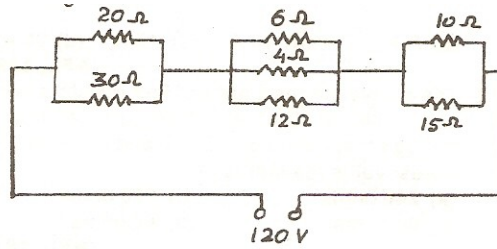


ELECTRICAL ENGINEERING

PRACTICE SET- 3

Q1. In the figure below, the current of 1 ampere flows through the resistance of:



(a) 4 ohms

(b) 20 ohms

(c) 30 ohms

(d) 12 ohms

Q2. Give that

E = time and space dependent electric intensity vector

μ = permeability of the medium

σ = conductivity of the medium

ϵ = permittivity of the medium

The electromagnetic wave equation is given by

(a) $E - \mu\sigma - \mu\epsilon = 0$

(b) $E - \mu\sigma - \mu\epsilon = 0$

(c) $E - \sigma\epsilon - \mu\sigma = 0$

(d) $E = - = 0$

Q3. In machine tool drive application, the speed of separately excited dc motor is required to be controlled both below and above the rated speed of the motor. Which one of the following methods is best suited for this purpose? (= armature voltage, = field current and = field current at rated speed)

- (a) V = variable
- (b) fixed, variable
- (c) V and variable, with
- (d) and variable, with

Q4. 'Creep in energy meters can be prevented by

- (a) Using extra turns on the voltage coil.
- (b) Having two holes on opposite sides of the disc.
- (c) Using a stronger brake magnet.
- (d) Using steel laminations of high permeability.

Q5. Which one of the following statements are true of a type I system having unity gain in the forward path and a unity feedback?

1. Positional error constant is equal to infinity.
2. Acceleration error constant is equal to zero.
3. Steady-state error to a unit step displacement input is equal to one.

Select the correct answer using the codes given below:

Codes:-

- (a) 1, 2 and 3 (b) 1 and 2 (c) 2 and 3 (d) 1 and 3

Q6. The number of elements in the power set $P(S)$ of the set

$S = \{1, \{2, 3\}\}$ is

- (a) 2 (b) 4 (c) 8 (d) None of these

Q7. A non transistor has a beta cut off frequency of a 1 MHz, and common-emitter short-circuits low-frequency current of 200. Its unity-gain frequency and the alpha cut off frequency respectively are

- (a) 200 MHz, 201 MHz
- (b) 200 MHz, 199 MHz
- (c) 199 MHz, 200 MHz
- (d) 201 MHz, 200 MHz

Q8. Top loading is sometimes used with an antenna in order it increase its

- (a) Effective height.
- (b) Bandwidth.
- (c) Beam width.
- (d) Input capacitance.

Q9. An I/O processor controls the flow of information between

- (a) Cache memory and I/O devices.
- (b) Main memory and I/O devices
- (c) Two I/O devices.
- (d) Cache and main memories.

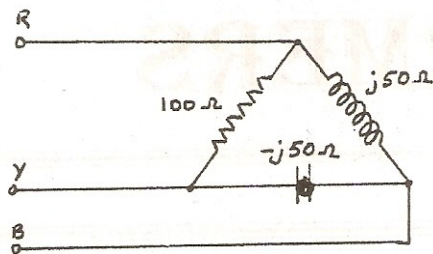
Q10. The most toxic pollutant obtained by combustion of coal is

- (a) Carbon dioxide
- (b) Nitrogen
- (c) Smoke
- (d) Hydrogen

Q11. Forging iron at a temperature below the recrystallization temperature will increase the hardness of iron because

- (a) Internal stresses do not appear in the iron.
- (b) Crystal defects such as dislocations are formed.
- (c) Surface shrinkage from the forging operation puts pressure on the interior of the iron.
- (d) The increases in the density will cause pores and cavities in the metal to disappear.

Q12. A set of 3 equal resistors, each of value connected in star across RYB in place of load as shown in the given figure consumes the same power as the unbalanced delta connected load. The value of is

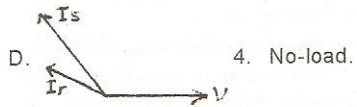
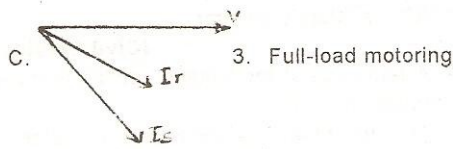
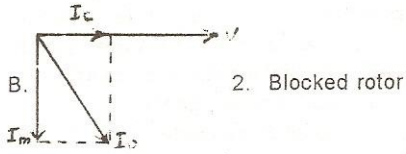
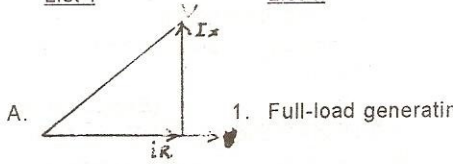


- (a) 33.33 ohm
- (b) 100 ohm
- (c) 173.2 ohm
- (d) 300 ohm

Q13. Approximate phasor diagram of 3-phase induction machines for different operating conditions are indicated in List-1 (with usual notations). Match List-1 with the operating conditions given in the List-2 and select the correct answer using the codes given below the Lists:

List-I

List-II



Codes:

(a) A B C D

2 4 1 3

(b) A B C D

2 3 4 1

(c) A B C D

2 4 3 1

(d) A B C D

4 2 3 1

Q14. The armature current of a dc motor fed from a thyristor power converter contains ripple. This ripple in the armature current affects.

- (a) Commutating capability of the motor.
- (b) Overload capacity of the motor.
- (c) Torque capability of the motor.
- (d) Controllability of the speed of the motor.

Q15. Which of the following limit in the reactive power output of a synchronous generator?

1. Armature current.
2. Field current.
3. Load angle.
4. Prime mover input.

Q16. A dc machine has, conductors per pair of poles A , length of each armature conductor L , linear velocity of armature conductor and air-gap flux-density distribution $B = \sin$. The instantaneous emfs in successive conductors under one pole should be a series whole first two terms are $= \sin$ and $= \sin$.

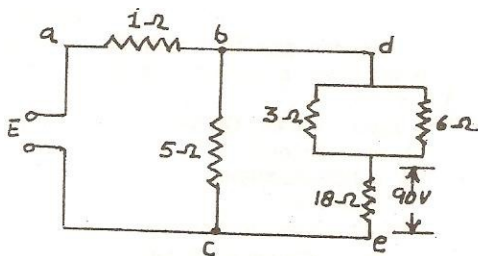
The last term in this series will be

- (a) \sin
- (b) \sin
- (c) \sin
- (d) \sin

Q17. Bulb turbines are

- (a) High speed turbines.
- (b) High pressure turbines.
- (c) Low head turbines.
- (d) High head turbines.

Q18. In the figure below, the voltage across the 18 ohm resistor is 90 volts. What is the total voltage across the combined circuit?



- (a) 12 V
- (b) 16 V
- (c) 24 V
- (d) 40 V

Q19. Consider the following statements regarding Maxwell's equations in differential form (symbols have the usual meanings)

1. For free space
2. For free space
3. For steady current

4. For static electric field

Of these statements:

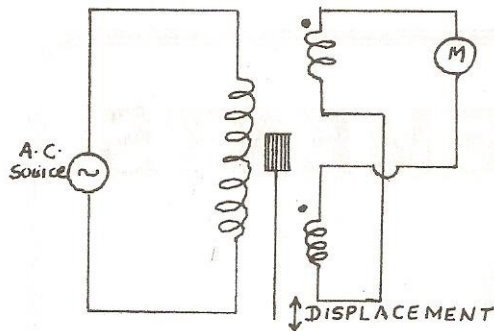
- (a) 1 and 2 are correct
- (b) 2 and 3 are correct
- (c) 3 and 4 are correct
- (d) 1 and 4 are correct

Q20. If the commutation angle of a diode rectifier (due to source inductance effect) is μ , then the inductive voltage regulation will be

- (a) $1 + \frac{\mu}{\pi}$
- (b) $1 + \frac{\mu}{2\pi}$
- (c) $1 - \frac{\mu}{\pi}$
- (d) $1 - \frac{\mu}{2\pi}$

Q21. Which one of the following instruments should be used at M in the given figure of the measurement of magnitude as well as direction of the displacement?

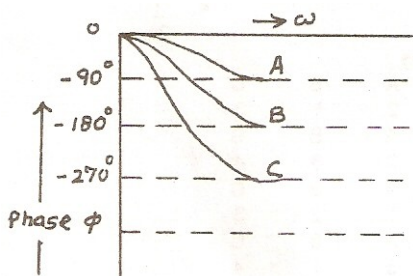
- a. Permanent magnet moving coil voltmeter
- b. vacuum Tube voltmeter (VTVM)



- (c) Transistor voltmeter (TVM)
- (d) Phase Sensitive Detector (PSD)

Q22. $(j\omega)$, $(j\omega)$ are three transfer functions whose phase variations are shown in the given figure. The magnitude variation with respect to frequency is the same for both $(j\omega)$ and $(j\omega)$, but their phase variation is as indicated by the curves labeled A and C in the given figure. The transfer function $(j\omega)$ is such that

$$(j\omega) = (j\omega) + (j\omega)$$



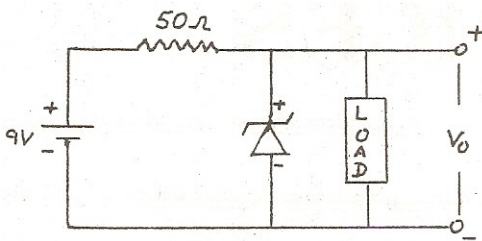
are respectively

- (a) Minimum phase, all pass and non-minimum phase functions.
- (b) Minimum phase, non-minimum phase and all pass functions.
- (c) All pass, minimum phase and non-minimum phase functions
- (d) All pass non-minimum phase and minimum phase functions.

Q23. In the interval $(0, \pi)$, the equation $x = \cos x$ has

- a. No solution.
- b. Exactly one solution.
- c. Exactly two solutions.
- d. An infinite number of solutions.

Q24. A zener diode in the circuit shown in fig. below has a knee current of 5 mA, and a maximum allowed power dissipation of 300 mW. What are the minimum and maximum load currents that can be drawn safely from the circuit, keeping the output voltage at 6 V?



- (a) 0 mA, 180 mA
- (b) 5 mA, 110 mA
- (c) 10 mA, 55 mA
- (d) 60 mA, 180 mA

Q25. Which of the following is UHF?

- (a) 40 GHz
- (b) 400 MHz
- (c) 400 KHz
- (d) 40 KHz

Q26. The Zenith Computer can execute 1,000,000 instructions per second. A program running on this computer performs on average a one sector read and one sector writes for every 200 instructions that it executes. The disk drive handling the I / O transfer requires 0.00010 seconds each to perform the read and write operations. Assuming no overlap of these operation, the percent of CPU time spent in the wait state, is

- (a) 12%
- (b) 39%
- (c) 57%
- (d) 91%

Q27. The percentage of silica in earth's crust is nearly

- (a) 10%
- (b) 26%
- (c) 35%
- (d) 52%

Q28. The viscoelastic behavior of an amorphous polymer will change with increasing temperature from its rigid structure at low temperatures. The polymer's behavior may proceed through the following stages:

1. Leathery
2. Rubbery
3. Viscous

What is the consecutive order of the stages it will pass through?

- (a) 1, 3 only (b) 2,3 only (c) 2,1, 3 (d) 1,2,3

Q29. A Buchholz relay is used for

- a. Protection of a transformer against all internal faults.
- b. Protection of a transformer against external faults.
- c. Protection of a transformer against both internal and external faults.
- d. Protection and induction motors.

Q30. In a 3-phase induction machine, motoring generating and braking operations take place in the range of slip 's' given by

(a) Motoring: 1

 Generating: 1

 Braking:

(b) Motoring: 1

 Generating: 0

 Braking:

(c) Motoring: s

 Generating: 0

 Braking:

(d) Motoring: 0

 Generating: s

 Braking:

Q31. While operating on variable frequency supplies, the ac motors require variable voltage as well in order to

- (a) Protect the insulation.
- (b) Avoid the effects of saturation.

(c) Improve the commutation capabilities of the inverter.

(d) Protect the thyristors from dv / dt .

Q32. During the slip-test for determining the direct and the quadrature axis synchronous reactance of an alternator, the voltage across the open field circuit terminals is

(a) Dc voltage.

(b) Ac voltage of supply frequency.

(c) As voltage of slip frequency.

(d) A modulated voltage with an envelope of slip frequency.

Q33. Consider the following statements regarding speed control of dc motors

1. Ward-Leonard method is suitable for constant torque drives.

2. Field control method facilitates speed control below 'base speed'.

3. 'Armature resistance control' method is more efficient when compared to Ward-Leonard method.

4. Field control method is suitable for constant horse power drives.

Of these statements:

a. 1, 2 and 3 are correct

b. 1, 3 and 4 are correct

c. 2, 3 and 4 are correct

d. 1 and 4 are correct

Q34. Betz law finds application in

(a) MHD systems

(b) Solar cells

(c) Geothermal power plants

(d) Wind mills

Q35. A current of 20 A flows through ammeters A and B joined in series. Across A the potential difference is 0.2 V and across B it is 0.3V. Find how the same current will be divided between A and B when they are joined in parallel.

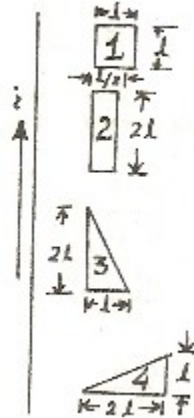
(a) = =10 A

(b) = =8A

(c) = =12 A

(d) = =16 A

Q36. For an infinite linear current, four loops are shown in the given figure. The magnetic flux would be the maximum through the loop number.



- (a) 1 (b) 2 (c) 3 (d) 4

Q37. Consider the following statements:-

The diodes in a voltage source inverter (Mc Murry inverter) should be able to

1. Withstand a large voltage in the reverse direction.
2. Carry the commutating current excess of load current.
3. Provide the required reverse bias to the outgoing thyristor.
4. Feedback the reactive current to the source

Of these statements

- (a) 1, 2 and 3 are correct
 (b) 1, 3 and 4 are correct
 (c) 2, 3 and 4 are correct
 (d) 1, 2 and 4 are correct

Q38. An integrating digital voltmeter measures

- (a) True average value.
 (b) rms Value.
 (c) Peak value.
 (d) Peak to peak value.

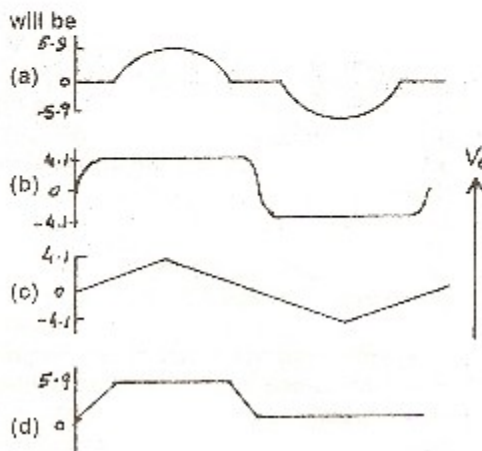
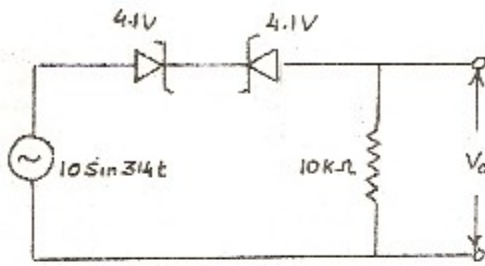
Q39. The band with of a control system is the range of frequency over which $|C/R(j\omega)|$ is greater than or equal to

- (a) 1 and it depends only the undamped natural frequency of the system.
- (b) 1 and it depends only on the damping factor of the system.
- (c) 1 and it depends only on the undamped natural frequency of the system.
- (d) $1/\zeta$ and it depends on both undamped natural frequency and the damping factor of the system.

Q40. If at every point of a certain curve, the slope of the tangent equals $-2x/y$ the curve is

- (a) A Straight line
- (b) A parabola
- (c) A Circle
- (d) An ellipse.

Q41. The wave shape of V in figure below,



Q42. A 1000 KHz carrier is simultaneously modulated with 300 Hz, 800 Hz and 2 KHz audio sine waves.

The frequencies present in the output will be

- (a) 1000 KHz, 300 Hz, 800 Hz and 2 KHz
- (b) 1300, Hz, 1800 Hz, 2100 Hz and 4100 Hz
- (c) 300 Hz, 500 Hz, 1200 Hz and 998 KHz
- (d) 998 KHz, 999.2 KHz, 999.7 KHz, 1000.3 KHz, 10008 KHz and 1002.2 KHz.

Q43. Consider a memory system with the following parameters:

= Cache Access Time = 100 ns

= Main Memory Access Time = 1200 ns

If we would like to have effective (average) memory access time to be or more than 20% higher than cache access time, the hit ratio for the cache must at least be:

- (a) 80%
- (b) 90%
- (c) 98%
- (d) 99%

Q44. Which of the following gem is green in colour?

- (a) Emerald
- (b) Sapphire
- (c) Ruby
- (d) Diamond

Q45.The Microstructure composition of pearlite for an C diagram consists of

- (a) Carbon dissolved in alpha iron having a body centered cubic structure.
- (b) Carbon dissolved in gamma iron having a body-centered cubic structure.
- (c) A mixture of body-cented alpha having a face-centered gamma iron.
- (d) Carbon dissolved in body-cented alpha iron and a C compound of higher carbon.

Q46. Match List -1 with List-2 and select the correct answer using the codes given below the lists:

List -1

List-2

(Equipment)

(Function)

A. Circuit Breaker

1. Voltage control

B. Lightning Arrester

2. Power control

C. Governors

3. Overvoltage protection

D. Exciter

4. Over current protection

Codes:

(a) A B C D

1 2 3 4

(b) A B C D

4 1 2 3

(c) A B C D

2 3 4 1

(d) A B C D

4 3 2 1

Q47. A voltmeter gives 120 oscillations per minute when connected to the rotor of an induction motor. The stator frequency is 50 Hz. The slip of the motor is

- (a) 2% (b) 2.5% (c) 4% (d) 5%.

Q48. Consider the following steps:

1. Reversing connections to the terminals of the capacitor.
2. Changing the position of the capacitor from auxiliary winding circuit to main winding circuit.
3. Reversing supply connection to the main winding.
4. Reversing supply connection to the auxiliary circuit.

While installing a new ceiling fan, if the fan motor is found to be rotating in the wrong direction, then the direction of rotation of the motor can be corrected by

- (a) 1, 2 and 3 (b) 1, 2 and 4 (c) 1, 3 and 4 (d) 2, 3 and 4

Q49. A 3-phase fault occurs at the terminals of an unloaded alternator at an instant when the ac component in one phase is at its maximum value. The variation in dc component during the post-fault period in that phase will depend upon

- (a) Sub transient time constant.
(b) Transient time constant.
(c) Open-circuit time constant.
(d) Armature time constant.

Q50. A dc shunt motor runs at 500 rpm of 220 V. A resistance of 4.5 ohm is added in series with the armature for speed control. The armature resistance is 0.5 ohm. The current to stall the motor will be

- (a) 44 Amp (b) 50 Amp (c) 44.4 Amp (d) 60 Amp

Solution

1:- (d) There are three parallel banks which are in turn connected in series:

Equivalent resistance of 20 ohm and 30 ohm

Parallel resistors = = 12 ohms

Equivalent resistance of 6 ohm, 4 ohm and 12 ohm bank = 2 ohms.

Similarly equivalent resistance of 10 ohm and

15 ohms resistors = = 6 ohms.

Total resistance of the circuit = $12 + 2 + 6 = 20$ ohms

Current drawn from supply = = 6A

Current through 20 ohms resistor

$$= 6 \times = 3.6A$$

Current through 30 ohms resistor

$$= 6 - 3.6 = 2.4 A$$

Equivalent resistance of 6 ohm, 4 ohm and 12 ohm bank is 2 ohm, voltage drop

$$= 6 \times 2 = 12 V.$$

Current through 4 ohm resistor

$$= 12 / 6 = 2 A$$

Current through 4 ohm resistor

$$= 12 / 4 = 3 A$$

Current through 12 ohm resistor

$$= 12 / 12 = 1A$$

Current through 10 ohm resistor

$$= 6 \times = 3.6A$$

Current through 15 ohm resistor

$$= 6 - 3.6 = 2.4A$$

2:- (a) The electromagnetic wave equation is given by

$$E - = 0$$

3:- (c) With speed is reduced and with the speed is increased above normal. Also with less than speed falls, and with greater than speed rises above normal. To avoid overloading of either the field winding or the armature winding, through little expensive: Choice (c) seems to be suitable.

4:- (b) Creep in the energy meters can be prevented by having two holes on opposite sides of the disc.

5:- (b) 1 and 2

6:- (c) The set has 3 members. So its power set has $2^3 = 8$ members.

7:- (a) = 1 MHz

$$= 200$$

=

$$= 200 \times 1 \text{ MHz}$$

$$= 200 \text{ MHz}$$

And, $f =$

$$= (1+B)$$

$$= 201 \text{ MHz.}$$

8:- (a) Top loading of antenna is done mainly to increase the effective height.

9:- (b) Main memory and I / O devices.

10:- (a) Carbon dioxide and carbon monoxide.

11:- (b) The forging operation distorts the equiaxed microstructure of the metals and causes the formation of crystal defects such as dislocations. Elongated coarse grains are also produced in the direction of formation. These effects of the forging operation create iron that is brittle.

12:- (b) Let the line voltage be V , the power consumed by the load impedances of the figure shown is $V^2 / 100W$. When resistors, each of value are connected in star, the total power drawn is

$$P = 3W.$$

Since $R = 100 \text{ ohm}$.

13:- (c) A – 2, B – 4, C – 1.

14:- (a) The ripple in the armature current affects commutation capability of the motor.

15:- (a) Reactive power is not dependent upon load angle and prime mover input.

16:- (d) The phase difference between two adjacent conductors:

$$\theta = -$$

$$\text{Thus, } \theta = L u \sin ($$

17:- (c) Bulb turbines are low head turbines.

18:- (a) since voltage across 18 ohm resistance is 90 volts,

Current through 18 ohm resistance

$$= 90 / 18 = 5A$$

Equivalent resistance of 3 ohm and 6 ohm bank is

$$= 2 \text{ ohms}$$

This 2 ohms resistance is in series with 18 ohm resistance giving total resistance of $18+2 = 20 \text{ ohms}$

This 20 ohm resistance is in parallel with 5 ohm resistance giving equivalent resistance of

$$= 4 \text{ ohms}$$

Hence total resistance circuit

$$= 1+4 = 5 \text{ ohms.}$$

Since total resistance across de = $18+20 = 20$ ohms.

Current through this branch is 5 A

$$\text{Voltage across de} = 5 \times 20 = 100 \text{ V.}$$

$$= \text{voltage across bc.}$$

Hence, current through 5 – ohm resistance be = $100 / 5 = 20$ A

$$\text{Total current through ab} = 20+5 = 25 \text{ A.}$$

Since total resistance of the circuit is 5 ohm,

$$\text{Voltage E} = 25 \times 5 = 125 \text{ V.}$$

19:- (c) For free space are each zero. Thus statements 3 and 4 are correct.

20:- (d) = [

Where is the rectifier output voltage when the delay angle; and γ , the commutation angle; are both zero.

Assuming to be zero

$$= (1 + \cos \gamma).$$

Change in voltage due to source inductance effect is

Fractional regulation is

=

21:- (d) M should be able to detect phase reversal if not strictly phase sensitive. Phase sensitive detector can well serve the purpose.

22:- (a) It can be minimum phase, all pass and non-minimum phase function.

23:- (b) the point of intersection of the line $y=x$ and the curve $y=\cos(x)$, will be the root (s). If you draw the graph it will be clear that they meet only once in the given interval $(0, \pi)$. So, exactly one root

ALLITER:

Consider the function $f(x) = x - \cos(x)$ $f(0)$ is $0-1 = -1$, a negative number $f(\pi)$ is $-\pi - (-1) = -\pi + 1$, a positive number. So, the function should have odd number of roots in the interval $(0, \pi)$. Also it can not have infinitely many roots as \cos

(x) oscillates in (-1, 1), while x, increases monotonically and so infinite solution is impossible. Hence B is the correct answer.

$$\begin{aligned} 24:- (c) \quad I &= \\ &= 3 / 50 \text{ A} \\ &= 0.3 / 5 \text{ A} \\ &= 0.06 \text{ A} \\ &= 60 \text{ mA} \end{aligned}$$

So maximum load current (60-5) mA=mA

$$\text{Now, } I = P / V = 300 / 6 = 50 \text{ mA}$$

$$I_{\text{min}} = 60 \text{ mA} - 50 \text{ mA} = 10 \text{ mA.}$$

25:- (b) The range for Ultra High Frequency is 300 MHz to 3 GHz.

26:- (d) The wait time can be calculated in the following manner:

Time to read 1 sector	0.0010
Time to write 1 sector	0.0010
Time to execute 200 instructions	0.0002
Total program cycle time	0.0022

$$\text{Wait time} = 0.0020 / 0.0022 * 100\% = 91\%.$$

27:- (b) Common elements in the Earth's crust

<u>Element</u>	<u>Percentage by weight</u>
Oxygen	46.6
Silicon	27.72
Aluminum	8.13
Iron	5.00
Calcium	3.63
Sodium	2.83
Potassium	2.59
Magnesium	2.09
All other	1.41

28:- (d) The polymer goes from a leathery stage, to a rubbery and then a viscous stage. In the leathery stage the polymer can be deformed readily but it cannot regain its shape quickly if the stress is removed. In the rubbery stage the polymer can regain its original shape quickly. In the viscous stage the polymer deforms extensively by viscous flow.

29:- (a) A Buchholtz relay is used for protection of a transformer against all internal faults.

30:- (a) motoring: $1 < s < 0$

Generating: $0 < s < -1$

Braking: $s < -1$

31:- (a) Avoid the effects of saturation.

32:- (c) Clearly, the voltage induced in the field winding would have a frequency directly related to the relative speed of the rotor and the synchronously rotating armature mmf.

33:- (d) Statements 1 and 4 only are correct.

34:- (d) Betz law finds application in wind mills.

35:- (b) Resistance of ammeter A is

$$R_A = 0.01 \text{ ohm}$$

Resistance of ammeter B is

$$R_B = 0.15 \text{ ohm}$$

When the ammeters A and B are joined in parallel,

$$I = 20 \text{ A}$$

$$I_A = 12 \text{ A}$$

$$I_B = 8 \text{ A}$$

$$I = 8 \text{ A}$$

36:- (b) All the loops have equal areas. B at any distance r from the wire is k / r . For any rectangular loop of height h (in the direction of the wire) and width w (the wire), the

Flux ϕ is $Kh \ln$

Where a is the distance of the nearside from the wire.

Thus, for 1, $\phi_1 = k I \ln$

For 2, $\phi_2 = k \cdot 2l$ in

For 3, $\phi_3 = k \cdot 2l$ in

For 4, $\phi_4 = kl$ in

$\phi_1 = Kl$ in (1+, $\phi_2 = 2kl$ in (1+

$\phi_3 = Kl$ in (1+, $\phi_4 = kl$ in (1+

The long terms do not change by significant amount. Thus, ϕ_2 should be of highest value.

37:- (c) 2, 3 and 4 are correct.

38:- (a) An integrating digital voltmeter measures true average value.

39:- (d) The bandwidth of a control system in the range of frequency over which

$(j\omega) |$

is greater than or equal to $1/\zeta$. This is as per definition. Further, bandwidth depends on both- the undamped natural frequency and the damping ratio. For instance, the characteristic equation of a second order system may be expressed as

$$s^2 + 2\zeta\omega_n s + \omega_n^2 = 0$$

Where ω_n is the undamped natural frequency of oscillation and ζ is the damping ratio. Also it can be shown that $1/\zeta$ is the bandwidth. Thus the bandwidth is dependent on both ω_n and ζ

40:- (d) Slope $(dy / dx) = (-2x / y)$

$$y dy = -2x dx$$

Integrating both sides, $y^2 / 2 = (-2x^2 / 2) + C$ i.e., $x^2 / C + y^2 / b^2 = 1$,

Ellipse, $x^2 / a^2 + y^2 / b^2 = 1$

It is clear that the curve is an ellipse.

41:- (a) One cycle time = 20 mS

Time for source voltage to become 4.1 V during positive half cycle is given by

$$4.1 = 10 \sin 0.314t, \quad t \text{ in mS}$$

Thus, $t = 1 / 0.314 \cdot 4.1 / 10$

$$= 1.345 \text{ mS.}$$

The diode B conducts now (A is already forward biased) and the voltage across the load is $(10 \sin .314t - 4.1)$ V. Similar situation occurs in the negative half cycle when Zener B is forward biased and Zener A avalanches when source voltage becomes 4.1 V. Thus the voltage across 10 k-ohm is given in figure (a)

42:- (d) 300 Hz = 0.3 GHz; 800 Hz = 0.8 KHz

Frequencies present in the output will be 1000

I.E. 999.7 KHz, 100.3 KHz 999.2 KHz, 1000.8 KHz, 998 KHz and 1002 KHz.

43:- (c) The hit ratio of at least 98% can be shown by the following formula:

Effective System Access Time

$$= H + (1-H)$$

Where H is the hit ratio expressed as 85...95 etc, and the other parameters as defined in the question accordingly:

$$100 H + 1200(1-H)$$

Should be less than or equal to:

$$+ 0.020 \times = 100+20 = 120 \text{ ns}$$

More than cache access time)

Therefore:

$$100 H + 1200 - 1200 H = 120 \text{ and: } H = 1090 / 1100 = 0.98$$

Since H the answer of 98% or higher in (c) is the correct one.

44:- (a) Emerald is a gem quality beryl, bright green in colour owing to the presence of chromium.

Sapphire is blue in colour and Ruby is red.

45:- (d) Pearlite structure is an intimate mixture of ferrite and cementite. Ferrite is gamma iron with face centered cubic structure capable of dissolving up to 0.025% cementite is a compound of composition Fe_3C with a carbon content of 6.69%.

46:- (d) A – 4, B – 3, C – 2, D – 1.

47:- (c) circuit = slip x

$$= s \times 50$$

$$s = \quad \times 100\% = 4\%$$

48:- (d) 2, 3 and 4.

49:- (d) will depend on armature – time constant.

50:- (a) the motor is to be stalled, i.e., the motor speed is reduced to zero by adding more and more load on the shaft.
Under that condition

$$= = 44 \text{ A.}$$