CHAPTER -1. BASIC ELECTRICAL ENGINEERING

[1] Which of the following can vary with ac, but never with dc?
- A. Power
- B. Voltage
- **C. Frequency**
- D. Amplitude

[2] If all other factors are kept constant, the inductance of the air-core coil is not affected by
- **A. The frequency**
- B. The number of turns
- C. The diameter of the coil
- D. The length of the coil

[3] The length of time between a point in one cycle and the same point in the next cycle of an ac wave is the
- A. Frequency
- B. Magnitude
- **C. Period**
- D. Polarity

[4] Capacitance acts to store electrical energy as
- A. Current
- B. Voltage
- C. A magnetic field
- **D. An electric field**

[5] On a spectrum analyzer, a ac signal having only one frequency component looks like
- **A. A single pip**
- B. A sine wave
- C. A square wave
- D. A sawtooth wave

[6] A ferromagnetic core is place in the inductor to
- A. Increase the current carrying capacity
- **B. Increase the inductance**
- C. Limit the current
- D. Reduce the inductance

[7] The period of a ac wave, in seconds is
- A. The same as the frequency in hertz
- B. Not related to the frequency in any way
- **C. Equal to 1 divided by the frequency in hertz**
- D. Equal to the peak amplitude in volts divided by the frequency in hertz

[8] An inductor works by
- A. Charging a piece of wire
- **B. Storing energy as a magnetic field**
- C. Choking off dc
- D. Introducing resistance into a field

[9] As capacitor plate area increases
- **A. The capacitance increases**
- B. The capacitance decreases
- C. The capacitance does not change
- D. The current handling ability decreases

[10] In a small inductance
- A. Energy is stored and released slowly
- B. The current flow is always large
- C. The current flow is always slow
- **D. Energy is stored and released quickly**

[11] In ac circuit, the ratio of kW/kVA is
- **A. power factor**
- B. form factor

C. load factor
D. diversity factor

[12] Suppose that two ac waves have the same frequency but differ in phase by exactly 1/20 of a cycle. What is the phase difference between these two waves?

A. 18 deg
B. 20 deg
C. 36 deg
D. 5.73 deg

[13] The unit of inductance is

A. Mho
B. hendry
C. ohm
D. farad

[14] What is the angular frequency of the ac signal having a frequency of 1770Hz

A. 1770 rad/s
B. 11,120 rad/s
C. 282 rad/s
D. Data insufficient

[15] Thevenin's equivalent circuit consists of

A. series combination of Rth, Eth, Rl
B. series combination of Rth, Eth
C. parallel combination of Rth, Eth, Rl
D. parallel combination of Rth, Eth

[16] The frequency of DC supply is

A. 16 2/3 Hz
B. 60 Hz
C. 50 Hz
D. 0 Hz

[17] Load factor is defined as the ratio of

A. max demand/ average demand
B. average demand/ connected load
C. average demand/ max. demand
D. connected load/ max demand

[18] Q factor of an inductive coil is given by

A. 2π fL/R
B. 2π fr/R
C. R/Z
D. *l*r/*l*

[19] The rms value of sinusoidal 100V peak to peak is

A. 100 V
B. $50/\sqrt{2}$ V
C. 50 V
D. $100/\sqrt{2}$ V

[20] Which of the following bulbs will have the least resistance?

A. 220V, 60W
B. 220V, 100W
C. 115V, 60W
D. 115V, 100W

[21] The wire is stretched to double its length, then its resistance R will become

A. r/2
B. 4r
C. 2r
D. r/4

[22] The power drawn by the circuit whose input is 20KVA and p.f is 0.8 lagging

A. 12
B. 20
C. 16
D. 8

[23] The combined resistance of two equal resistors connected in parallel is equal to

A. One half the resistance of one resistor
B. twice the resistance of one resistor
C. four times the resistance of one resistor
D. one fourth the resistance of one resistor

[24] The superposition theorem is applicable to circuits only having ..... elements

A. non-linear
B. passive
C. resistive
D. linear bilateral

[25] The Q-factor of a coil is given by

A. its power factor
B. Ratio of max. energy stored & energy dissipated per cycle.
C. reciprocal of its power factor
D. ratio R/Z

[26] The power factor at resonance in RLC circuit is

A. zero
B. unity
C. 0.5 lagging
D. 0.5 leading

[27] Cells are connected in parallel to

A. Increase the available voltage
B. Reduce the cost of wiring
C. Increase the available current
D. Reduce the time required to fully charge them after use

[28] the power factor of a purely resistive circuit is

A. zero
B. unity
C. lagging
D. leading

[29] Which of the following has minimum running cost?

A. Hydro electric station
B. nuclear power station
C. thermal power station
D.diesel power station

[30] The color code of a resistor 2.7Kohm with the tolerance of 10% is

A. red, violet, red and silver
B. red, violet, yellow and gold
C. red, violet, orange, silver
D. red, violet, red,gold

[31] In a 117Vrms utility circuit, the peak-to-peak voltage is approximately

A. 82.7 V
B. 165 V
C. 234 V
D. 331 V

[32] Watt hour is the unit of

A. Electric power
B. Electric capacity
C. Electric energy
D. Electric charge

[33] In India,electrical power is transmitted by

A. 1-phase ac system
B. 3-wire dc system
C. 3-phase 3-wire ac system
D. 2 wire dc system

[34] If two perfect sine waves have the same frequency and the same phase, the composite wave

A. Is a sine wave with an amplitude equal to the difference between the amplitude of the waves
B. Is a sine wave with an amplitude equal to the sum of the amplitudes of the two original waves
C. Is not a sine wave, but has the same frequency as the two input waves
D. Has zero amplitude (ie, it does not exist) because the two input waves cancel each other out.

[35] In a ac circuit the product of voltage and current is known as

A. Power
B. Real Power
C. Resistive power
D. Apparent power

[36] The advantage of AC over DC in utility applications is

A. AC is easier to transform from one voltage to another
B. AC is transmitted with lower loss in wires
C. AC can be easily obtained from dc generators
D. AC can be generated with less dangerous by products

[37] A network that does not have either voltage or current source is called .....network

A. Active
B. Passive
C. Resistive
D. Dummy

[38] The sixth harmonic of a ac wave whose period is 1 Milli second has a frequency of

A. 0.006Hz
B. 167.0 Hz
C. 7.0 kHz
D. 6 kHz

[39] A degree of phase represents

A. 6.28 cycles
B. 57.3 cycles
C. 1/60 of a cycle
D. 1/360 of a cycle

[40] A battery is source of

A. DC voltage
B. 1 phase AC voltage
C. 3 phase ac voltage
D. ac or dc voltage

[41] The power plant having highest efficiency is

A. Hydro
B. Thermal
C. Nuclear
D. Diesel

[42] As the spacing between plates in a capacitor is made smaller

A. The capacitance increases
B. The capacitance decreases
C. The capacitance does not change
D. The resistance increases

[43] The relationship between frequency and time period of ac waveform is

A. $f = T$
B. $f = 1/ T^2$

C. f = 1/T

D. $f = T^2$

[44] The five 0.050uF capacitors are connected in parallel. The equivalent capacitance is

A. 0.010 uf

B. 0.25 uf

C. 0.50uf

D. 0.025uf

[45] The current gain of a bipolar transistor drops at high frequencies because of

A. Transistor capacitance

B. High current effects in the base

C. Parasitic inductive elements

D. the early effect

[46] If two perfect sine waves have the same frequency and the same amplitude, but are in opposite phase, the composite wave

A. Has twice the amplitude of either input wave alone

B. Has half the amplitude of either input wave alone

C. Is complex, but has the same frequency as the originals.

D. Has zero amplitude (that is, it does not exist) because the two input waves cancel each other out.

[47] Three capacitors are connected in series having capacitance of 8uF, 32uF, 16uF, the total capacitance is

A. 32/7 uF

B. 7.32 uF

C. 56 uF

D. 32 uF

[48] Which one of the following does not affect the power output available from a particular ac generator?

A. The strength of the magnet

B. The number of turns in the coil

C. The type of natural energy source used

D. The speed of rotation of the coil or magnet

[49] Which of the following are active components

A. resistor and inductor

B. Diode, BJT, FET

C. Opamp, BJT, thermionic triode

D. Capacitor, Inductor

[50] The energy required to charge a 10 uF capacitor to 100V is

(a) 0.10 J

(b) 0.05 J

(c) 5 X 10-9 J

(d) 10 X 10-9 J

[51] The current in a inductor changes from 0 to 200mA in 4ms and induces a voltage of 100mV. The value of inductor is

(a) 2mH

(b) 0.5mH

(c) 8mH

(d) 4mH

[52] A battery has a short-circuit current of 30A and an open circuit voltage of 24V. If the battery is connected to an electric bulb of resistance 2 ?, the power dissipated by the bulb is

(a) 80W

(b) 1800W

(c) 112.5W

(d) 228W

[53] Which of the following is ferromagnetic material?

a) Copper

b) Palladium

c) Silver

d) Cobalt

[54] A complex wave form made up frequency components 1 Hz, 3 Hz, 5 Hz, 7 Hz and 9 Hz. Its fundamental frequency is

a) 9 Hz
b) 12.5 Hz
c) 1 Hz
d) Indeterminate

[55] If a 175V dc source were connected in series with the utility mains from a standard wall outlet, the result would be

A. Smooth dc at a constant voltage
B. Pure ac with equal peak voltages
C. Ac with one peak voltage greater than the other
D. Fluctuating dc

[56] The main advantage of air as a dielectric material for capacitors is

A. Has a high dielectric constant
B. Is not physically dense
C. Has low loss
D. Allows for large capacitance in a small volume

[57] Which of the following is a polarized capacitor?

A. Paper
B. Mica
C. Inter electrode
D. Electrolytic

[58] In a 117Vrms utility circuit, the positive peak voltage is approximately

A. 82.7V
B. 165V
C. 234V
D. 331V

[59] If a capacitor has a negative temperature coefficient then

A. Its capacitance decreases as the temperature rises
B. Its capacitance increases as the temperature rises
C. Its capacitance does not change with temperature
D. It will not work if the temperature is below freezing

[60] Inductors in series, assuming there is no mutual inductance, combine

A. Like resistors in parallel
B. Like resistors in series
C. Like batteries in series with opposite polarities
D. In a way unlike any other type of component

[61] The five 0.050 μF capacitors are connected in series. The equivalent capacitance is

A. 0.010 μf
B. 0.25 μf
C. 0.50 μf
D. 0.025 μf

[62] A material with a high dielectric constant

A. Acts to increase capacitance per unit volume
B. Acts to decrease capacitance per unit volume
C. Has no effect on capacitance
D. Causes a capacitor to become polarized

[63] In a perfect sine wave, the peak to peak amplitude is equal to

A. Half the peak amplitude
B. The peak amplitude
C. 1.414 times the peak amplitude
D. Twice the peak amplitude

[64] A triangular wave exhibits

A. An instantaneous rise and a defined decay

B. A defined rise and an instantaneous decay
C. A defined rise and a defined decay, and the two are equal
D. An instantaneous rise and an instantaneous decay

[65] The colour bands on a carbon composition resistor occur in the sequence: yellow, violet, yellow and silver. Its resistance is
(a) 470 KΩ± 47 KΩ
(b) 470 KΩ± 23.5 %
(c) 47 KΩ± 10 %
(d) 47 KΩ± 5 %

[66] If 120°C of charge passes through an electric conductor in 60 sec, the current in the conductor is
(a) 0.5A
(b) 2A
(c) 3.33mA
(d) 0.3mA

[67] The energy required to move 120 coulomb through 3V is
(a) 25mJ
(b) 360J
(c) 40J
(d) 2.78mJ

[68] The current carrying capacity of a 1W, 4MΩ resistor used in radio receiver is
(a) 0.5kA
(b) 2kA
(c) 2mA
(d) 0.5mA

[69] A capacitor is charged by a constant current of 2mA and results in a voltage increase of 12V in a 10 sec interval. The value of capacitance is
(a) 0.75mF
(b) 1.33mF
(c) 0.6mF
(d) 1.67mF

[70] Three phase ac supply
A. Has sawtooth waves that add together in phase
B. Consists of three sine waves in different phases
C. Is a sine wave with exactly three harmonics
D. Is of interest only to physicists

[71] Power is defined as
A. the rate at which current flows in a circuit
B. the product of voltage and resistance in a circuit
C. the rate at which energy is radiated or dissipated
D. the accumulation of energy over time
E. the amount of heat generated in a circuit.

[72] At the exact moment a 60Hz ac sine wave is at its positive peak voltage, the instantaneous rate of change in the voltage is
A. Large and positive
B. Small and negative
C. Large and negative
D. Small and negative
E. Zero

[73] A flute sounds different than a violin, even if the two instruments are played at the same pitch, because of a difference in the
A. Phase
B. Chamber length
C. Frequency
D. Waveform
E. Bias

[74] A common-collector transistor circuit is often used

A. to provide high gain and sensitivity over a wide range of frequencies

B. to match a high impedance to a low impedance

C. as a high-fidelity audio power amplifier

D. as an oscillator at microwaves frequencies

E. as the rectifier in a dc power supply.

[75] The internal conductance of an ammeter is generally

A. Low

B. Directly proportional to the current

C. Inversely proportional to the current

D. High

E. Any value. It doest matter

[76] A steady magnetic field can be produced by

A. a straight wire carrying a constant direct current.

B. a loop of wire carrying a constant direct current.

C. a coil of wire carrying a constant direct current.

D. a constant-intensity stream of protons in free space, moving in a straight line.

E. any of the above.

[77] The output wave of a common-gate amplifier circuit with a pure sine-wave input

A. is in phase with the input wave.

B. lags the input wave by 90° of phase.

C. leads the input wave by 90° of phase.

D. is 180° out of phase with the input wave.

E. is inverted with respect to the input wave.

[78] Which of the following capacitor types is polarized?

A. Electrolytic

B. Paper

C. Ceramic

D. Mica

E. Air variable

[79] when a non zero net reactance exists in an ac circuit, the apparent power is

A. Zero

B. Equal to the true power

C. Less than the true power

D. Greater than the true power

E. Infinite

[80] The gauss is a unit of

(a) Charge carrier flow speed.

(b) Magnetic flux density.

(c) Electrostatic field strength.

(d) Electromagnetic field intensity.

(e) Electrical charge quantity.

Ans:B. Exp: In SI system the unit is tesla(T). In CGS system the unit is Gauss

[81] An average responding rectifier type electronic ac voltmeter has its scale calibrated in terms of the rms value of a sine wave, when a square wave voltage of peak magnitude 100V is measured using this voltmeter then the reading indicated by the meter, will be ?

a) 111V

b) 100V

c) 90.09V

d) 70.7V

[82] A house served by a 220V supply light, is protected by a 9-Ampere fuse. The maximum number of 60 W bulbs in parallel that can be turned on is

a) 11

b) 33

c) 22
d) 44

[83] Silicon has a preference in IC technology because
(a) it is an indirect semiconductor
(b) it is a covalent semiconductor
(c) it is an elemental semiconductor
(d) of the availability of nature oxide SiO

[84] Three equal resistance of magnitude 5 Ohm each are connected in delta. The resistance between any two pair of terminals of the delta will be
(a) 5 Ohm
(b) 5/3 Ohm
(c) 10/3 Ohm
(d) 3/5 Ohm

[85] The R.M.S. value of a half wave rectified sinusoidal alternating current with peak value Im is
(a) Im / 1
(b) Im / v2
(c) Im / 2
(d) Im v3

[86] The unit which indicates the rate at which energy is expended?
A. Watt
B. Ampere-hour
C. Coulomb
D. Volt

[87] The peak voltage in an ac wave is always
A. greater than the average voltage
B. less than the average voltage
C. greater than or equal to average voltage
D. less than or equal to the average voltage

[88] When an electrical charge exists but there is no flow of current, the charge is said to be
A. ionizing
B. electronic
C. Static
D. Atomic

[89] As the number of turns in a coil that carries ac increases without limit, the current in the coil will
A. Eventually become very large
B. Stay the same
C. Decrease, approaching zero
D. Be stored in the core material

[90] As the number of turns in a coil increases, the reactance at a constant frequency
A. Increases
B. Decreases
C. Stays the same
D. Is stored in the core material

[91] In an RL circuit, as the ratio of inductive reactance to resistance (XL/R) decreases, the phase angle
A. Increases
B. Decreases
C. Stays the same
D. Becomes alternately positive and negative

[92] The best filter for a power supply is
A. a capacitor in series
B. a choke in series
C. a capacitor in series and a choke in parallel
D. a capacitor in parallel and a choke in series

[93] Voltage regulation can be achieved by a zener diode connected in

A. parallel with the filter output, forward biased
B. parallel with the filter output, reverse biased
C. series with the filter output, forward biased
D. series with the filter output, reverse biased

[94] A current surge takes place when a power supply is first turned on because

A. the transformer core is suddenly magnetized
B. the diodes suddenly start to conduct
C. the filter capacitor must be initially charged
D. arching takes place in the power switch

[95] A dc electromagnet

A. has constant polarity
B. Requires an air core
C. Cannot be used to permanently magnetize anything
D. Does not attract or repel permanent magnet

[96] In a multi-stage RC coupled amplifier the coupling capacitor_____

A) Limits the low frequency response
B) Limits the high frequency response
C) Does not affect the frequency response
D) Block the DC component without affecting the frequency response

[97] It is required to measure temperature in the range of 13000 deg C to 15000 deg c. The most suitable thermocouple to be used as a transducer would be?

a) chromel - constantan
b) Iron - constantan
c) chromel - alumel
d) platinum- rhodium

[98] Telemetering is a method of?

a) Counting pulses sent over long distances
b) Transmitting pictures from one place to another
c) Transmitting information concerning a process over a distance
d) None

[99] A dc to dc converter having an efficiency of 80% is delivering 16W to a load. If the converter is generating an output of 200V from an input source of 20V, then the current drawn from the source will be?

a) 0.1A
b) 0.5A
c) 1.0A
d) 10.0A

[100] The location of lighting arrestor is?

a) Near the transformer
b) Near the circuit breaker
c) Away from the transformer
d) None

[101] Which of the following is not a general characteristic of ac wave?

A. The wave shape is identical for each cycle
B. The polarity reverses periodically
C. The electrons always flow in the same direction
D. There is a definite frequency

[102] All sine waves

A. Have similar general appearance
B. Have instantaneous rise and fall times
C. Are in the same phase as cosine waves
D. Rise instantly, but decay slowly

[103] The derivative of a sine wave

A. Is shifted in phase by ½ cycle from the sine wave
B. Is the rate of change in the instantaneous value

C. Has instantaneous rise and decay times
D. Rise instantly, but decays slowly

[104] A phase difference of 180deg in the circular motion model of a sine wave represents
A. ¼ revolution
B. ½ revolution
C. A full revolution
D. Two full revolution

[105] We can add or subtract a ….degrees of phase to or from a wave, and end up with exactly the same wave again
A. 90
B. 180
C. 270
D. 360

[106] A wave has a frequency of 300kHz. One complete cycle takes…..seconds
A. 1.3000
B. 0.00333
C. 1/3000
D. 3.33×10^{-6}

[107] A wave has a frequency of 440Hz, how long does it take for 10^0 of a cycle to occur?
A. 0.00273s
B. 0.0000273s
C. 0.0000631s
D. 0.00000631s

[108] One waveform has a peak value of ±3V and the other has peak value of ±5V. These two waves are in phase coincidence. The resultant has voltages of
A. ±8Vpk, in phase with the composites
B. ±2 Vpk, in phase with the composites
C. ±8Vpk, in phase opposition with respect to the composites
D. ±2 Vpk, in phase opposition with respect to the composites

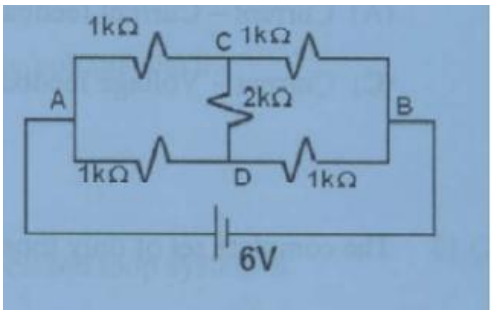
[109] Two pure sine waves that differ in phase by 180^0 can be considered to
A. Be offset by two full cycles
B. Be in phase opposition
C. Be separated by less than ¼ cycle
D. Have a frequency of ½ cycle

[110] A BJT has
A. three PN junctions
B. three semiconductor layers
C. two N type layers around a P type layer
D. a low avalanche voltage

[111]Consider the following statements: [IES2010]
Piezoelectric materials serve as
1.A source of ultrasonic waves
2.When electric field is applied, the mechanical dimensions of the substances are not at all altered.
3.Converts electrical energy to mechanical and vice versa
4.Converts thermal energy to electrical energy

Which of the above statements is/are correct?
A.1 only
B.2 and 3 only
C.1 and 3 only
D.1,2,3 and 4

[112]The current through the 2KΩ resistance in the circuit shown is [GATE2009]

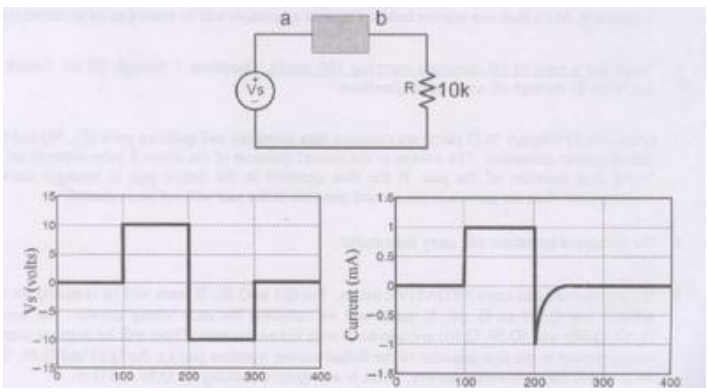


A.0 mA
B.1 mA
C.2 mA
D.6 mA

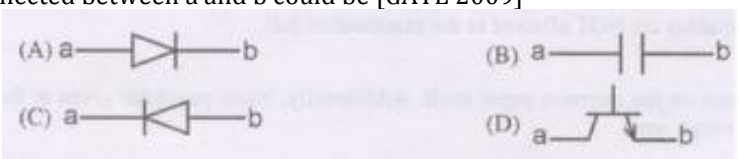
[113]Out of the following plant categories
1.Nuclear
2.Run-of-river
3.Pump storage
4.Diesel
the base load power plants are [GATE2009]

A.1 and 2
B. 2 and 3
C.1,2 and 4
D.1, 3,and 4

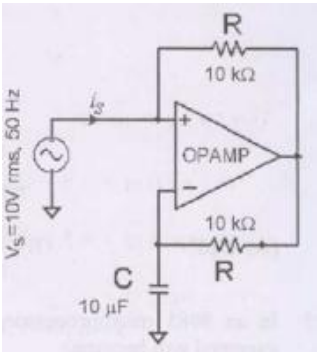
[114]The following circuit has a source voltage Vs as shown in the graph. The current through the circuit is also shown



The element connected between a and b could be [GATE 2009]



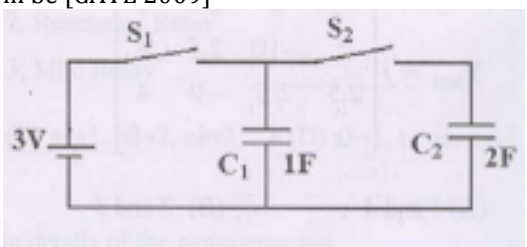
[115]The following circuit has R= 10kΩ , C=10μF. The input voltage is a sinusoid at 50Hz with an rms value of 10V. Under ideal conditions, the current i_s from the source is [GATE 2009]



A. 10π mA leading by 90°
B. 20π mA leading by 90°
C. 10π mA leading by 90°
D. 10πmA lagging by 90°

Ans: A

[116]In the figure shown, all elements used are ideal. For time t<0, S_1 remained closed and S2 open. At t=0, S_1 is opened and S_2 is closed. If the voltage V_{c2} across the capacitor C_2 at t=0 is zero, the voltage across the capacitor combination at $t=0^+$ will be [GATE 2009]



A. 1V
B. 2V
C. 1.5V
D. 3 V

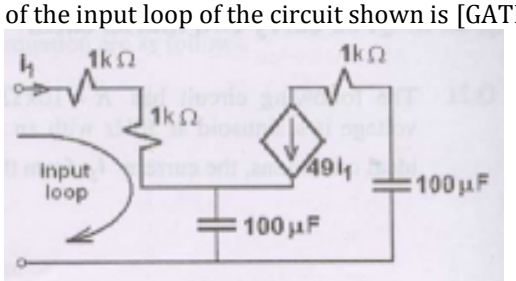
Ans: D

[117]Transformer and emitter follower can both be used for impedance matching at the output of an audio amplifier. The basic relationship between the input power P_{in} and output power P_{out} in both the cases is [GATE 2009]

A. $P_{in} = P_{out}$ for both transformer and emitter follower
B. $P_{in} > P_{out}$ for both transformer and emitter follower
C. $P_{in} < P_{out}$ for transformer and Pin = Pout for emitter follower
D. $P_{in} = P_{out}$ for transformer and Pin < Pout for emitter follower

Ans: None of the above

[118]The equivalent capacitance of the input loop of the circuit shown is [GATE 2009]



A. 2μF
B. 100μF
C. 200μF
D. 4μF

CHAPTER-2. ELECTRICAL MACHINE

2.1 - ALTERNATOR

[1] Squirrel cage bars placed in the rotor pole faces of an alternator help reduce hunting
- **A.** above synchronous speed only
- **B.** below synchronous speed only
- **C. above and blow synchronous speeds both**
- **D.** none of the above

[2] The stationary alternator should not be connected to live bus-bars because it
- **A.** is likely to run as synchronous motor
- **B. will get short - circuited**
- **C.** will decrease bus - bar voltage though momentarily
- **D.** will disturb generated emf's of other alternators connected in parallel.

[3] With a unity load p.f, the effect of armature reaction on the main field flux of an alternator is
- **A. distortional**
- **B.** magnetising
- **C.** demagnetising
- **D.** nominal

[4] At lagging loads, armature reaction in an alternator is
- **A.** cross-magnetising
- **B.** demagnetising
- **C.** non-effective
- **D. magnetising**

[5] The frequency of voltage generated by an alternator having 4 poles and rotating at 1800 rpm is
- **A. 60 Hz**
- **B.** 7200 Hz
- **C.** 120 Hz
- **D.** 450 Hz

[6] The main disadvantages of using short pitch winding in alternators is that it
- **A.** reduces harmonics in the generated voltage
- **B. reduces the total voltage around the armature coils**
- **C.** produces asymmetry in the three phase windings
- **D.** increases Cu of end connections.

[7] Zero power factor method of an alternator is used to find its
- **A.** efficiency
- **B. voltage regulation**
- **C.** armature resistance
- **D.** synchronous impedance

[8] Armature reaction in an alternator mainly affects
- **A.** rotor speed
- **B.** terminal voltage per phase
- **C.** frequency of armature current
- **D. generated voltage per phase**

[9]The effect of increasing air gap length in the induction motor will increase the
- **A.** power factor
- **B.** speed
- **C. magnetising current**
- **D.** air gap flux

[10] The principle of operation of a 3 phase induction motor is most similar to that of a
- **A.** synchronous motor
- **B.** repulsion start induction motor
- **C. transformer with a shorted secondary**
- **D.** capacitor start, induction run motor