* BL. Thareja important notes *

RATAN MAURYA. Backbenchers.

- Current density — ampere / meter^2 (Imp)
- Current density is vector quantity.

* The speed with which ~~charge~~ the effect of e.m.f. is exprincend at all part of conductor resulting in flow of current is called velocity of propagation of electrical field. Value nearly 3×10^8 m/s.

Specific Resistance

(Imp)
- Resistance b/w the opposite faces of a metre cube of that material.

Conductane

DGCAD
- unit of conductance is Siemens (S) - unit was called mho.

Temp. Coefficient of Resistane

(Imp)
- Directly on initial resistance.
- " " rise in temp.
- on nature of material of conductor.
- Define as ↑ in resistance per ohm original resistance per °C rise in temprature.

Absoulute and relative permittivity

- Absoulte permittivity → 8.854×10^{-12} F/M.
- Relative " → 1
- If relative permittivity, as compared to vacuum is ε_r, then it absolute permittivity is — $\varepsilon = \varepsilon_0 \varepsilon_r$ F/m.

DGCAD
- Relative permittivity of air is one, of water 81, of Paper b/w 2 and 3, of glass b/w 5 and 10 and of mica b/w 2.5 and 6.

(Imp)

Electrostatic induction

DGCAQ

- Uncharged body getting charged merely by the nearness of a charged body is known as induction.

Imp

- unit tube of flux is known as Faraday tube.

Field strength or Field Intensity

DGCAQ

- unit is newton / Coulomb (N/C).

Imp

- Electric intensity at any point defined as equal to the line of force.
- Electric intensity at any point equal to potential gradient at that point.
- Electric displacement D is also a vector quantity.

Potential and potential difference

Imp DGCAQ

- numerically equal to the work done in bringing a positive charge of one coulomb from infinity to that point against the electric field.
- unit is depend upon unit of charge taken and work done.

$$1 \text{ volt} = \frac{1 \text{ joule}}{1 \text{ Coulomb}}$$

Potential Gradient

- rate of change of potential with distance in the direction of electric force

Imp

- unit is volt/meter.

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Absolute and relative permeability of a medium

DGCA
- magnetism and electromagnetism are dependent upon a certain property of medium called permeability.

DGCA
- absolute permeability: $\mu_0 = 4\pi \times 10^{-7}$ H/m

DGCA
- relative " : $\mu_r = 1$.

Magnetic field Strength (H)

Imp
- unit is Henery = N/wb.
- it is vector quanity.

Imp

Magnetic potential

Imp
- $M = \frac{m}{4\pi \mu_0 r}$ J./wb.

DGCA
- it is Scalar quantity.

Flux density (B)

- The flux passing per unit area at right angles to the flux.

DGCA
- unit is wb/m^2 or tesla.

Imp
- its vector quanity.

- Relative permeability equals to the ratio of the flux density produced in that material to the flux density produced in vacuum by same magnetising force.

Intensity of magnetisation

- induced pole strength developed per unit area of bar,
- it is define as flux density produced in it due to its own induced magnetism.

Susceptibility (K)

Imp.

- the ratio of intensity of magnetism to magnetising force.

K = Henry/meter.

(1) - Two parallel conductor attract each other if currents through them flow in same direction and repel each other if current through them flow in opposite direction.

(2) - The force b/w two parallel conductors proportional to the product of current strength and to the length of the conductor considered and varies inversely distance b/w them.

Ohm's Law of magnetic circuit

- $\text{flux} = \frac{\text{m.m.f}}{\text{reluctance}}$ or $\phi = F/S$.

Reluctance

Imp. DGVAO.

- unit is AT/wb.

Permeance — DGVAO

- wb/AT or Henry.
- unit of self inductance is Henry
- Reciprocal induction is measured in terms of Co-efficient of mutual induction.

Indication of full charged Cell

DGVAO

- Gassing, Voltage, Specific gravity and Colours of plates
- DGVAO Colour plates on full charge is deep chocklet brown for (+) plate and clear slat grey for negative plate.

Constant - voltage S/S

Imp

- In this methode, time of charging is almost redue to half. It ↑ the capacity by approx - 20% but ↓ the efficiency by 10%.

Imp

- A milking booster is a motor - driven low - voltage dynamo which can be connected directly across the terminal of the sulphated cells.

Actual transformation ratio (K).

Imp

$$K = \frac{\text{Primary current}}{\text{Corresponding Secondary Current}}$$

Ratio Error

Imp

- $$= \frac{\text{normal ratio} - \text{actual ratio}}{\text{actual ratio}}$$

Current transformer

- Primary winding — one or more turn of thick wire.
  Secondary " — large no. of thin wire.

Clip-on type current transformer

- it has laminated core. it permits very heavy current carrying bus - bars.

Potential transformers

- are extremly accurate - ratio stepdown transformers and are used in conjuction with standard low - rang valtmeter.
- rating are usually 40 to 100 W.

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Ans – frequency of the complex wave is 50 Hz.

(i) – The max^m value or peak value or amplitude of an alternating voltage is given by co-efficient of sine of the time angle.

(ii) – The frequency is given by the co-efficient of time divided by 2π.

Def – The r.m.s value of complex current wave is equal to the square root of the sum of the square of the r.m.s value of its individual component.

Average value

– Steady current which transfers across any circuit the same charge as it transferred by alternating current during same time.

Imp Def – it equal to $0.637 \times$ max^m value.

– R.M.S value is always grater than average value except in the case of rectangular wave when both are equal.

Form factor

Def – $\dfrac{\text{r.m.s value}}{\text{average value}} = \dfrac{0.707 I_m}{0.637 I_m} = 1.1$ (Sinusodial AC only).

– Sinusodial alternating valtage = 1.11.

Crest or peak or Amplitude factor

Def – $\dfrac{\text{max}^m \text{ value}}{\text{R.M.S value}} = 1.414$ (for sinusodial a.c only).

R.M.S value of Haw Retified AC

– $I = \dfrac{I_m}{2} = 0.5 I_m$.

form-factor/Average value of How rectified AC

- $\frac{\text{rms value}}{\text{average value}} = \frac{Im/2}{Im/\pi} = \pi/2 = 1.57$.

Power factor

- cosine of angle of lead or lag.
- ratio = $\frac{\text{resistance}}{\text{impendence}}$
- ratio = $\frac{\text{true power}}{\text{apperent power}} = \frac{\text{watt}}{\text{vatt-ampers}}$

APPerent power

Imp

- Product of rms value of applied valtage and current.

$S = V \cdot I = (IZ) \cdot I = I^2 Z$ valt-ampers.

ACTive Power - True power.

- power actully disipited in resistive circuit

$P = I^2 R = VI \cos\phi$ watts.

Reactive power

- Power developed in indective reactance of circuit.

$Q = I^2 X_L = I^2 Z \sin\phi = I \cdot \sin\phi = VI \sin\phi$.

valt-ampers-ractive.

Q factor of coil

Imp

- Reciprocal of power factor is Q factor

$Q = 1/\text{Power factor}$.

Define – frequency at which net reactance of Series circuit is zero called resonant frequency.

Resistance

Define – It is independent of f. it is represented by straight line

Inductive reactance $X_L = 2\pi f L$

Define – Directly proportional to frequency straight line passing through the origin.

Capacitive reactance

Define – $X_C = \frac{1}{2\pi f C}$. Inversely proportional to frequency.

– Horizontal axis at high frequencies and vertical axis at low frequencies.

~~Net~~ Net Reactance

– $X = X_L - X_C$.

Circuit impedance

– At low frequency Z is large. because X_C is large.
– " high " Z " " but is inductive because $X_L > X_C$
circuit impedance has minimum value at f_0 given by,

Current I_0

– it is reciporcal of Impedance

Resonance curve

– Curve, b/w current and frequency of applied voltage is resonance curve.
– The ability of resonant circuit to discriminate b/w one particular frequency and all others is called selectivity.

Band-pass filter

DGCA-Q
- it is resonant circuit which pass a certain band or range of frequency while rejecting all frequency below and above this range-? (called pass band).

Band-Stop filter

DGCA-Q
- it is resonant circuit that reject a certain band or range of frequency while passing all frequecies below and above the rejected band. Such filter also called - wavetrap, notch filter, or band elimination, band separation or band rejection filters.

Decibel S/S

- widely used in audio, radio, TV and instrument industry for comparing two voltage, current or power levels. These level are measured in a unit called bel (B) or decibel (dB).

Compensating winding

DGCA-Q
- used for large d.c machine which r subjected to large fluctuations in load.

Imp
- it neautralise the cross magnetizing effect of armature reaction.
- Magnitude of e.m.f will depend upon the rapidity of change in load and amount of change.

Imp
- its connected in series with armature.

Reactance voltage

Imp
- Reactance voltage = Coefficient of self-inductance × rate of change of current.

Commutation improving methode

- (i) - resistance commutation
(2) - e.m.f commutation (which help of brush lead or interpoles).

Resistance commutation

- low-resistance Cu brushes replacing by high-resistance Carbon brushes.

e.m.f commutation

- It is neutralize the reactence voltage by producing a reversing e.m.f in.

Interpoles of compoles

/DGUAcc

- Small pole fixed to yok and spaced in b/w the main poles.
- Imp DG: It wound with few heavy gauge Cu wire connected in Series with armature so carry full armature current.
- Imp In case of generator, main pole ahead in direction of rotation
- DG: sparkless communication can be obtained up to 20 to 30% overload with fixed brush position.
- interpoles raise sparking limit of machine to almost same value of heating limit.
- This ensures automatic neutralization of reactance voltage which due to armature current.

Equalizer ring

- to avoid unequal distribution of current at brushes thereby helping to get sparkless comutation.
- one equalizer ring is connected to all conductors in armature which are two pole apart.

$$\text{no. of rings} = \frac{\text{no. of conductors}}{\text{No. of pairs of poles}}$$

imp

Parllel operation of shunt generators for.

- ① Continuety of Service ② Efficiency ③ maintenan and repair
④ Additions to plant.

characteristics of D.C generators

- ① no-load Saturation (E_0 : I_f). – also known as magnetic characteitic or open circuit characteti.
② internal or total characteristic – ③
③ – External charetetics – reffered as performance chart or voltage regulation curve.

imp

Factor affecting voltage building of DC generator

- ① reversed shunt field connection. ② reversed rotation
③ reversed residual magnetism.

External characteties

DG VAO
① – Armature resistance drop ② Armature reaction

Speed regulation

$$\text{Speed regulation} = \frac{\text{N.L speed} - \text{F.L speed}}{\text{F.L Speed}} \times 100$$

Torque and speed of d.c motor

- Speed depend on torque and not vice versa.

Performance curve

Shut motor — Torque, current, speed and efficiency.

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Losses and efficiency

- copper losses ② magnetic losses ③ Mechanical losses.

Controlling factor of d.c motor

- ① flux/pole ② Resistance ③ applied voltage.

Speed control of series motor

① - flux control method ② . ~~field diverters~~ ③ ~~Armature Diverter.~~

Electric barking

① - friction braking ② Electric braking.
load may be brought to rest quickly by this method.

Ideal transformer

DGVA©

- have no losses - no ohmic resistance, no magnetic leakage
- ideal transformer consist of two purely inductive coil
- A transformer with magnetic leakage is equivalent to an ideal transfer with inductive coil connected in both primary and secondary circuit.

Auto transformer

- In this transformer the primary and secondary are not electrically isolated from each other
- 2 winding transformer can be converted into auto transformer either step up or step down.
- In additive polarity auto-transformer is step-up.
- In Subtractive " " " " Step-down

(255) – Parmanent magnet retatcvity –

—

(256) – Battery capacity depend upon — (1) rate of discharge (2) – Temp. (3) – Density of electrolyte (4) – Quatity of active material.

– Battery rating — Ampere – hour capacity (2) Reverse capacity. (3) Zero cracking power (4) Cold cracking power.

DGCA apparent power — it is product of rms value of applied voltage and circuit current.

$S = VI = (IZ) \cdot I = I^2 Z$ volt-amperes.

DGCA active power — it is power which actually dissipated in circuit resistance $P = I^2 R = VI$

DGCA Reactive power — power developed in inductive reactance of circuit — DGCA

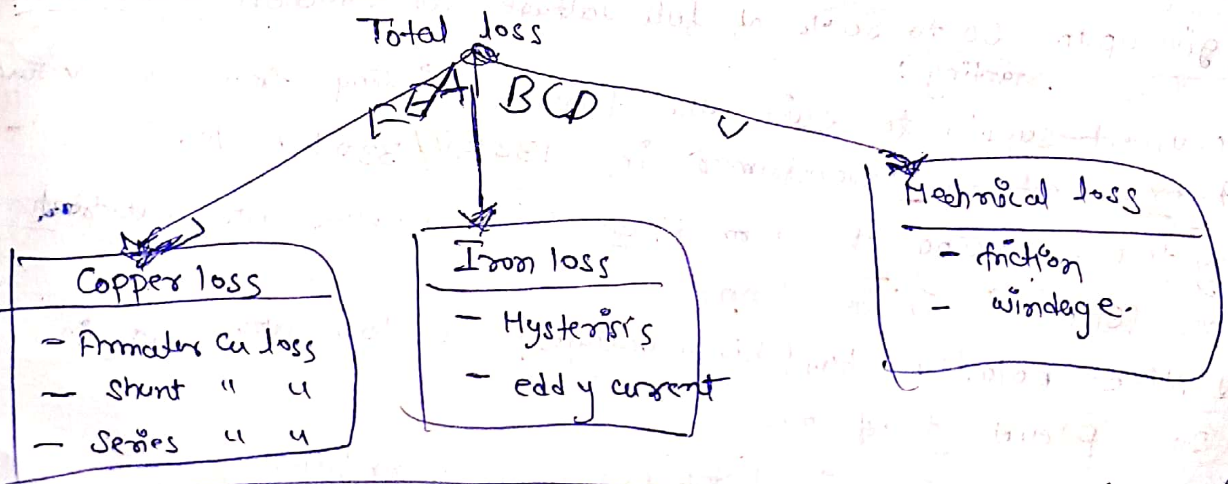
Imp — Reciprocal of power is called Q-factor

DGCA Inductive reactance — ↑ linearly with frequency

DGCA Capacitive " — ↓ with frequency.

* DC motor *

- Magnetic losses — also known as iron or core loss.
- Mechanical losses — friction loss at bearing and commutator
  - air friction or windage loss of rotating armature.



Magnetic and mechanical losses are collectively known as stray losses. — DGCA

- Cu losses constant for shunt and compound generators.

DGCA Compensating winding :— used for large D.C machine which are subjected to large fluctuations in load. These winding embedded in slots in the pole shoes and are connected in series with armature

DGCA Interpoles are wound with comparatively few heavy gauge Cu wire turns are connected in series with armature.

- DCPPAO – Electrical characteristic — Torque and armature current.
- DCPPAO Characteristic — Speed and armature current.
- DCPP Mechanical characteristic — speed and torque. (found speed is high, torque is low)
- Imp DCPPAO For max^m efficiency armature Cu losses are equal to const losses.

Transformer

- Imp DCPPAO A transformer with magnetic leakage is equivalent to an ideal transformer with inductive coil connected in both primary and secondary circuit.
- Cu loss is proportional to $(current)^2$ or KVA^2.
- DCPAO – max^m efficiency Cu loss = Iron loss.
- Commercial efficiency of transformer = Output in watts / Input in watts.

Auto transformer

- to give small boost to a distribution cable.
- give upto 50 to 60% of full voltage to induction motor during starting
- Conuient supply to suit the furnace winding from 230-V su...
- Imp DCPAO Interconnecting transformer in 132 KV/330 KV S/S.
- Imp DCPPAO Any two - winding transformer can be converted into auto transformer either step up or step down.
- DCPPAO additive polarity b/w high-voltage and low voltage in step up auto-transformer.
- DCPP Subtractive polarity in step down- auto-transformer.

Instrument Transformers

- In D.C circuit when large current to be measured, used low-range ammeters with suitable shunt.
- measuring high voltage, low range voltmeter are used with high resistance connected in series with them.

Current transformer

- It has primary coil of one or more turn of thick wire connected in series.
- Secondary coil large no. of turn of fine wire.

- Commonly used current transformer is clip-on-type or Clamp on
- Secondary of current transformer should never be left open under any circumstances.
- Unit of field strength or field intensity is newton/coulomb or tesla.
- Parallel conductors carry current in opposite direction, the field repulse.
- If two parallel conductor attached each other current flow in same direction and repel each other if opposite direction.
- MMF measured in ampere turn.

Faraday's EMF Law

- First law — whenever magnetic flux linked with a circuit changes — emf is always induced.
- Second law — magnitude of induced emf is equal to rate of change of flux linkage.
- Wrought iron and cast steel have high permeability and fairly good conductivity, making for electromagnet.

formation of plates of Lead-acid cell

20 B 34.
1. Plante plates or formed plates
2. Faure plate or pasted plates.

efficiency of cell

- Quantity or ampere hour efficiency
- Energy or watt hour —.

(1) - In Series combination of Capacitor - ?
(a) - charge on each Capacitor remain same.
(b) - Potential diff across each is different
✓(c) - both.

(2) - In RCL circuit when voltage varies which elements is Constant - ?
(a) - Inductor (B) - Capacitor (C) - Resistor (D) - all.

(3) - Load power factor of alternator affect armature reaction, for lagging load at zero power factor - ?
(a) - Armature reaction demagnetics the poles and ↑ armature current.
(b) - Armature reaction diamagetic the pole and ↓ to armature current.
(c) - Armature reaction don't demagnetic the current.

B.L Theraja Question from Module - III

4) - A battery internal resistance is determined by - ?
✓(a) - IR = OCV - CCV / i
(b) - IR = (OCV + CCV) / i
(c) - IR = OCV - CCV / V

(1)- The principle of operation 3-phase induction motor is most similar to that-?

(a) - Synchronous motor. (B) - Repulsion- start induction motor

✓(C) - Transforme with shorted secondary (D). Capacitor start, induction run motor

(2) - In 3-phase induction motor, the relative speed of Stator flux with respect to ---- is zero-?

(a)- Stator winding (B) - rotor ✓(C) - rotor flux (D)- space.

(3) - The effect of ↑ the lenght of air-gap in induction motor will be to ↑ the-?

(a) - Power factor (B) - Speed ✓(C) - magnetising current

(D) - air- gap flux.

(4) - Magnetising current drawn by transformer and induction motor is the cause of --?--- power factor-?

(a). leading ✓(B) - lagging (C) - Zero (D)- unity.

(5)- In 3-phase induction motor, the rotor field rotate at synchronous speed with respect to-?

✓(a)- Stator (B) - rotor (C) - Stator flux (D)- NOTA.

(6) - pull out of torque of synchronous occurs at that value of slip where rotor power factor equals-?

(a) - unity ✓(B) - 0.707 (C) - 0.866 (D) - 0.5

(7) - Irrespective of the supply frequency, the torque developed by Synchronous motor is same whenever ---- is the same-?

(a) - Supply voltage (b) - external load (c) - rotor resistance ✓(D) - slip speed.

(8) - Power factor of Squirrel-Cage induction motor is-?

✓(a) - low at light load only (B) - low at heavy loads only

(c) - Both a and b (D) - low at rated load only.

(9) - which of the following rotor quantity in Synchronous motor does not depends on its slip-?

(a) - Reactance ✓(B) - speed (C) - induced emf

(D) - frequency.

(10) - The fractional slip of induction motor is the ratio-?
✓(A) - rotor cu loss / rotor i/p (B) - stator cu loss / stator i/p
(C) - rotor cu loss / rotor o/p (D) - stator cu loss / stator o/p

(11) - efficiency of 3-phase induction motor is approximately proportional
✓(A) - (1-s) (B) - S (C) - N (D) - N_s

(12) - Torque developed by 3-phase induction motor depends on the-?
(A) - Speed, frequency, no. of poles (B) - V, current and stator impe
(C) - Synchronous speed, rotor speed and frequency
✓(D) - rotor emf, rotor current and rotor p.f.

(13) - If stator voltage and frequency of induction motor are ↓ proportionately, its-?
(A) - locked rotor current is ↓ (B) - torque developed is ↑
(C) - Magnetising current is ↓ ✓(D) - Both a and b.

(14) - Efficiency and p.f of synchronous motor ↑ in proportion to.
(A) - Speed ✓(B) - Mechanical load (C) - voltage (D) - rotor torque

(15) - Synchronous motor run at constant speed only so long as-?
(A) - Torque developed by it remain constant (B) - it supply v. remain constant
✓(C) - it torque exactly equal to mechanical load (D) - Stator flux remain constant.

(16) - The synchronous speed of ↑linear induction motor does not depend upon-?
(A) - width of pole pitch ✓(B) - no. of poles (C) - supply frequency
(D) - any of the above.

(17) - Thrust developed by linear induction motor depend upon-?
(A) - Synchronous speed (B) - rotor i/p (C) - no. of poles.
✓(D) - both a and b

(18) - which class of induction motor will be suited for large refrigerators-?
(A) - E (B) - F (C) - B ✓(D) - C

(19) - The starting winding of single phase motor is placed in the-?
(A) - rotor ✓(B) - Stator (C) - Armature
(D) - field.

(20)- Single phase - motor is - ?

(a) - require only one winding ✓(B) - is not Self-starting (C) - is self starting.

(21) -

TEST-2

(i) - Kirchhoff's current low is applicable to only - ?

(a) - Closed loops in a network

(B) - electronic circuit

✓(C) - junction in a network

(D) - electric circuit.

(2) - Kirchhoff's voltage low is concerned with - ?

(a) - IR drops (B) - battery e.m.fs

(C) - junction voltage ✓(D) - both a and b.

(3) - The algebraic sign of an IR drops is primarily dependent upon the - ?

(a) - amount of current through it (B) - Value of R

✓(C) - Direction of current flow (D) - Battery connection.

(4) - Maxwell's loop current methode of solving electrical network - ?

(a) - uses branch current ✓(B) - utilizes kirchhoff's voltage low

(C) - is confined to single - loop circuit (D) - is a network ↓ methode.

(5) - NTICS - ? in node - voltage technique of solving networks - ?

(a) - affect the operation of circuit

(b) - change the voltage across any element

(C) - alter the P.d b/w any pairs of node

✓(D) - affect voltage of various node.

Test - 3

(i) - If a 220 V heater is used on supply 110 V. heat produced by it will be ________ as much - ?

(a) - one - half (B) - Twice

✓(C) - one - forth (D) - four times.

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(2)- For a given line voltage, four heating coils will produce max^m heat when connected-?

(a)- all in parallel (B)- all in series

(c)- with two parallel pair in series (D)- one pair in parallel with other 2 in series

(3)- one KWh of energy equals nearly-?

(a)- 1000 W (B)- 860 KCal

(c)- 4186 J (D)- 735.5 W

(4)- one Kwh of electric energy equal to-?

(a)- 3600 J (B)- 860 KCal

(c)- 3600 W (D)- 4186 J

Test-4

(1)- The unit of absolute permittivity of a medium is-?

(a)- joule/coloumb (B)- newton/meter

(c)- farad/meter (D)- farad/columb.

(2)- If relative permittivity of mica is 5, its absolute permittivity is-?

(a)- $5\varepsilon_0$ (B)- $5/\varepsilon_0$ (C)- $\varepsilon_0/5$ (D)- 8.854×10^{-12}

(3)- Two similar electric charge of 1 C each are placed 1 m apart in air. force of repulsion b/w them would be nearly ..... newton

(a)- 1 (b)- 9×10^{9} (C)- 4π (D)- 8.854×10^{-12}

(4)- Electric flux emanating from an electric charge of + Q Coloumb is-?

(a)- Q/ε_0 (b)- Q/ε_r (c)- $Q/\varepsilon_0\varepsilon_r$ (D)- Q

(5)- The unit of electric intensity is-?

(a)- joule/coloumb (B)- newton/coloumb

(c)- volt/meter (D)- both b and c.

(6)- If D is electric flux density, then value of electric intensity in air is-?

(a)- D/ε_0 (B)- $D/\varepsilon_0\varepsilon_r$ (c)- dv/dt (D)- $Q/\varepsilon A$

(8) - Inside a conducting spere --- remain constant -?
(a) - electric flux (B) - electric intensity (C) - charge ✓(D) - patential.
(9) - S.I unit of electric intensity is -?
(a) - N/m (B) - V/m (C) - N/C ✓(D) - either b or c
(11) - which is zero inside a charged conducting sphere -?
(a) - patential (b) - electric intensity ✓(c) - both.
(12) - In practic, earth is chosen an a place of zero electric patential because it -?
(a) - is non-conducting (b) - is easily available
(c) - keeps loosing and going charge everyday ✓(D) - has almost constant patential

Test - 5

(1) - A capacitor consist of two -?
(a) - insulation seperated by a dielectric.
✓(b) - conductor " " insulator
(c) - Ceramic plate and one mica disc
(D) - silver - coated insulator.
(2) - The capacitance of a capacitor is not influnged by -?
✓(a) - Plate thickness (B) - Plate area
(C) - plate seperation (D) - nature of dielectric.
(3) - Relative permeability of vacum is -?
(a) - $4\pi \times 10^{-7}$ H/m (B) - 1 H/m
✓(c) - 1 (D) - $1/4\pi$.
(4) - unit of magnetic flux is -?
✓(a) - weber (b) - ampereturn (c) - tesla
(D) - coulomb
(5) - MTECS - about magnetising force at centre of circular coil varies -?
✓(a) - Directly as the no. of its term
(b) - Directly as current
(c) - D " " radius
(D) - inversely " radius

(6)- A pole of driving point admittance function implies-?
(a)- zero current for finite value of driving voltage
(b)- " voltage " " " " " current
(c)- an open circuit condition.
(D)- None.

(7)- According to Faraday's Law of electromagnetic induction, an emf induced in a conductor whenever it-?
(a)- lies in magnetic field
(B)- cut " flux
(C)- moves parallel to line of magnetic field.
(D)- lies perpendicular to the magnetic flux.

(8)- Parmanent magnet made up of-?
(a)- aluminium
(B)- wrought iron
(C)- Cast iron ← used for electromagnet.
(D)- alnico alloys.

(9)- Active material of lead acid cell are-?
(a)- lead peroxide
(B)- sponge lead
(c)- dilute H_2SO_4
(D)- All

(10)- During the charging of lead-acid cell-?
(a)- its cathode become dark chocolate brown in colour
(b)- its voltage ↑
(c)- its give out energy.
(D)- Specific gravity of H_2SO_4 ↓

(11)- The ratio of Ah efficiency to wh efficiency of lead-acid cell is-
(a)- always less than one
(B)- just one
(C)- " greater " one
(D)- either a or b.

(12)- Sulphation in a lead acid battery occurs due to-?
(a)- Trickle charging
(B)- incomplete charging.
(c)- heavy discharging
(D)- fast charging.

(13)- The active material of nickel-iron battery are-?
(a)- nickle hydroxide
(b)- Powdered iron its oxide
(c)- 21% solution of caustic potash
(D)- All

(14)- Compared to lead-acid cell, the efficiency of nickel-iron cell is less due to its-?
(a) - lower e.m.f (B) - Smaller Quantity of electrolyte used.
✓(c)- higher internal resistance (D) - Compactness

(15) - A Dead storage battery can be revived by-?
(a) - a dose of H_2SO_4 (B) - adding so called battery restore.
(c) - adding distilled water ✓(D)- NOTA.

(16) - The Sediment which accumulates at the bottom of a lead acid battery consist largely of-?
(a) - lead-peroxide (B) - lead sulphate
✓(c)- antimony-lead alloy (D) - graphite.

(17) - Floting battery s/s are widely used for-?
(a)- Power station (B) - emergency lightning.
(c) - ~~flat charge~~ telephone exchange installation ✓(D)- all

(18) - Any charge given to the battery when taken off the vechicle is called-?
✓(a)- Bench charge (B) - Step charge (C) - float charge.
(D) - trickle charge.

(19) - The decible is measure of-?
(a)- Power (b) - voltage (C) - Current ✓(D)- power level.

(20) - In a simple high pass RC filter, if the value of capacitance is doubled, the cutoff frequency is-?
✓(a)- ~~low pass~~ Half (B)- ~~high pass~~ Double (C)- ~~low~~ triple (D)- none

(21) - When two simple low-pass filters having combined filter will have a roll-off of ---- dB/decade-?
(a)- -20 (b)- -12 ✓(c)- -40 (D) - -36.

(22) - In a synchronous motor, damper winding is provide in order to.
(a)- Stablize rotor motion (B)- Suppress rotor oscillation
(c) - develope necessary starting torque ✓(D)- Both (b) and (c),

(23)- In a Synchronous motor, magnitude of stator back emf E_b depend on-?

(a)- Speed of motor (B)- load of motor

(c)- Speed and rotor flux ✓(D)- D.C excitation only.

(24)- A eletric motor in which rotor and stator fields rotate with same speed Called-?

(a)- D.C (B)- charge ✓(C)- Synchronous motor

(D)- universal motor.

(25)- The direction of rotation of Synchronous motor can be reversed by reversing-?

(a)- Current to the field winding ✓(B)- Supply phase sequence

(C)- Polarity of rotor poles (D)- none

(26)- The angle b/w the synchronously-rotating stator flux and rotor poles of synchronous motor called-?

(a)- Synchronizing ✓(B)- Torque (C)- Power factor

(D)- slip

(27)- The max^m value of torque angle in Synchronous motor is?

(a)- 45° ✓(B)- 90° (C)- b/w 45° to 90° (D)- below 60°

(28)- A Synchronous motor running with normal excitation adjusts to load ↑ essentially by ↑ in its-?

(a)- Power factor (b) torque angle (c)- back e.m.f ✓(D)- armature current

(29)- If field of Synchronous motor is under excited, the power factor will be-?

✓(a)- lagging (b) leading (c)- unity (D)- more than unity

(30)- When load on Synchronous motor is ↑, its armature current is ↑, provided it is-?

(a)- normally excited (B)- over-excited

(c)- under-excited ✓(D)- All.

(31)- In a Synchronous machin when the rotor speed during hunting, the damping bars develop-?

(a)- Synchronous motor torque (B)- D.C motor torque

(C)- induction motor torque ✓(D)- induction generator torque

(32)- In a synchronous motor, the rotor cu losses are met

(a)- motor input (B)- armature input

(c)- Supply line ✓(D)- D.C Source.

(33)- Synchronous machine called a 'double excited' machine because
(a)- it can be overexcited
(B)- it has two set of rotor pair
✓(C)- rotor and stator are excited
(D)- it need twice normal exciting current.

(34)- Synchronous Capacitor is -?
- over-excited synchronous motor running without machnical load

(35)- The basic requirment of d.c armature winding is that it must be
✓(a)- a closed one
(B)- a lap winding
(C)- a wave winding
(D)- either (b) or (c).

(36)- A wave winding must go at least ---- around the armature before it close back where it started-?
(a)- once
✓(B)- Twice
(C)- Thrice
(D)- fourth times.

(37)- DC armature winding in which coil sides are pole pitch apart is called-?
(a)- Multiplex
(B)- fractional-pitch
✓(C)- full-pitch winding.
(D)- pole-pitch

(38)- The series field of a short-shunt DC generator is excited by---- current-?
(a)- shunt
(B)- armature
✓(C)- load.
(D)- external.

(39)- In D.C generator, the generated e.m.f is directely proportional to-?
(a)- field current
✓(B)- pole flux
(C)- no. of armature parallel p
(D)- no. of dummy coil.

(40)- Commercial efficiency of shunt generator is max^m when it variable loss equals ---- loss-?
✓(a)- Constant
(B)- Stray
(C)- Iron
(D)- friction and windage.

(41)- The critical resistance of d.c generator is resistance of -?
(a)- Armature
✓(B)- field
(C)- load
(D)- Brushes.

(42)- In small D.C. machine, armature slots are sometimes not made axial but are skewed to-?
(a)- Quieter operation
(B)- Slight ↓ in losses.
(C)- Saving of copper
✓(D)- both a and b

(43)- most likely cause of sparking at the brushes in d.c machine is-?

(a)- open coil in armature (B)- defective interpoles

(C)- incorrect brush spring pressure ~~(D)-~~ All.

(44)- The commutation process in d.c generator basically involves

(a)- Passage of current from moving armature to a stationary load.

~~(B)-~~ reversal " " in armature coil as it cross MNA.

(C)- Conversion of AC into DC

(D)- Supresion of reactance voltage

(45)- Shunt generator are most suited for stable parllel operation because of their voltage characterstics-?

(a)- identical ~~(B)-~~ dropping (C)- linear (D)- rising.

(46)- main function of equalizer bar is to make the parllel operation of two over-compounded d.c generator-?

~~(A)-~~ Stable (B)- possible (C)- regular (D)- Smooth.

(47)- The external charactestic of shunt generator can be obtained directly from its-?

(a)- internal ~~(B)-~~ open-circuit (C)-load-saturation (D)-performance

(48)- Load saturation characterstic of d.c generator give relatio b/w

(a)- V and I_a (B)- E and I_a (C)- E_0 & I_f ~~(D)-~~ V and I_f.

(49)- The voltage builup process of d.c. generator is-?

(a)- difficult (B)- delayed ~~(C)-~~ Commulative (D)- infinite

(50)- which of d.c generator can't builup on open circuit-?

(a)- shunt ~~(B)-~~ Series (C)- short shunt (D)- long shunt

(51)- If residual magnetism of shunt generator is destroyed accidentally it may be restored by connecting its shunt field-?

(a)- to earth (B)- AC source (C)- in reverse ~~(D)-~~ DC source

(52)- which cause ↓ in terminal voltage of shunt generator-?

(ans)- [armatur resistence, armature reaction, ↓ in field current

(53)- An Ideal DC generator is one that has --- voltage regulation

(a)- low ~~(B)-~~ zero (C)- (+) (D)- (−)

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(54) - The --- generator has poorest voltage regulation-?

✓(a)- series (B)- Shunt (C)- Compound (D)- high

(55) - The voltage regulation of an overcompound d.c generator is always-?

(a)- Positive ✓(b)- negative (C)- zero (D)- high

(56) - Most commercial compound d.c generator are normally supplied by the manufactures as over compound machine because?

(a)- They are ideally suited for transmission of d.c energy to remotely-located loads.

✓(b)- Degree of compounding can be adjust by using divertor across series field

(C) - They are more cost effective than shunt generators.

(D) - They have zero percent regulation.

(57) - The counter e.m.f of a d.c motor-?

(a)- often exceeds the supply voltage

(b)- aids the applied voltage

✓(c)- helps in energy conversion

(D)- regulates its armature voltage

(58) - the normal value of armature resistance is-?

(a)- 0.005 ✓(b)- 0.5 (C)- 10 (D)- 100

(59) - E_b/V ratio of d.c motor is indication of-?

✓(a)- Efficiency (b)- Speed regulation (c)- Starting torque (D)- Running torque.

(60) - The mechanical power developed by armature of d.c motor is equal to-?

✓(a)- armature current multiplied by back e.m.f (B) - Power i/p — losses

(C)- Power o/p multiplied by efficiency (D) - Power o/p + Iron losses.

(61) - The induced e.m.f in the armature conductors of d.c motor is-

✓(a)- Sinosodial (b)- trapezodial (c)- rectangular (D)- alternating

(62) - D.c motor can be locked upon d.c generator with power flow-?

(a) - ↓ ✓(b)- reversed (C)- ↑ (D)- modified.

(63) - In a d.c motor the mechanical o/p power actully comes from-?

(a)- field s/s (b)- air-gap flux (c)- back emf ✓(d)- electrical i/p power

(64) - The maxm torque of d.c motor is limited by-?

✓(a)- Commutation (b)- heating (C) - speed (D)- armature current.

(65) - which maintain the same direction wheather d.c machine run as a generator or as a motor-?

✓(a) - induced e.m.f (B) - armatur current (c) - field current (D) - Supply current

(66) - under constant load condition, the speed of d.c motor affected by

✓(a) - field flux (b) - armature current (c) - ~~field current~~ back e.m.f (D) - ~~Supply current~~ both b & c.

(67) - if ↑ field flux at same time, ↑ the speed of d.c motor Provided its ---- is held constant-?

(a) - applied voltage (b) - Torque (C) - Armature circuit resistance ✓(D) - armatur current

(68) - shaft torque of d.c motor is less than armature torque because of ---- losses-?

(a) - Copper (b) - mechanical (c) - Iron ✓(D) - rotational.

(69) - If load of D.C ~~motor~~ shunt motor is ↑, its speed is ↓ due to?

(a) - ↑ in its flux ✓(B) - ↓ in back e.m.f

(c) - ↑ in armature current (D) - ↑ in brush drop.

(70) - If the pole ~~of~~ flux a d.c motor approaches zero, its speed will

(a) - Zero ✓(B) - infinite (c) - both (D) -

(71) - If field circuit a loded shunt motor is suddenly opened-?

(a) - it would race to almost infinite speed (B) - draw abnormal high armatur current

✓(c) - Circuit braker or fuse will open circuit (D) - before to much damage is done to motor

(72) - which d.c motor suitable for drive requiring high starting torque but only fairly constant speed -?

(a) - shunt (b) - Series ✓(c) - Compound (D) - Parmanent magnet

(73) - D.C shunt motor is found suitable to drive fans because they require-?

(a) - small torque at start up (B) - large torque at high speed.

(c) - Practically constant voltage ✓(D) - both (a) and (b).

(74) - which load would be best driven by d.c Compound motor-?

✓(a) - reciprocating pump. (B) - Centrifugal pump.

(c) - electric locomotive (D) - fan

(75) - As load ↑, the speed of d.c shunt motor -?

(a) - ↑ proportionately (b) - remain constant (c) - ↑ slightly ✓(D) - ↓ slightly

(76) - B/W no-load and full load ---- motor develops the least torque.

✓(a) - Series motor (b) - shunt (C). Cumulative,