

MCQ TEST 1

Transformer

1. A transformer transforms
 - a. frequency
 - b. voltage
 - c. current
 - d. voltage and current

2. Which of the following is the basic element of transformer
 - a. core
 - b. primary winding
 - c. secondary winding
 - d. mutual flux

3. In an ideal transformer
 - a. winding has no resistance
 - b. core has no losses
 - c. core has infinite permeability
 - d. all of the above

4. The main purpose of using core in a transformer is to
 - a. decrease iron losses
 - b. prevent eddy current losses
 - c. eliminate magnetic hysteresis
 - d. decrease reluctance of common magnetic circuit

5. Transformer cores are laminated in order to

- a. simplify its construction
 - b. minimise eddy current losses
 - c. reduce cost
 - d. reduce hysteresis loss
6. A transformer having 1000 primary turns is connected to a 250 volt ac supply, for a secondary voltage of 400 volt, the no. secondary turns should be
- a. 1600
 - b. 250
 - c. 400
 - d. 1250
7. The primary and secondary induced emf E_1 & E_2 in a 2 winding transformer are always
- a. equal in magnitude
 - b. antiphase with each other
 - c. Inphase in each other
 - d. determine by load on transformer secondary
8. A step up transformer increases
- a. voltage
 - b. current
 - c. power
 - d. frequency
9. The primary and secondary windings of an two winding transformer always have,

- a. different no of turns
 - b. same size of copper wire
 - c. a common magnetic circuit
 - d. separate magnetic circuit
10. In a transformer the leakage flux of each winding is proportional to the current in that winding because,
- a. Ohm's law applies to the magnetic circuit
 - b. Leakage path do not saturate
 - c. the two windings are electrically isolated
 - d. mutual flux is confined to core
11. In a 2 winding transformer the emf per turn in secondary winding is always the induced emf per turn in primary
- a. equal to k times
 - b. equal to $1/k$ times
 - c. equal to
 - c. greater than
12. In a relation to a transformer the rayio 20/1 ; indicates that
- a. there are 20 turns on primary and 1 turn on secondary
 - b. secondary voltage is $1/20$ th of primary voltage
 - c. primary current is 20 times greater than secondary surrent
 - d. for every 20 turns on primary there is 1 turn on secondary
13. In performing short circuit test on transformer
- a. high voltage side is usuallu short circuited

- b. low voltage is usually short circuited
 - c. any side is short circuited with preference
 - d. none of the above
14. The equivalent resistance of the primary of a transformer having $K=5$ and $R_1=0.1$ ohm when referred to secondary becomesohm.
- a. 0.5
 - b. 0.02
 - c. 0.004
 - d. 2.5
15. A transformer has negative voltage regulation when its load power is
- a. zero
 - b. unity
 - c. leading
 - d. lagging
16. The primary reason why open circuit test is performed on the low voltage winding of the transformer is that it
- a. draws sufficiently large on load current for convenient reading
 - b. requires least voltage to perform the test
 - c. needs minimum power input
 - d. involves less core loss
17. No load test on a transformer is to measure its
- a. copper losses
 - b. magnetising current

- c. magnetising current and no load losses
 - d. efficiency of the transformer
18. The main purpose of performing open circuit test on a transformer is to measure its
- a. copper loss
 - b. core loss
 - c. total loss
 - d. insulation resistance
19. During short circuit test, iron loss of the transformer is negligible because
- a. the entire input is just sufficient to meet cu losses only
 - b. flux produced is a small fraction of the normal flux
 - c. iron core becomes fully saturated
 - d. supply frequency is held constant
20. The iron loss of a transformer at 400Hz is 10 watt. Assuming that eddy current and hysteresis losses vary as the square of the flux density the iron loss of the transformer at rated voltage but at 50 Hz would bewatts.
- a. 80
 - b. 640
 - c. 1.25
 - d. 100
21. In operating a 400 Hz transformer at 50 Hz,
- a. only voltage is reduced in the same proportion as the frequency
 - b. only kVA rating is reduced in the same proportion as the frequency

- c. both voltage and kVA rating are reduced in the same proportion as the frequency
 - d. none of the above
22. The voltage applied to the HV side of a transformer during short circuit test is 2% of its rated voltage. The core loss will be.....% of the rated core loss
- a. 4
 - b. 0.4
 - c. 0.25
 - d. 0.04
23. Transformer are rated in kVA instead of kW because
- a. load power factor is often not known
 - b. kVA is fixed whereas kW depends on load PF
 - c. total transformer loss depends on the volt ampere
 - d. it has become customary
24. When a 400 Hz transformer is operated at 50 Hz, its kVA rating is,
- a. reduced to 1/8
 - b. increased 8 times
 - c. unaffected
 - d. increased 64 times
25. At relatively light loads, transformer efficiency is low because,
- a. secondary output is low
 - b. transformer losses are high
 - c. fixed losses are high in proportion to the output

d. cu loss is small

26. A 200 kVA transformer has an iron loss of 1kW and full load copper loss of 2 kW. Its load kVA corresponding to maximum efficiency is.....kVA.

a. 100

b. 141.4

c. 50

d. 200

27. If Cu loss of a transformer at 7/8th full load is 4900 W, then its full load cu loss will be.....watt.

a. 5600

b. 6400

c. 375

d. 429

28. The ordinary efficiency of a given transformer is maximum when

a. it runs at half load

b. it runs at full load

c. its cu loss equals iron loss

d. it runs slightly overload

29. The o/p current corresponding to maximum efficiency for a transformer having core loss of 100 watt and equivalent resistance referred to secondary of 0.25 ohm isampere.

a. 20

b. 25

- c. 5
 - d. 400
30. The maximum efficiency of a 100 kVA transformer being iron loss of 900 kW and F.L. cu loss of 1600 W occurs atkVA.
- a. 56.3
 - b. 133.3
 - c. 75
 - d. 177.7
31. The all day efficiency of the transformer depends primarily on
- a. its copper loss
 - b. the amount of load
 - c. the duration of the load
 - d. both b and c
32. The marked increase in kVA capacity produced by connecting a 2 winding transformer as an autotransformer is due to
- a. increase in turns ratio
 - b. increase in secondary voltage
 - c. increase in transformer efficiency.
 - d. establishment of conductive link between primary and secondary
33. The kVA rating of an ordinary 2 winding transformer is increased when connected as an autotransformer because,
- a. transformer ratio is increased
 - b. secondary voltage is increased
 - c. magnetic quality of the core material

- d. secondary current is increased
34. The saving in Cu achieved by converting a 2 winding transformer into an autotransformer is determined by,
- a. voltage transformation ratio
 - b. load on the secondary
 - c. magnetic quality of the core material
 - d. size of the transformer core
35. An autotransformer having a transformation ratio of 0.8 supplies a load of 3 kW. The power transferred conductively from primary to secondary is.....kW.
- a. 0.6
 - b. 2.4
 - c. 1.5
 - d. 0.27
36. The essential condition for parallel operation of two 1 phase transformer is that they should has the same.....
- a. polarity
 - b. kVA rating
 - c. voltage ratio
 - d. percentage impedance
37. If the impedance triangles of two transformer operating in parallel are not identical in shape and size, the two transformer will,
- a. share the load unequally
 - b. get heated unequally

- c. have a circulatory secondary current even when unloaded
- d. run with different power factors

QUESTION NO.	ANSWER	QUESTION NO.	ANSWER
1	D	20	B
2	D	21	B
3	D	22	D
4	D	23	C
5	B	24	A
6	A	25	C
7	C	26	B
8	A	27	B
9	C	28	C
10	B	29	A
11	C	30	C
12	D	31	D
13	B	32	D
14	D	33	C
15	C	34	A
16	A	35	B
17	C	36	A
18	B	37	D
19	B	38	C

38. Two transformers A and B having equal outputs and voltage ratios but unequal percentage impedances of 4 and 2 are operating in parallel.

Transformer A will be running over load by..... percentage.

- a. 50
- b. 66
- c. 33
- d. 25

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TRASFORMER MCQ ANSWERS KEY

ELECTROSTATICS

- Q.1) The force between two electrons separated by a distance r varies as.....
a) r^2 b) r c) r^{-1} d) r^{-2}
- Q.2) Two charges are placed at a certain distance apart. A brass sheet is placed between them. The force between them will
A) Increase b) decrease c) remain unchanged d) none of the above
- Q.3) Which of the following will be studied under electrostatics?
A) Incandescent lamp b) electric iron c) lightning rod d) electric motor
- Q.4) The relative permittivity of air is
a) 0 b) 1 c) 8.854×10^{-12} d) none of the above
- Q.5) The relative permittivity of air is
a) 8.854×10^{-11} F/m b) 9×10^8 F/m c) 5×10^{-5} F/m d) 9×10^5 F/m
- Q.6) Another name for relative permittivity is
a) dielectric constant b) dielectric strength c) potential gradient d) none of the above
- Q.7) The relative permittivity of most materials lies between
a) 20 and 100 b) 10 and 20 c) 100 and 200 d) 1 and 10
- Q.8) When the relative permittivity of the medium is increased, the force between two charges placed at a given distance apart
a) increases b) decreases c) remains same d) none of the above
- Q.9) Two charges are placed at a distance apart. If a glass slab is placed between them, the force between the charges will
a) be zero b) increase c) decrease d) remain same
- Q.10) There are two charges of +1 microC and +5 microC. The ratio of the forces acting on them will be
a) 1:1 b) 1:5 c) 5:1 d) 1:25
- Q.11) A soap bubble is given a negative charge. Its radius
a) decrease b) increases c) remains unchanged d) information is incomplete to say anything
- Q.12) The ratio of force between two small spheres with constant charge in air and in medium of relative permittivity K is
a) $K^2 : 1$ b) $1 : K$ c) $1 : K^2$ d) $K : 1$
- Q.13) An electric field can deflect
a) x-rays b) neutrons c) alpha particles d) gamma rays
- Q.14) Electric lines of force enter or leave a charged surface at an angle
a) of 90° b) of 30° c) of 60° d) depending upon the surface conditions
- Q.15) Which of the following does not change when a glass slab is introduced between the plates of a charged parallel plate capacitor
a) Electric charge b) electric energy c) capacitance d) electric field intensity
- Q.16) As one penetrates a uniformly charged sphere, the electric field strength E
a) increases b) decreases c) is zero at all points d) remains the same as at the surface
- Q.17) If the relative permittivity of the medium increases, the electric intensity at a point

due to a given charge

a)decrease b)increases c)remains the same d)none the above

Q.18)electric lines of force about a negative point charge are

a)circular ,anti clockwise b)circular,Clockwise c)radial,inward d)radial ,outward

Q.19)A hollow sphere of charge does not produce an electric field at any

a) outer point b)interior point c)beyond 2 m d)beyond 10 m

Q.20)Two charged sphere of radii 10 cm and 15 cm are connected by a thin wire .No current will flow if they have

a)the same charge b)the same energy c)the same field on their surface d)the same potential

Q.21)Electric potential is a

a)Scalar quantity b)vector quantity c)dimensionless d)nothing can be said

Q.22) The capacitance of a capacitor is relative permittivity.

a)directly proportional to b)inversely proportional to c)independent of d)directly proportional to square of

Q.23)An air capacitor has same dimensions as that of a mica capacitor.If the capacitance of mica capacitor is 6 times that of air capacitor,then relative permittivity of mica is

a)36 b) 12 c)3 d)6

Q.24)The most convenient way of achieving large capacitance is by using

a)multiplate construction

b)decreased distance between plates

c)air as dielectric

d)Dielectric of low permittivity

Q.25)Another name for relative permittivity is

a)dielectric strength b)breakdown volatge c)specific inductive capacity d)potential gradient

Q.26)A capacitor opposes

a)change in current b)change in voltage c)both change in current and voltage

d)none of the above

Q.27)If a multiplate capacitor has 7 plates each of area 6cm^2 then

a)6 capacitor will be in parallel

b)7 capacitor will be in parallel

c)7 capacitor will be in series

d)6 capacitor will be in series

Q.28)The capacitance of a 4 plate capacitor isthat of two plate capacitor a)two times

b)4 times c)3 times d) 6 times

Q,29)Two capacitors of capacitances 3 microF and 6 micro F in series will have total capacitance of

a)9 micro F B) 2 micro F c)18 micro F d)24 microF

30) A capacitor of 20 micro F charged to 500 V is connected in parallel with another capacitor of to 10 microF capacitance and charged to 200 V the common potential is

a)200 V b)250 V c) 400 V d) 300V

AUnit: 3

B. Electrostatics

1. The unit of electric flux is

2. The value of ϵ_0 isF/m
3. If $Q_1 = Q_2 = 1 \text{ C}$ and distance between them is 1 m then the force between them is N
4. The unit of capacitance is
5. The capacitance of a parallel plate capacitor is.....
6. The capacitor is charged to 10 V and its capacitance is $1 \mu\text{F}$ then charge on it is
7. A capacitance uses the plates of area 25 cm^2 and distance between the plates is 5 cm . then its capacitance with air as a dielectric is
8. The charge transferred on the plates of a capacitor is 2 nC while the distance between the plates is 1 mm . If area of cross- section is 10 cm^2 and air is used as a dielectric then voltage across the plates is V.
9. A capacitor of $10 \mu\text{F}$ has a charge of 1 mC . If the distance between the plates is 1 cm then the electric field intensity between the plates is.....
10. The capacitors $15 \mu\text{F}$, $10\mu\text{F}$ and $3 \mu\text{F}$ are connected in series and series combination is connected across 10 V . When the capacitors are fully charged then the charge on $3 \mu\text{F}$ capacitor is.....
11. Three capacitors in series have equivalent capacitance of $2\mu\text{F}$. If one of the capacitors is removed the effective capacitance becomes $3 \mu\text{F}$ then the value of capacitance which is removed is μF
12. Two capacitors $3 \mu\text{F}$ and $6 \mu\text{F}$ are connected in series across 100 V d.c supply. Then the voltage across $3 \mu\text{F}$ capacitor will beV
13. Two capacitors $3 \mu\text{F}$ and $6 \mu\text{F}$ are in parallel and combination is connected across 100 V supply then the charge on $6 \mu\text{F}$ is
14. A Capacitor is charged to 100 mc and energy stored is 10 J then voltage across capacitor is
15. If the p.d between the plates is increased by 10% then energy stored in the capacitor increases by%
16. A charging time constant of RC circuit is time required by the capacitor voltage to rise from.....
17. The expression for the charging current while charging C through resistor R is

18. The expression for the discharged current through RC circuit when a charged C discharges is
19. The capacitor of 10 μF is discharged through a resistance of 100 k Ω then the time constant is
20. A capacitor of 5 μF is charged to 500 V and is discharged through R = 2 M Ω then the value of discharging current after 5 sec is

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ELECTROSTATICS MCQ ANSWERS KEY

QUESTION NO.	ANSWER	QUESTION NO.	ANSWER
1	D	16	C
2	B	17	A
3	C	18	C
4	B	19	B
5	A	20	D
6	A	21	A
7	D	22	A
8	B	23	D
9	C	24	A
10	A	25	C
11	B	26	B
12	D	27	A
13	C	28	C
14	A	29	B
15	A	30	C

Unit - 4

AC Fundamentals

1. A current is represented by $i = 100 \sin (314t - 30^\circ)$ A. The rms value of the current and frequency are, respectively
- (a) 100 A and 314 Hz (c) 70.7 A and 314 Hz
- (b) 100 A and 50 Hz (d) 70.7 A and 50 Hz
2. A current of 10 A is flowing through a circuit. The power factor is 0.5 lagging. The instantaneous value of the current can be written as
- (a) $i = 10 \sin 60^\circ$ A (c) $i = 14.14 \sin (wt - 60^\circ)$ A
- (b) $i = 10 \sin(wt-30^\circ)$ A (d) $i = 14.14 \sin (wt + 60^\circ)$ A

3. In a purely inductive circuit
- (a) Current lags the voltage by 90° by 90° (c) voltage lags the current by 90°
- (b) Current leads the voltage by 90° voltage by 180° (d) current lags the voltage by 180°
4. Form factor of an ac wave indicates
- (a) Low sharp or steep the wave shape is
- (b) Low symmetrical the wave shape is
- (c) Low flat the wave shape is
- (d) The degree of its conformity to sinusoidal form
5. Power consumed by a pure inductor is
- (a) Infinite (c) zero
- (b) Very high (d) very small
6. If form factor of a sinusoidal wave is 1.11, then the form factor of a triangular wave will
- (a) also be 1.11 (c) be more than 1.11
- (b) be less than 1.11 (d) be 1
7. A Voltage of $v = 100 \sin(314t - 30^\circ)$ is connected across a 10Ω resistor. The power dissipated in the circuit will be
- (a) 100,000 W (c) 500 W
- (b) 1000 W (d) 250 W
8. The average value of a sinusoidal current is
- (a) $2I_m/\pi$ (c) $I_m/2\pi$
- (b) I_m/π (d) $I_m^2/2\pi$
9. Form factor of an alternating wave form is the ratio of
- (a) rms value and average value
- (b) average value and rms value
- (c) maximum value and average value
- (d) maximum value and rms value

10. The form factor of a square wave is
(a) 1.11 (b) 1.0 (c) 0 (d) 1.414
11. Two sinusoidal waves are represented as $v_1 = 100 \sin (wt + 30^\circ)$ and $v_2 = 200 \sin (wt - 60^\circ)$. The phasor relationship between the voltages can be expressed as
(a) V_1 lags v_2 by 90° (c) v_1 leads v_2 by 30°
(b) V_2 lags v_1 by 90° (d) v_2 lags v_1 by 60°
12. The power factor of a purely resistive circuit is
(a) 1.0 (b) 0 (c) 0.1 (d) 0.5
13. A sinusoidal voltage is represented as $v = 141.4 \sin (628t - \pi/3)$ the rms value, frequency and phase angle are, respectively,
(a) 141.4 , 628, 60°
(b) 100, 100, -60°
(c) 141.4, 50, 60°
(d) 141.4, 100, 60°
14. One forth cycle of 50 Hz waveform corresponds to.....
(a) 10 msec
(b) 20 msec
(c) 1 msec
(d) 5 msec
15. For a 50 Hz alternating waveform, the angular frequency israd/sec.
(a) 314.16
(b) 50
(c) 0.126
(d) None of these

16. An instantaneous value of an alternating voltage having 50 Hz frequency and maximum value of 100 V at 0.01 sec is
- 100 V
 - $100\sqrt{2}$
 - $100/\sqrt{2}$
 - 0 V
17. A sinusoidal voltage has a magnitude of 200 V at 150° then its maximum value is.....
- 100 V
 - 400 V
 - 200 V
 - 300 V
18. An A.C. voltage is given by $100 \sin 314t$. The frequency is
- 50 Hz
 - 75 Hz
 - 25 Hz
 - 100 Hz
19. An alternating voltage is given by $v(t) = 150 \sin (wt + \frac{\pi}{3})$ V then its phase is
- 30°
 - 90°
 - 0°
 - 60°
20. For a pure resistance, impedance in rectangular form is
- $R - j X_L$
 - $R + j X_L$

- (c) $R + j 0$
- (d) $R - j X_c$
21. In a phasor diagram, the phasors representing different alternating quantities are drawn normally to represent their
- (a) Maximum value (b) r.m.s value (c) average value (d) none of the above
22. Two alternating quantities of the same frequency which attain their corresponding values at different instants are said to be
- (a) Out of phase (b) in phase (c) in quadrature (d) none of the above
23. With the increase in frequency, the capacitive reactance of the circuit
- (a) Increases (b) decreases (c) remains the same (d) none of the above
24. In a purely inductive circuit, if the supply frequency is doubled, the current will be
- (a) Doubled (b) reduced to half (c) four times as high (d) reduced to one fourth
25. Ohm is a unit of all of the following except
- (a) Inductance (b) resistance (c) inductive reactance (d) capacitive reactance
26. The instantaneous current is given by $I = 7.071 \sin (157.08t - \pi/4)$ amperes. The time for this current to reach its positive maximum value will be
- (a) 20 ms (b) 15 ms (c) 10 ms (d) 5 ms

27. An alternating current is represented by the expression $i = 10\sin(2\pi \cdot 60 \cdot t - \pi/6)$ amperes. What will be its instantaneous value at $t = 0$?
- (a) -8 A (b) -7 A (c) -6 A (d) -5 A
28. What will be the current taken by 100 μF capacitor when it is connected across a 230 V, 50 Hz supply?
- (a) 4.56 A (b) 5.45 A (c) 6.34 A (d) 7.23 A
29. A coil of negligible resistance and inductance of 0.5 H when connected to a 230 V, 50 Hz supply will draw a current of
- (a) 3.25 A (b) 2.36 A (c) 1.47 A (d) 0.58 A
30. For a sinusoidal alternating current with maximum value of 25 A, its r.m.s and average values are respectively...
- (a) 17.678 A , 15.93 A (b) 18.57 A, 16.82 A
(c) 19.46 A , 17.71 A (d) 20.35 A , 18.69 A

Answer KEY

Q. No	Answer
1	d
2	c
3	a
4	a
5	c
6	c
7	c

8	a
9	a
10	b
11	b
12	a
13	b
14	d
15	a
16	d
17	b
18	a
19	d
20	c
21	b
22	a
23	b
24	b
25	a
26	b
27	d
28	d
29	c
30	a