

## Rites Ltd electronics

Q.1 The two windings of a transformer is

- (A) conductively linked.
- (B) inductively linked.
- (C) not linked at all.
- (D) electrically linked.

Ans : B

Q.2 A salient pole synchronous motor is running at no load. Its field current is switched off. The motor will

- (A) come to stop.
- (B) continue to run at synchronous speed.
- (C) continue to run at a speed slightly more than the synchronous speed.
- (D) continue to run at a speed slightly less than the synchronous speed.

Ans: B

Q.3 The d.c. series motor should always be started with load because

- (A) at no load, it will rotate at dangerously high speed.
- (B) it will fail to start.
- (C) it will not develop high starting torque.
- (D) all are true.

Ans: A

Q.4 The frequency of the rotor current in a 3 phase 50 Hz, 4 pole induction motor at full load speed is about

- (A) 50 Hz.
- (B) 20 Hz.
- (C) 2 Hz.
- (D) Zero.

Ans: C

Q.5 In a stepper motor the angular displacement

- (A) can be precisely controlled.
- (B) it cannot be readily interfaced with micro computer based controller.
- (C) the angular displacement cannot be precisely controlled.
- (D) it cannot be used for positioning of work tables and tools in NC machines.

Ans: A

Q.6 The power factor of a squirrel cage induction motor is

- (A) low at light load only.
- (B) low at heavy load only.
- (C) low at light and heavy load both.
- (D) low at rated load only.

Ans: A

Q.7 The generation voltage is usually

- (A) between 11 KV and 33 KV.
- (B) between 132 KV and 400 KV.
- (C) between 400 KV and 700 KV.
- (D) None of the above.

Ans: A

Q.8 When a synchronous motor is running at synchronous speed, the damper winding produces

- (A) damping torque.
- (B) eddy current torque.

- (C) torque aiding the developed torque.
- (D) no torque.

Ans: D

Q.9 If a transformer primary is energised from a square wave voltage source, its output voltage will be

- (A) A square wave.
- (B) A sine wave.
- (C) A triangular wave.
- (D) A pulse wave.

Ans: A

Q.10 In a d.c. series motor the electromagnetic torque developed is proportional to  
Option figure

Ans: B

Q.11 In a 3 – phase induction motor running at slip 's' the mechanical power developed in terms of air gap power

11 and 12 figure

In a 3 – phase induction motor the maximum torque

- (A) is proportional to rotor resistance
- (B) does not depend on
- (C) is proportional to
- (D) is proportional to

Q.13 In a d.c. machine, the armature mmf is

- (A) stationary w.r.t. armature.
- (B) rotating w.r.t. field.
- (C) stationary w.r.t. field.
- (D) rotating w.r.t. brushes.

Ans: C

Q.14 In a transformer the voltage regulation will be zero when it operates at

- (A) unity p.f.
- (B) leading p.f.
- (C) lagging p.f.
- (D) zero p.f. leading.

Ans: B

Q.15 The maximum power in cylindrical and salient pole machines is obtained respectively at load angles of

Q.16 The primary winding of a 220/6 V, 50 Hz transformer is energised from 110 V, 60 Hz supply. The secondary output voltage will be

- (A) 3.6 V.
- (B) 2.5 V.
- (C) 3.0 V.
- (D) 6.0 V.

Ans: C

Q.17 The emf induced in the primary of a transformer

- (A) is in phase with the flux.
- (B) lags behind the flux by 90 degree.
- (C) leads the flux by 90 degree.
- (D) is in phase opposition to that of flux.

Ans: C

Q.18 The relative speed between the magnetic fields of stator and rotor under steady

state operation is zero for a  
(A) dc machine.  
(B) 3 phase induction machine.  
(C) synchronous machine.  
(D) single phase induction machine.  
Ans: all options are correct

Q.19 The current from the stator of an alternator is taken out to the external load circuit through  
(A) slip rings.  
(B) commutator segments.  
(C) solid connections.  
(D) carbon brushes.  
Ans: C

Q.20 A motor which can conveniently be operated at lagging as well as leading power factors is the  
(A) squirrel cage induction motor.  
(B) wound rotor induction motor.  
(C) synchronous motor.  
(D) DC shunt motor.  
Ans: C

Q.21 A hysteresis motor  
(A) is not a self-starting motor.  
(B) is a constant speed motor.  
(C) needs dc excitation.  
(D) can not be run in reverse speed.  
Ans: B

Q.22  
The most suitable servomotor for low power applications is  
(A) a dc series motor.  
(B) a dc shunt motor.  
(C) an ac two-phase induction motor.  
(D) an ac series motor.  
Ans: B

Q.23 The size of a conductor used in power cables depends on the  
(A) operating voltage.  
(B) power factor.  
(C) current to be carried.  
(D) type of insulation used.  
Ans: C

Q.24 Out of the following methods of heating the one which is independent of supply frequency is  
(A) electric arc heating  
(B) induction heating  
(C) electric resistance heating  
(D) dielectric heating  
Ans: C  
Q.25

A two-winding single phase transformer has a voltage regulation of 4.5% at full-load and unity power-factor. At full-load and 0.80 power-factor lagging load the voltage regulation

will be

(A) 4.5%.

(B) less than 4.5%.

(C) more than 4.5%.

(D) 4.5% or more than 4.5%.

Ans: C

#### Electronics Quiz

1. In a mercury arc rectifier

Ion stream moves from cathode to anode

Current flows from cathode to anode

Electron stream moves from anode to cathode

Ion stream moves from anode to cathode

.The answer is Ion stream moves from anode to cathode

2. For producing cathode spot in a mercury arc rectifier

An auxiliary electrode is used

Tube is evacuated

Low mercury vapour pressures are used

Anode is heated-Answer

3. If the voltage of anode B is raised to 510 V

Anode B will conduct but anode A will also continue to conduct

Anode B will not conduct but anode A will continue to conduct-Answer

Both anodes will not conduct

None of these

4. Ripple frequency of full wave rectifier working on 50 Hz supply will be

25 Hz-Answer

150 Hz

6 anode rectifier with inter phase transformer

All will have identical power factor

5. The form factor for half-wave rectifier sine wave is

1.05

1.15

1.45

1.57-Answer

6. A silicon controlled rectifier is a

Unijunction device

Device with three junctions-Answer

Device with four junctions

None of the above

7. For full-wave rectifier sine wave, form factor is

1.55

1.44

1.22

1.11-Answer

8. At absolute zero temperature a semi-conductor behaves as

An Insulator-Answer

A Super-Conductor

A Good Conductor

A Variable Resistor

9. An electron in the conduction band

Has higher energy than the electron in the valence band-Answer

Has lower energy than the electron in the valence band

Loses its charge easily

Jumps to the top of the crystal

10. EG for silicon is 1.12 eV and for germanium is 0.72 eV thus it can be conducted that

More number of electron-hole pairs will be generated in silicon than in germanium at room temperature

Less number of electron hole pairs will be generated in silicon than in germanium at room temperature-Answer

Equal number of electron hole pairs will be generated in both at lower temperatures

Equal number of electron hole pairs will be generated in both at higher temperatures

11. Before doping semiconductor material is generally

Dehydrated

Heated

Hardened

Purified-Answer

12. Select the one that is a acceptor impurity element

Antimony

Gallium-Answer

Arsenic

Phosphorous

13. At room temperature when a voltage is applied to an intrinsic semiconductor

Most of the electrons and holes move towards negative terminal

Most of the electrons and holes move towards positive terminal

Electrons move towards positive terminal and holes towards negative terminal-Answer

Electrons move towards negative terminal and holes towards positive terminal

14. Under which of the following conditions avalanche breakdown in a semiconductor diode takes place ?

When potential barrier is reduced to zero

When reverse bias exceeds a certain value-Answer

When forward bias exceeds a certain value

When forward current exceeds a certain value

15. Select the rectifier that needs four diodes

Half wave rectifier

Center-tap full wave rectifier

Bridge rectifier-Answer

None of the above

16. Maximum forward current in case of signal diode is in the range of

1A to 10A

0.1A to 1A

Few milli amperes-Answer

Few nano amperes

17. In a semiconductor avalanche breakdown takes place when

Reverse bias exceeds the limiting value-Answer

Forward bias exceeds the limiting value

Forward current exceeds the limiting value

Potential barrier is reduced to zero

18. The D.C output voltage from a power supply

Increases with higher values of filter capacitance and decreases with more load current-Answer

Decreases with higher values of filter capacitance and increases with more load current

Decreases with higher values of filter capacitance as well as with more load current

Increases with higher values of filter capacitance as well as with more load current

19. A solar cell provides a example of

Photo Voltaic Cell-Answer

Photo Conductive Cell

Photo Emissive Cell

Photo Radiation Cell

20. When yellow light is incident on a surface, no electrons are emitted while green light can emit. If red light is incident on the surface, then it is expected that

No electrons are emitted-Answer

Photons are emitted

Electrons of higher energy are emitted

Electrons of lower energy are emitted

21. An ideal diode should have

Zero resistance in the forward bias as well as reverse bias

Zero resistance in the forward bias and an infinitely large resistance in reverse bias-  
Answer

Infinitely large resistance in reverse bias

Infinitely large resistance in forward as well as reverse bias

22. The reverse resistance of a PN junction diode

Is always low

Is always high

Is given by breakdown voltage / reverse leakage current-Answer

Is given by forward voltage / reverse leakage current

23. In which case the temperature coefficient is positive

Intrinsic Semi-Conductor

Extrinsic Semi-Conductor-Answer

Both intrinsic as well as extrinsic semi-conductor

Neither intrinsic nor extrinsic semi-conductor

24. A PNP transistor is generally made of

Silicon

Germanium

Either silicon or germanium-Answer

None of the above

25. In a transistor the region that is very lightly doped and is very thin is

Emitter

Base-Answer

Collector

None of these

26. In a NPN transistor, when emitter junction is forward biased and collector junction is reverse biased, the transistor will operate in

Active Region-Answer

Saturated Region

Cut off Region

Inverted Region

27. A transistor will operate in inverted region if

Emitter junction is forward biased and collector junction is reverse biased

Emitter junction is reverse biased and collector junction is forward biased-Answer

Emitter junction as well as collector junction are forward biased

Emitter junction as well as collector junction are reverse biased

28. Which of the following is essential for transistor action ?

The base region must be very wide

The base region must be very narrow-Answer

The base region must be made of some insulating material

The collector region must be heavily doped

29. In a transistor, current  $I_{CBO}$  flows when

Some D.C voltage is applied in the reverse direction to the emitter junction with the collector open circuited

Some D.C voltage is applied in the forward direction to the collector junction with the emitter open circuited

Some D.C voltage is applied in the reverse direction to the collector junction with the emitter open circuited-Answer

Some D.C voltage is applied in the forward direction to the emitter junction with the collector open circuited

30. The current  $I_{cbo}$

Increases with increase in temperature-Answer

Is normally greater for silicon transistors than germanium transistors

Mainly depends on the emitter base junction

Depends largely on the emitter doping

31. Thermal runaway of a transistor occurs when

Heat dissipation from transistor is excessive

Transistor joints melt due to high temperature

There is excessive leakage current due to temperature rise-Answer

None of above

Rites Limited electrical and electronics communication engg questions with answers,

32 The drain of an n-channel MOSFET is shorted to the gate so that  $V_{GS} = V_{DS}$ . The threshold voltage ( $V_T$ ) of MOSFET is 1 V. If the drain current ( $I_D$ ) is 1 mA for  $V_{GS} = 2V$ , then for  $V_{GS} = 3V$ ,  $I_D$  is

A) 2 mA

B) 3 mA

C) 9 mA

D) 4 mA

Answer : (D)

33 The first and the last critical frequency of an RC-driving point impedance function must respectively be

A) a zero and a pole

B) a zero and a zero

C) a pole and a pole

D) a pole and a zero

Answer : (D)

34 In what range should  $\text{Re}(s)$  remain so that the Laplace transform of the function  $e^{(a+2)t+5}$  exists?

A)  $\text{Re}(s) > a + 2$

B)  $\text{Re}(s) > a + 7$

C)  $\text{Re}(s) < 2$

D)  $\text{Re}(s) > a + 5$

Answer : (A)

35 A parallel plate air-filled capacitor has plate area of  $10^{-4} \text{ m}^2$  and plate separation of

10-3 m. It is connected to a 0.5 V, 3.6 GHz source. The magnitude of the displacement current is ( $\epsilon_0 = 1/36\pi \times 10^{-9}$  F/m)

- A) 10 mA
- B) 100 mA
- C) 10 A
- D) 1.59 mA

Answer : (A)

36 For the polynomial  $P(s) = s^5 + s^4 + 2s^3 + 2s^2 + 3s + 15$ , the number of roots which lie in the right half of the s-plane is

- A) 4
- B) 2
- C) 3
- D) 1

Answer : (B)

37 The phase velocity of an electromagnetic wave propagating in a hollow metallic rectangular waveguide in the TE<sub>10</sub> mode is

- A) equal to its group velocity
- B) less than the velocity of light in free space
- C) equal to the velocity of light in free space
- D) greater than the velocity of light in free space

Answer : (D)

38 A device with input  $x(t)$  and output  $y(t)$  is characterized by:  $y(t) = x^2(t)$ . An FM signal with frequency deviation of 90 kHz and modulating signal bandwidth of 5 kHz is applied to this device. The bandwidth of the output signal is

- A) 370 kHz
- B) 190 kHz
- C) 380kHz
- D) 95kHz

Answer : (C)

38 The Q - meter works on the principle of

- A) mutual inductance
- B) self inductance
- C) series resonance
- D) parallel resonance

Answer : (C)

39 The Fourier transform of a conjugate symmetric function is always

- A) imaginary

- B) conjugate anti-symmetric
- C) real
- D) conjugate symmetric

Answer : (C)

40 An ideal op-amp is an ideal

- A) voltage controlled current source
- B) voltage controlled voltage source
- C) current controlled current source
- D) current controlled voltage source

Answer : (B)

41 A system has poles at 0.01 Hz, 1 Hz and 80 Hz; zeros at 5 Hz, 100 Hz and 200 Hz. The approximate phase of the system-response at 20 Hz is

- A)  $-90^\circ$
- B)  $0^\circ$
- C)  $90^\circ$
- D)  $-180^\circ$

Answer : (A)

42 In an abrupt p-n junction, the doping concentrations on the p-side and n-side are  $N_A = 9 \times 10^{16}/\text{cm}^3$  and  $N_D = 1 \times 10^{16}/\text{cm}^3$  respectively. The p-n junction is reverse biased and the total depletion width is 3 mm. The depletion width on the p-side is

- A) 2.7 mm
- B) 0.3 mm.
- C) 2.25 mm
- D) 0.75 mm

Answer : (B)

43 A master-slave flip-flop has the characteristic that

- A) change in the input immediately reflected in the output
- B) change in the output occurs when the state of the master is affected
- C) change in the output occurs when the state of the slave is affected
- D) both the master and the slave states are affected at the same time

Answer : (C)

44 A parallel plate air-filled capacitor has plate area of  $10^{-4} \text{ m}^2$  and plate separation of  $10^{-3} \text{ m}$ . It is connected to a 0.5 V, 3.6 GHz source. The magnitude of the displacement current is ( $\epsilon_0 = 1/36\pi \times 10^{-9} \text{ F/m}$ )

- A) 10 mA
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- D) 1.59 mA

Answer : (A)

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- B) less than the velocity of light in free space
- C) equal to the velocity of light in free space
- D) greater than the velocity of light in free space

Answer : (D)

46 Noise with uniform power spectral density of  $N_0$  W/Hz is passed through a filter  $H(\omega) = 2 \exp(-j\omega t_d)$  followed by an ideal low pass filter of bandwidth  $B$  Hz. The output noise power in Watts is

- A)  $2N_0B$
- B)  $4N_0B$
- C)  $eN_0B$
- D)  $16 N_0B$

Answer : (B)

47 The cascade amplifier is a multistage configuration of

- A) CC-CB
- B) CE-CB
- C) CB-CC
- D) CE-CC

Answer : (B)

48 Consider a lossless antenna with a directive gain of +6dB. If 1 mW of power is fed to it the total power radiated by the antenna will be

- A) 4 mW
- B) 1 mW
- C) 7 mW
- D) 1/4 mW

Answer : (A)

49 The bandgap of Silicon at room temperature is

- A) 1.3 eV
- B) 0.7 eV
- C) 1.1 eV
- D) 1.4 eV

Answer : (C)

50 In a PCM system, if the code word length is increased from 6 to 8 bits, the signal to

quantization noise ratio improves by the factor

- A) 8/6
- B) 12
- C) 16
- D) 8

Answer : (C)

51 A device with input  $x(t)$  and output  $y(t)$  is characterized by:  $y(t) = x^2(t)$ . An FM signal with frequency deviation of 90 kHz and modulating signal bandwidth of 5 kHz is applied to this device. The bandwidth of the output signal is

- A) 370 kHz
- B) 190 kHz
- C) 380kHz
- D) 95kHz

Answer : (C)

52 For the polynomial  $P(s) = s^5 + s^4 + 2s^3 + 2s^2 + 3s + 15$ , the number of roots which lie in the right half of the  $s$ -plane is

- A) 4
- B) 2
- C) 3
- D) 1

Answer : (B)

53 An AM signal is detected using an envelope detector. The carrier frequency and modulating signal frequency are 1 MHz and 2 kHz respectively. An appropriate value for the time constant of the envelope detector is

- A) 500 msec
- B) 20 msec
- C) 0.2 msec
- D) 1 msec

Answer : (B)

54 In a PCM system, if the code word length is increased from 6 to 8 bits, the signal to quantization noise ratio improves by the factor

- A) 8/6
- B) 12
- C) 16
- D) 8

Answer : (C)

55 Consider the following statements S1 and S2.

S1: The  $\beta$  of a bipolar transistor reduces if the base width is increased.

S2: The  $\beta$  of a bipolar transistor increases if the doping concentration in the base is increased. Which one of the following is correct?

- A) S1 is FALSE and S2 is TRUE
- B) Both S1 and S2 are TRUE
- C) Both S1 and S2 are FALSE
- D) S1 is TRUE and S2 is FALSE

Answer : (D)

56 A digital-to-analog converter with a full-scale output voltage of 3.5 V has a resolution close to 14m V. Its bit size is

- A) 4
- B) 8
- C) 16
- D) 32

Answer : (B)

57 A single-phase half-controlled rectifier is driving a separately excited dc motor. The dc motor has a back emf constant of 0.5 V/rpm. The armature current is 5 A without any ripple. The armature resistance is 2W. The converter is working from a 280 V, single phase ac source with a firing angle of  $80^\circ$ . Under this operating condition, the speed of the motor will be

- A) 339 rpm
- B) 359 rpm
- C) 366 rpm
- D) 386 rpm

Answer : (C)

58 In relation to the synchronous machines, which one of the following statements is false?

- A) In salient pole machines, the direct-axis synchronous reactance is greater than the quadrature-axis synchronous reactance
- B) The damper bars help the synchronous motor self start
- C) Short circuit ratio is the ratio of the field current required to produce the rated voltage on open circuit to the rated armature current
- D) The V-curve of a synchronous motor represents the variation in the armature current with field excitation, at a given output power

Answer : (C)

59A parallel plate air-filled capacitor has plate area of  $10^{-4}$  m<sup>2</sup> and plate separation of  $10^{-3}$  m. It is connected to a 0.5 V, 3.6 GHz source. The magnitude of the displacement current is ( $\epsilon_0 = 1/36\pi \times 10^{-9}$  F/m)

- A) 10 mA
- B) 100 mA
- C) 10 A
- D) 1.59 mA

Answer : (A)

60 The 8085 assembly language instruction that stores the content of H and L registers into the memory locations 2050H and 2051H, respectively, is

- A) SPHL 2050H
- B) SPHL2051H
- C) SHLD 2050H
- D) STAX 2050H

Answer : (C)

61 If  $E$  is the electric field intensity,  $\nabla(\nabla \times E)$  is equal to

- A)  $E$
- B)  $|E|$
- C) null vector
- D) zero

Answer : (D)

62 The insulation strength of an EHV transmission line is mainly governed by

- A) load power factor
- B) switching over-voltages
- C) harmonics
- D) corona

Answer : (B)

63 The Q - meter works on the principle of

- A) mutual inductance
- B) self inductance
- C) series resonance
- D) parallel resonance

Answer : (C)

64 A 800 kV transmission line is having per phase line inductance of 1.1 mH/km and per phase line capacitance of 11.68 nF/km. Ignoring the length of the line, its ideal power transfer capability in MW is

- A) 1204 MW
- B) 1504 MW
- C) 2085 MW
- D) 2606 MW

Answer : (C)

65 In a PCM system, if the code word length is increased from 6 to 8 bits, the signal to quantization noise ratio improves by the factor

- A) 8/6
- B) 12
- C) 16
- D) 8

Answer : (C)

66 At an industrial sub-station with a 4 MW load, a capacitor of 2 MVAR is installed to maintain the load power factor at 0.97 lagging. If the capacitor goes out of service, the load power factor becomes

- A) 0.85
- B) 1.00
- C) 0.80 lag
- D) 0.90 lag

Answer : (C)

67 The conduction loss versus device current characteristic of a power MOSFET is best approximated by

- A) a parabola
- B) a straight line
- C) a rectangular hyperbola
- D) an exponentially decaying function

Answer : (A)

68 High Voltage DC (HVDC) transmission is mainly used for

- A) bulk power transmission over very long distances
- B) inter-connecting two systems with the same nominal frequency
- C) eliminating reactive power requirement in the operation
- D) minimizing harmonics at the converter stations

Answer : (A)

69 For the equation,

$$s^3 - 4s^2 + s + 6 = 0$$

the number of roots in the left half of s-plane will be

- A) 0
- B) 1
- C) 2
- D) 3

Answer : (C)

70 For the function  $f(x) = x^2 e^{-x}$ , the maximum occurs when x is equal to

- A) 2
- B) 1

- C) 0
- D) -1

Answer : (B)