is conducted from the armature to the external load by the \_\_\_\_\_.

Yoke

Pole

Pole shoes

Carbon brushes

71) Brushes are made up of \_\_\_\_\_.

Copper

Carbon

Cast steel

Mica

72) The \_\_\_\_\_ winding is classified into lap and wave winding.

Field

Armature

Excitation

Auxiliary

73) For \_\_\_\_\_ winding the number of parallel paths is exactly equal to the number of poles P.

Lap

Wave

Field

Excitation

74) The lap winding is useful for \_\_\_\_\_ machines.

High voltage high current

Low voltage high current

High voltage low current

Low voltage low current

75) \_\_\_\_\_ winding will create only two parallel paths irrespective of the number of poles.

Lap

Wave

Field

Excitation

76) If the two field windings (series and shunt) are wound in such a way that the fluxes produced by them always add or assist each other, then the type of compound motor is called as \_\_\_\_\_.

Universal motor

DC Series motor

Differential compound DC motor

Cumulative compound DC motor

77) The torque of DC shunt motor is proportional to \_\_\_\_\_.

Field current

Armature current

Flux

Angular velocity

78) The torque of DC series motor is proportional to \_\_\_\_\_.

Field current

Armature current

Square of armature current

Square of field current

79) Ideal value of speed regulation of DC motor is \_\_\_\_\_.

100%

0%

10%

50%

80) In case of DC shunt motor, as the load on the motor increases, armature current increases proportionally and the torque produced by the motor \_\_\_\_\_.

Increases

Decay exponentially

Slightly dropping

Decreases

81) The \_\_\_\_\_ motor is used in those applications which demand a moderate starting torque.

DC shunt motor

Differential compound DC motor

Induction motor

Cumulative compound DC motor

82) The speed-armature current characteristic is slightly \_\_\_\_\_, as we increase the load from no load to full load.

Rising

Exponential

Dropping

Constant

83) In DC shunt motor, as the load increase, torque will also increase and speed \_\_\_\_\_.

Increase

Decrease

Remains constant

Double

84) Which motor will never start in no load condition?

DC shunt

DC series

Long shunt compound

Short shunt compound

85) If the series field winding is more effective, then the characteristic of compound motors is closer to those of the \_\_\_\_\_.

DC shunt motor

DC series motor

Alternator

Separately excited motor



86) Shunt, series and compound generators are the types of \_\_\_\_\_.

Separately excited generators

Self-excited generators

Long shunt differential compound generators

short shunt differential compound generators

87) The voltage drop across the brushes is constant and equal to \_\_\_\_\_.

0-5 volts

5-10 volts

1-2 volts

3-5 volts

88) \_\_\_\_\_ losses include friction and windage loss.

Rotational

Gross

Mechanical

Shaft

89) The external load is connected between the \_\_\_\_\_ winding whereas the \_\_\_\_\_ winding is connected to an external DC supply.

Lap, wave

Wave, lap

Armature, field

Field, armature

90) In the separately excited generator, the \_\_\_\_\_ winding is connected to the external DC source.

Field

Armature

Lap

Wave

91) Due to the separate excitation, the \_\_\_\_\_ will remain constant.

Load current

Armature current

Field current

Armature current and load current both

92) Magnetization characteristics is the graph of \_\_\_\_\_ and \_\_\_\_\_.

Flux, field current

Armature voltage, armature current

Terminal voltage, load current

Terminal voltage, armature current

93) \_\_\_\_\_ characteristic is also known as the open circuit characteristics OCC.

External

Internal

Magnetization

94) \_\_\_\_\_ characteristic of DC generator is a graph of its terminal voltage and load current.

External

Internal

Magnetization

95) \_\_\_\_\_ characteristic is the graph of generated emf  $E$  and the load current.

External

Internal

Magnetization

96) If the shunt field winding is more effective then the characteristics of compound motors are closer to those of a \_\_\_\_\_.

DC shunt motor

DC series motor

Alternator

Separately excited motor

97) \_\_\_\_\_ motors run at moderately high speed even at no loads.

DC series

DC shunt

Cumulative compound

Differential compound

98) The \_\_\_\_\_ motors are not practically used.

DC series

DC shunt

Cumulative compound

Differential compound

99) For any load which need high starting torque, \_\_\_\_\_ motor is the only suitable drive.

Universal

DC shunt

Differential compound

DC series

100) DC shunt motors are used in \_\_\_\_\_.

Cranes

Hoists

Elevators

Printing machines

101) The number of brushes in lap winding are always \_\_\_\_\_ the number of poles.

double

same as

half

none of the above

102) A generator has 4 poles, 16 coils with two layer of lap winding. Find the pole pitch.

32

16

8

4

103) The actual flux distortion depends upon \_\_\_\_\_, in a DC machine.

clearance between tips of the adjacent pole shoe

shape of pole shoe

size of air gap

all of the above

104) The dummy coil in a DC machine are useful to

reduce the cost of the machine

improve the commutation

increase the efficiency

maintain mechanical balance of the armature

105) The commutator pitch for simplex lap winding is

+1

-1

+1 or -1

average pitch

106) Which type of the DC generator is used as an exciter in turbo generator?

series

shunt

compound

separately excited

107) Which of the following DC generator has rising VI characteristic.

series

shunt

compound

none

108) Which type of DC generator is used for arc welding purpose?

series generator

shunt generator

cumulatively compound generator

differentially compound generator

109) In a DC motor, the shaft torque is less than armature torque because of

stray loss

hysteresis loss

eddy current loss

all of the above

110) Ward Leonard control is basically a \_\_\_\_\_ control method.

field diverter

armature resistance

armature voltage

field

111) Number of conductors per pole is known as?

Pole pitch

Commutator pitch

Front pitch

112) Which of the following is the type(s) of drum armature winding?

Lap winding

Wave winding

Frog-leg winding

All of the above

113) Which of the following type(s) of lap winding?

Simplex winding

Double winding

Triple winding

All of the above

114) Number of parallel paths in duplex lap winding?

1

2

3

4

115) In DC machine, poor commutation occurs due to \_\_\_\_\_.

Non-uniform brush pressure

Vibrations of the brush in the holders

To increase the voltage between the commutator segments

All of the above

116) Which of the following method(s) is used for improving commutation?

use of high resistance brushes

shifting brushes

use of Inter-pole

All of the above

117) Where is the location of commutating poles in dc machine?

Midway between the main poles

Ahead of the main poles

Behind the main poles

None of the above

118) The strength of interpole is \_\_\_\_\_ to the load current.

Directly proportional

Inversely proportional

Equal to

No relation between them

119) Polarity of commutating pole will be \_\_\_\_\_ in the direction of rotation of the main pole for the DC generator.

Behind

Equal to

Ahead

Back

120) Compensating winding is used from \_\_\_\_\_ ratings of the dc machine.

0.5 kW, 1500 rpm

30 kW, 150 rpm

5 kW, 1500 rpm

100 kW, 1500 rpm

121) Laminations of core are generally made of

carbon

cast iron

stainless steel

silicon steel

122) The armature of the DC generator is laminated to

provide the bulk

reduce the bulk

reduce eddy current loss

insulate the core

123) The commutator segments are connected to the armature conductors using

resistance wires

copper lugs

brazing

insulation pads

124) While applying Fleming's right-hand rule to and the direction of induced EMF, the thumb points towards the direction of

induced EMF

flux

the motion of conductor, if forefinger points along the lines of flux

the motion of the conductor if forefinger points in the direction of generated EMF

125) For a D.C. generator, when the number of poles and the number of armature conductors is fixed, then which winding will give the higher EMF?

Wave winding

Lap winding

Either of (a) and (b) above

Depends on other features of the design

126) Copper brushes in DC machine are used

where high voltage and small currents are involved

where low voltage and high currents are involved

in both of the above cases

in none of the above cases

127) In a DC Machine, iron losses are independent of variations in

speed

speed and voltage

load

voltage

128) If  $B$  is the flux density,  $l$  the length of the conductor, and  $v$  the velocity of a conductor, then induced EMF is given by

$Blv^2$

$Blv$

$Bl^2v$

$Bl^2v^2$

129) In the case of a 4-pole D.C. generator provided with a two-layer lap winding with sixteen coils, the pole pitch will be

4

8

16

32

130) Armature reaction of an unsaturated DC machine is

cross magnetizing

magnetizing

demagnetizing

none of the above

131) In a DC Machines, eddy currents are induced in the pole shoes due to

oscillating magnetic field

relative rotation between field and armature

pulsating magnetic flux

all of the above

132) In the case of the DC machine winding, the number of commutator segments is equal to the number of armatures

coils

coil sides

conductors

turns

133) In the case of lap winding, the resultant pitch is also known as

multiplication of front and back pitches

division of front pitch by back pitch



a difference of front and back pitches

a sum of front and back pitches

134) Compensating windings are used in DC generators

mainly to reduce the eddy currents by providing local short-circuits

to neutralize the cross-magnetizing effect of the armature reaction

to provide a path for the circulation of cooling air

none of the above

135) Satisfactory commutation of DC machines requires

brushes should be of proper grade and size

brushes should smoothly run in the holders

smooth, concentric commutator properly undercut

all of the above

136) DC series motors are used where

load is constant

load changes frequently

constant operating speed is needed

in none of the above situations

137) In a DC generator, the number of mechanical degrees and electrical degrees will be the same in case of

RPM is more than 300

RPM is less than 300

number of poles is 4

number of poles is 2

138) The purpose of providing dummy coils in a generator is to

reduce eddy current losses

amplify voltage

enhance flux density

provide mechanical balance for the rotor

139) In a DC generator, the critical resistance refers to the resistance of

brushes

field

armature

load

140) In a DC machine, the stray loss is the sum of

total copper loss and mechanical loss

shunt field copper loss and mechanical loss

armature copper loss and iron loss

iron loss and mechanical loss