

Question Bank

APPLIED SCIENCE (22211) I SCHEME

For UT-1 And UT-2 (PHYSICS)

UNIT-1- MCQS ON CAPACITOR

1). Capacitor is a device used to _____

- a) store electrical energy
- b) vary the resistance
- c) store magnetic energy
- d) dissipate energy

View Answer a

Explanation: Capacitor is used to store the charge. It stores electrical energy between the plates.

2). Capacitor stores which type of energy?

- a) kinetic energy
- b) vibrational energy
- c) potential energy
- d) heat energy

View Answer c

Explanation: Capacitor store charge in between the plates. This charge is stationary so We can say Capacitor store potential energy.

3). Capacitor blocks _____ after long time.

- a) alternating current
- b) direct current
- c) both alternating and direct current
- d) neither alternating nor direct current

View Answer b

Explanation: Capacitor blocks direct current at steady state

4). Why does capacitor block dc signal at steady state?

- a) due to high frequency of dc signal
- b) due to zero frequency of dc signal
- c) capacitor does not pass any current at steady state
- d) due to zero frequency of dc signal

View Answer d

Explanation: Frequency of dc signal is zero. So, Capacitive reactance $X_c = 1/2\pi fc$ becomes infinite and capacitor behaves as open circuit for dc signal. Hence, capacitor block dc signal.

5). If a parallel plate capacitor of plate area $2m^2$ and plate separation $1m$ store the charge of $1.77 \times 10^{-11} C$. What is the voltage across the capacitor?

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

View Answer a

Explanation: $C = \epsilon_0 A/d$ On substituting values of d, A, we get $C = 2\epsilon_0$. $Q = CV$, $V = 1 V$.

6). Which of the following is a passive device?

- a) Transistor
- b) Rectifier
- c) Capacitor
- d) Vacuum Tubes

View Answer c

Explanation: Capacitor is a passive device as it consumes power rest all generate power so, they are active devices

7). What is the value of capacitance of a capacitor which has a voltage of 4V and has 16C of charge?

- a) 2F
- b) **4F**
- c) 6F
- d) 8F

8). For which medium capacitance is high?

- a) Air
- b) Mica
- c) Water
- d) Metal

View Answer d

Explanation: Metals are assumed to have a high value of dielectric constant so they have high capacitance.

9). What is the relation between current and voltage in a capacitor?

- a) $I = 1/C \int V dt$
- b) $I = C dv/dt$
- c) $I = 1/C dv/dt$
- d) $I = Ct$

View Answer b

Explanation: Current=rate of change of charge $I = dQ/dt$. $Q = CV$. C(capacitance) is constant for a given Capacitor so $I = C dv/dt$.

10). If 2V is supplied to a 3F capacitor, calculate the charge stored in the capacitor.

- a) 1.5C
- b) 6C
- c) 2C
- d) 3C

View Answer b

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $Q = CV$. $Q = 3 \times 2 = 6C$.

11). Calculate the current in the capacitor having 2V supply voltage and 3F capacitance in seconds.

- a) 2A
- b) 5A
- c) 6A
- d) 3A

View Answer d

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $Q = CV$. $Q = 3 \times 2 = 6C$. $I = Q/t = 6/2 = 3A$

12). A 4microF capacitor is charged to 120V, the charge in the capacitor would be?

- a) 480C
- b) 480microC
- c) 30C
- d) 30microC

View Answer b

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $Q = CV$. $Q = 4 \times 120 = 480 \text{microC}$.

13). For high frequencies, capacitor acts as _____

- a) Open circuit
- b) Short circuit
- c) Amplifier
- d) Rectifier

View Answer b

Explanation: Capacitive impedance is inversely proportional to frequency. Hence at very high frequencies, the impedance is almost equal to zero, hence it acts as a short circuit and there is no voltage across it.

14). For very low frequencies, capacitor acts as _____

- a) Open circuit
- b) Short circuit
- c) Amplifier
- d) Rectifier

View Answer a

Explanation: Capacitive impedance is inversely proportional to frequency. Hence at very low frequencies the impedance is almost infinity and hence acts as an open circuit and no current flows through it

15). A capacitor consists of _____

- a) Two conductors
- b) Two semiconductors
- c) Two dielectrics
- d) Two insulators

Answer: a

Explanation: A capacitor consists of two conductors connected in parallel to each other so that it can store charge in between the plates.

16). Capacitor preferred when there is high frequency in the circuits is _____

- a) Electrolyte capacitor
- b) **Mica capacitor**
- c) Air capacitor
- d) Glass capacitor

View Answer b

Explanation: Mica capacitors are preferred for high frequency circuits because they have low ohmic losses and less reactance.

20). Capacitance increases with _____

- a) Increase in plate area
- b) Decrease in plate area
- c) Increase in distance between the plates
- d) Increase in density of the material

View Answer a

Explanation: Capacitance is directly proportional to the plate area. Hence as the plate area increases, the capacitance also increases.

21). Capacitance increases with _____

- a) Increase in distance between the plates
- b) Decrease in plate area
- c) Decrease in distance between the plates
- d) Increase in density of the material

View Answer c

Explanation: Capacitance is inversely proportional to the distance between the two parallel plates. Hence, as the distance between the plates decreases, the capacitance increases.

22). Which among the following expressions relate charge, voltage and capacitance of a capacitor?

- a) $Q=C/V$
- b) $Q=V/C$
- c) $Q=CV$
- d) $C=Q^2V$

View Answer c

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $Q=CV$.

23). If a 2F capacitor has 1C charge, calculate the voltage across its terminals.

- a) 0.5V
- b) 2V
- c) 1.5V
- d) 1V

View Answer a

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $Q=CV$. $V=Q/C=1/2$ V=0.5V.

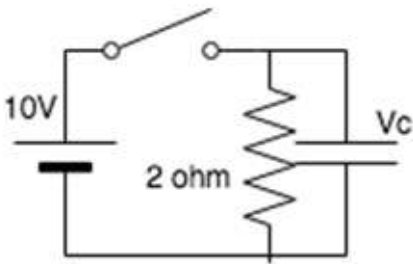
24). What is the voltage across a capacitor at the time of switching, that is, when $t=0$?

- a) Infinity
- b) 0V
- c) Cannot be determined
- d) 1V

View Answer b

Explanation: At the time of switching, when $t=0$, the capacitor acts as a short circuit. The voltage across a short is always equal to zero hence the voltage across the capacitor is equal to zero

25). What is the voltage across the capacitor if the switch is closed and steady state is reached?



- a) 8V
- b) 0V
- c) 10V
- d) Infinity

View Answer c

Explanation: When steady state is reached, the capacitor acts as an open circuit and the 10V source is connected in parallel to it. Hence $V_c = 10V$.

26). If one plate of a parallel plate capacitor is charged to positive charge the other plate is charged to?

- a) Positive
- b) Negative
- c) Positive or negative
- d) Not charged

View Answer b

Explanation: If one plate is charged to positive, the other plate is automatically charged to negative so that it can store electrical charge.

27). When the voltage across a capacitor increases, what happens to the charge stored in it?

- a) Increases
- b) Decreases
- c) Becomes zero
- d) Cannot be determined

View Answer a

Explanation: When the voltage across a capacitor increases, the charge stored in it also increases because a charge is directly proportional to voltage, capacitance being the constant of proportionality.

28). When will capacitor fully charged?

- a) When the voltage across its plates is half the voltage from ground to one of its plates
- b) When the current through the capacitor is a $1/\sqrt{2}$ time its value
- c) When the supply voltage is equal to the capacitor voltage
- d) Never

View Answer c

Explanation: When the capacitor voltage is equal to the supply voltage the current stops flowing through the circuit and the charging phase is over.

29). What happens to the current flow in a fully charged capacitor?

- a) Current flow stops
- b) Current flow doubles
- c) Current flow becomes half its original value
- d) Current flow becomes one-fourth its original value

View Answer a

Explanation: When a capacitor is fully charged, it does not store any more charge. There is no change in charge with time. Current is the rate of change of charge, hence it becomes zero, or stops.

30). Calculate the capacitance of a capacitor that stores 40 microC of charge and has a voltage of 2V.

- a) 20F
- b) 20 microF
- c) 10F
- d) 10 microF

[View Answer b](#)

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $C=Q/V$. $C=40\mu\text{C}/2\text{V}=20\mu\text{F}$.

31). What happens to the capacitance when the voltage across the capacitor increases?

- a) Decreases
- b) Increases
- c) Becomes 0
- d) No effect

[View Answer d](#)

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Capacitance is a constant so it will not change on changing voltage

*32). A power factor of a circuit can be improved by placing which, among the following, in a circuit?

- a) Inductor
- b) Capacitor
- c) Resistor
- d) Switch

[View Answer b](#)

Explanation: Power factor = Real power/Apparent power = kW/kVA By adding a capacitor in a circuit, an additional kW load can be added to the system without altering the kVA. Hence, the power factor is improved.

33). When the supply frequency increases, what happens to the capacitive reactance in the circuit?

- a) Increases
- b) Decreases
- c) Remains the same
- d) Becomes zero

[View Answer b](#)

Explanation: The expression for capacitive reactance is: $X_c=1/(2\pi f C)$. This relation Shows, that frequency is inversely related to capacitive reactance. Hence, as supply frequency increases, the capacitive reactance decreases.

34). Calculate the time constant of a series RC circuit consisting of a $100\mu\text{F}$ capacitor in series with a 100 ohm resistor.

- a) 0.1 sec
- b) 0.1 m sec
- c) 0.01 sec
- d) 0.01 m sec

[View Answer c](#)

Explanation: The time constant of a RC circuit= $R \times C= 100 \times 10^{-6} \times 100=0.01 \text{ sec}$

35). Capacitors charge and discharge in _____ manner.

- a) Linear
- b) Constant
- c) Square
- d) Exponential

[View Answer d](#)

Explanation: Capacitors charge and discharge in an exponential manner because of the relation: $X_c=1/(2\pi f C)$ and $Q=CV \therefore Q=V/(2\pi f X_c)$ X_c is complex which can be written in the form of exponent through Euler formula.

36). Air has a dielectric constant of _____

- a) Unity
- b) Zero
- c) Infinity
- d) Hundred

[View Answer a](#)

Explanation: Dielectric constant of air is the same as that of a vacuum which is equal to unity. Dielectric constant of air is taken as the reference to measure the dielectric constant of all other materials

37). What is the value of capacitance of a capacitor which has a voltage of 4V and has 8C of charge?

- a) 2F
- b) 4F
- c) 6F
- d) 8F

[View Answer a](#)

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $Q=CV$. From the relation, $C=Q/V= 8/4=2\text{F}$.

38). Unit of capacitance is _____

- a) Volts
- b) Farad
- c) Henry
- d) Newton

View Answer b

Explanation: Volts is the unit of voltage, Henry for inductance and Newton for a force. Hence the unit for capacitance is Farad

39). What will happen to the capacitor just after the source is removed?

- a) It will not remain in its charged state
- b) It will remain in its charged state
- c) It will start discharging
- d) It will become zero

View Answer b

Explanation: As soon as the source is removed, the capacitor does not start discharging it remains in the same charged state.

40). Which among the following equations is incorrect?

- a) $Q=CV$
- b) $Q=C/V$
- c) $V=Q/C$
- d) $C=Q/V$

View Answer b

Explanation: Q is directly proportional to V. The constant of proportionality in this case is C, that is, the capacitance. Hence $Q=CV$. From the given relation we can derive all the equations except for $Q=C/V$.

41). Capacitance is directly proportional to _____

- a) Area of cross section between the plates
- b) Distance of separation between the plates
- c) Both area and distance
- d) Neither area nor distance

View Answer a

Explanation: The relation between capacitance, area and distance between the plates is: $C=\epsilon_0 XA/D$. According to this relation, the capacitance is directly proportional to the area.

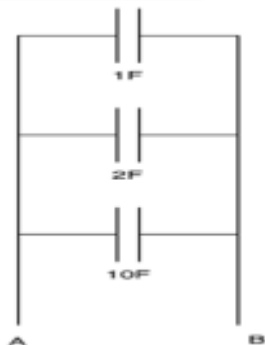
42). What is the total capacitance when three capacitors, C₁, C₂ and C₃ are connected in parallel?

- a) $C_1/(C_2+C_3)$
- b) $C_1+C_2+C_3$
- c) $C_2/(C_1+C_3)$
- d) $1/C_1+1/C_2+1/C_3$

View Answer b

Explanation: When capacitors are connected in parallel, the total capacitance is equal to the sum of the capacitance of each of the capacitors. Hence $C_{\text{total}}=C_1+C_2+C_3$.

43). Calculate the total capacitance.

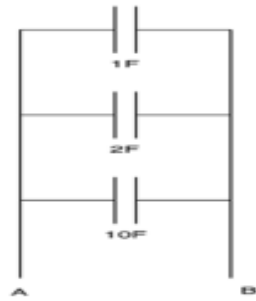


- a) 10F
- b) 15F
- c) 13F
- d) 20F

View Answer c

Explanation: The equivalent capacitance when capacitors are connected in parallel is the sum of all the capacitors = $1+2+10=13F$.

44). Calculate the voltage across AB if the total charge stored in the combination is 13C.



a) 1V

b) 2V

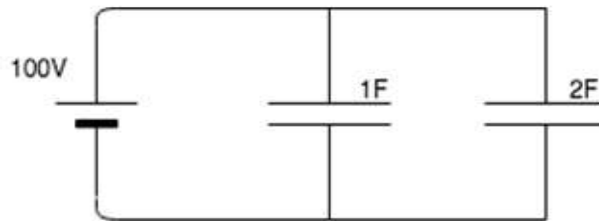
c) 3V

d) 4V

[View Answer](#)

Explanation: The equivalent capacitance when capacitors are connected in parallel is the sum of all the capacitors = $1 + 2 + 10 = 13\text{F}$. $V = Q/C = 13/13 = 1\text{V}$.

45). Calculate the charge in the 2F capacitor.



a) 200C

b) 100C

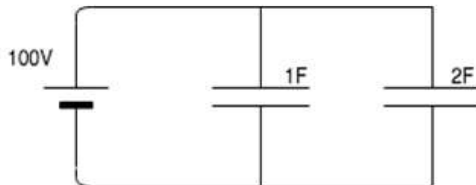
c) 300C

d) 400C

[View Answer](#)

Explanation: Since the capacitors are connected in parallel, the voltage across each is the same, it does not get divided. $Q = CV = 2 \times 100 = 200\text{C}$.

46). Calculate the charge in the 1F capacitor.



a) 200C

b) 100C

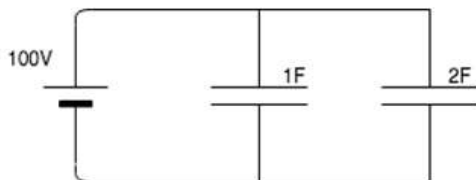
c) 300C

d) 400C

[View Answer](#)

Explanation: Since the capacitors are connected in parallel, the voltage across each is the same, it does not get divided. $Q = CV = 1 \times 100 = 100\text{C}$.

47). Calculate the total charge of the system.



a) 200C

b) 100C

c) 300C

d) 400C

View Answer c

Explanation: The equivalent capacitance when capacitors are connected in parallel is the sum of all the capacitors $= 1+2=3F$. $Q=CV= 3*100= 300V$.

48). When capacitors are connected in parallel, the total capacitance is always _____ the individual capacitance values.

- a) Greater than
- b) Less than
- c) Equal to
- d) Cannot be determined

View Answer a

Explanation: When capacitors are connected in parallel, the total capacitance is equal to the sum of the capacitance of each of the capacitors. Hence $C_{total}=C_1+C_2+C_3$. Since it is the sum of all the capacitance values, the total capacitance is greater than the individual capacitance values.

49). When capacitors are connected in parallel, what happens to the effective plate area?

- a) Increases
- b) Decreases
- c) Remains the same
- d) Becomes zero

View Answer a

Explanation: When capacitors are connected in parallel, the top plates of each of the capacitors are connected together while the bottom plates are connected to each other. This effectively increases the top plate area and the bottom plate area.

50). Three capacitors having a capacitance equal to 2F, 4F and 6F are connected in parallel. Calculate the effective parallel.

- a) 10F
- b) 11F
- c) 12F
- d) 13F

View Answer c

Explanation: When capacitors are connected in parallel, the total capacitance is equal to the sum of the capacitance of each of the capacitors. Hence $C_{total}=C_1+C_2+C_3= 2+4+6=12F$

51). Two capacitors having capacitance value 4F, three capacitors having capacitance value 2F and 5 capacitors having capacitance value 1F are connected in parallel, calculate the equivalent capacitance.

- a) 20F
- b) 19F
- c) 18F
- d) 17F

View Answer b

Explanation: When capacitors are connected in parallel, the total capacitance is equal to the sum of the capacitance of each of the capacitors. Hence $C_{total}=4+4+2+2+2+1+1+1+1+1=19F$.

52). What is the total capacitance when two capacitors C_1 and C_2 are connected in series?

- a) $(C_1+C_2)/C_1C_2$
- b) $1/C_1+1/C_2$
- c) $C_1C_2/(C_1+C_2)$
- d) C_1+C_2

View Answer c

Explanation: When capacitors are connected in series, the equivalent capacitance is:

$$1/C_{total}=1/C_1+1/C_2, \text{ therefore } C_{total}= C_1C_2/(C_1+C_2).$$

53). N capacitors having capacitance C are connected in series, calculate the equivalent capacitance.

- a) C/N
- b) C
- c) CN
- d) N/C

View Answer d

Explanation: When capacitors are connected in series, the equivalent capacitance is:

$$1/C_{total}= 1/C+1/C+1/C+.....N \text{ times.}$$

$$1/C_{total}=N/C.$$

$$C_{total}=C/N.$$

54). When capacitors are connected in series, the equivalent capacitance is _____ each individual capacitance.

- a) Greater than
- b) Less than
- c) Equal to
- d) Insufficient data provided

[View Answer b](#)

Explanation: When capacitors are connected in series, the equivalent capacitance is:

$1/C_{\text{total}} = 1/C_1 + 1/C_2$. Since we find the reciprocals of the sum of the reciprocals, the equivalent capacitance is less than the individual capacitance values.

55). What is the equivalent capacitance?



- a) 1.5F
- b) 0.667F
- c) 2.45F
- d) 2.75F

[View Answer b](#)

Explanation: When capacitors are connected in series,

$$1/C_{\text{total}} = 1/C_1 + 1/C_2 = 1/2 + 1 = 3/2$$

$$C_{\text{total}} = 2/3 = 0.667F.$$

56). When capacitors are connected in series _____ remains the same.

- a) Voltage across each capacitor
- b) Charge
- c) Capacitance
- d) Resistance

[View Answer b](#)

Explanation: When capacitors are connected in series, the charge remains the same because the same amount of current flow exists in each capacitor.

57). When capacitors are connected in series _____ Varies

- a) Voltage across each capacitor
- b) Charge
- c) Capacitance
- d) Resistance

[View Answer a](#)

Explanation: When capacitors are connected in series, the voltage varies because the voltage drop across each capacitor is different.

58). Four 10F capacitors are connected in series, calculate the equivalent capacitance.

- a) 1.5F
- b) 2.5F
- c) 3.5F
- d) 0.5F

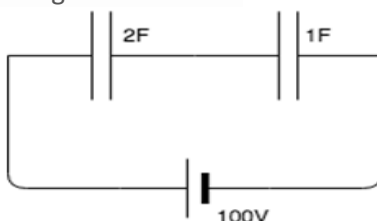
[View Answer b](#)

Explanation: When capacitors are connected in series,

$$1/C_{\text{total}} = 1/C_1 + 1/C_2 + 1/C_3 + 1/C_4 = 1/10 + 1/10 + 1/10 + 1/10 = 4/10F.$$

$$C_{\text{total}} = 10/4 = 2.5F.$$

59). Calculate the charge in the circuit.



- a) 66.67C
- b) 20.34C
- c) 25.45C
- d) 30.45C

[View Answer a](#)

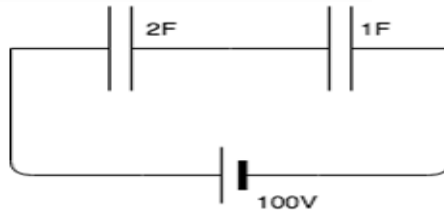
Explanation: When capacitors are connected in series, the equivalent capacitance is:

$$1/C_{\text{total}} = 1/C_1 + 1/C_2 = 1/2 + 1 = 3/2$$

$$C_{\text{total}} = 2/3 \text{ F}$$

$$Q = CV = (2/3) * 100 = 200/3 \text{ C} = 66.67 \text{ C}$$

60). Calculate the voltage across the 1F capacitor.



a) 33.33V

b) 66.67V

c) 56.56V

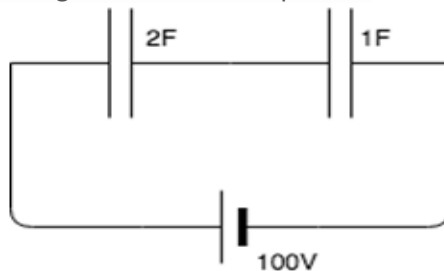
d) 23.43V

[View Answer b](#)

Explanation: When capacitors are connected in series, $1/C_{\text{total}} = 1/C_1 + 1/C_2 = 1/2 + 1 = 3/2$

$$Q = CV = (2/3) * 100 = 66.67 \text{ C. } V \text{ across the 1F capacitor} = 66.67/1 = 66.67 \text{ V}$$

61). Calculate the voltage across the 2F capacitor.



a) 33.33V

b) 66.67V

c) 56.56V

d) 23.43V

[View Answer a](#)

Explanation: When capacitors are connected in series,

$$1/C_{\text{total}} = 1/C_1 + 1/C_2 = 1/2 + 1 = 3/2 \dots$$

$$Q = CV = (2/3) * 100 = 66.67 \text{ C.}$$

$$V \text{ across the 2F capacitor} = 66.67/2 = 33.33 \text{ V.}$$

*62). The total voltage drop across a series of capacitors is _____

a) The voltage drop across any one of the capacitors

b) The sum of the voltage drop across each of the capacitors

c) The product of the voltage drop across each of the capacitors

d) Zero

[View Answer b](#)

Explanation: The total voltage drop across a series of capacitors is equal to the sum of the voltage drop across each of the capacitors because when capacitors are connected in series, the voltage drops across each capacitor

63). Capacitors C_1 , C_2 and C_3 have voltage drops 2V, 3V and 5V respectively. Calculate the total voltage in the circuit.

a) 10V

b) 2V

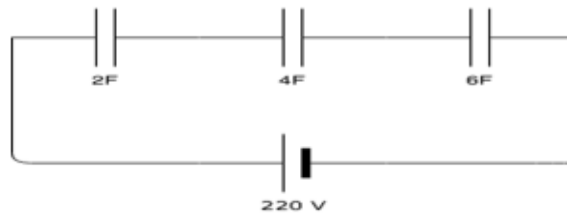
c) 5V

d) 0V

[View Answer a](#)

$$\text{Explanation: When capacitors are connected in series: } V_{\text{total}} = V_1 + V_2 + V_3 = 2 + 3 + 5 = 10 \text{ V.}$$

64). What is the voltage across the 2F capacitor?



- a) 240V
b) 200V
c) 220V
d) 120V

View Answer d

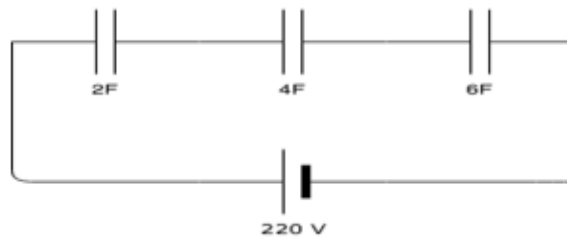
Explanation: Capacitors are in series.

$1/C = 1/2 + 1/4 + 1/6$, therefore, $C = (12/11)F$.

$Q = C \times V = 220 \times (12/11) = 240C$.

V across 2F capacitor = $Q/C = 240/2 = 120V$.

65). What is the voltage across the 4F capacitor?



- a) 120V
b) 60V
c) 100V
d) 220V

View Answer: b

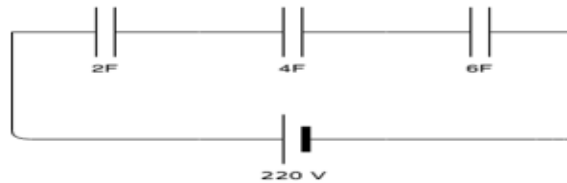
Explanation: Capacitors are in series.

$1/C = 1/2 + 1/4 + 1/6$, therefore, $C = (12/11)F$.

$Q = C \times V = 220 \times (12/11) = 240C$.

V across 4F capacitor = $Q/C = 240/4 = 60V$.

66). Calculate the voltage across the 6F capacitor.



- a) 120V
b) 60V
c) 40V
d) 220V

View Answer c

Explanation: Capacitors are in series.

$1/C = 1/2 + 1/4 + 1/6$, therefore, $C = (12/11)F$.

$Q = C \times V = 220 \times (12/11) = 240C$.

V across 6F capacitor = $Q/C = 240/6 = 40V$.

67). When capacitors are connected in series, which of the following rules are applied?

- a) Voltage divider
b) Current divider
c) Both voltage divider and current divider
d) Neither voltage divider nor current divider

View Answer a

Explanation: Voltage divider is the rule applied when capacitors are connected in series because when capacitors are connected in series, the voltage is different across each capacitor.

68). A capacitor does not allow sudden changes in _____

- a) Current
- b) Voltage
- c) Resistance
- d) Inductance

View Answer b

Explanation: Capacitor does not allow sudden changes in voltage because these changes occur in zero time which results in the current being infinity, which is not possible.

69). Which of the following expressions is correct with respect to the voltage across capacitors in series?

- a) $V_1/V_2 = C_2/C_1$
- b) $V_2/V_1 = C_2/C_1$
- c) $V_1 \times V_2 = C_1 \times C_2$
- d) $V_1/C_1 = V_2/C_2$

View Answer a

Explanation: When capacitors are connected in series, the charge across each capacitor remains the same whereas the voltage across each varies. When two capacitors are connected in series: $Q = V_1 C_1$; $Q = V_2 C_2$. Thus: $V_1/V_2 = C_2/C_1$.

70). Two 4F capacitors are connected in series, calculate the voltage across each if the total voltage is 20V.

- a) 10V
- b) 5V
- c) 20V
- d) 0V

View Answer: a

Explanation: The two capacitors have the same capacitance, hence the voltage gets divided equally. V across each = Total voltage/2 = $20/2 = 10V$.

71). Two capacitors having voltage 2F and 4F are connected in series. This combination is connected to a 100V supply, calculate the voltage across the 2F capacitor.

- a) 66.67V
- b) 33.33V
- c) 100V
- d) 0V

View Answer: a

Explanation: $C_{\text{total}} = 2 \times 4 / (2 + 4) = 4/3 F$, $Q = CV = (4/3) \times 100 = 400/3 C$.

V across 2F capacitor = $Q/C = (400/3)/2 = 200/3 = 66.67V$

72) Work done in charging a capacitor is _____

- a) QV
- b) $\frac{1}{2}QV$
- c) $2QV$
- d) QV^2

View Answer: b

Explanation: We know that work done = $Q^2/2C$. Substituting C as Q/V , we get work done = $Q/2V$.

73). Energy stored in 2000mF capacitor charged to a potential difference of 10V is?

- a) 100J
- b) 200J
- c) 300J
- d) 400J

View Answer: a

Explanation: From the expression: $WD = CV^2/2 = 100J$.

74). When do we get maximum energy from a set of capacitors?

- a) When they are connected in parallel
- b) When they are connected in series
- c) Both in series and parallel
- d) Insufficient information provided

View Answer: a

Explanation: We get maximum energy when capacitors are connected in parallel because the equivalent capacitance is larger than the largest individual capacitance when connected in parallel. The relation between capacitance and energy is: $\text{Energy} = CV^2/2$, hence as the capacitance increases, the energy stored in it also increases.

75). If the charge stored in a capacitor is 4C and the value of capacitance is 2F, calculate the energy stored in it.

- a) 2J
- b) 4J
- c) 8J
- d) 16J

View Answer: b

Explanation: The expression for finding the value of energy is:

$$U = Q^2 / 2C = 4 \times 4 / (2 \times 2) = 4J.$$

76). If the charge in a capacitor is 4C and the energy stored in it is 4J, find the value of capacitance.

a) 2F

b) 4F

c) 8F

d) 16F

View Answer: a

Explanation: The expression for finding the value of energy is: $U = Q^2 / 2C$. Substituting the values of U and Q, we get $C = 2F$.

78). If the charge in a capacitor is 4C and the energy stored in it is 4J, calculate the voltage across its plates.

a) 2V

b) 4V

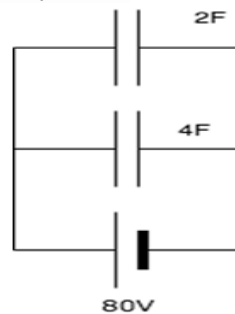
c) 8V

d) 16V

View Answer: a

Explanation: The expression for finding the value of energy is: $U = Q^2 / 2C$. Substituting the values of U and Q, we get $C = 2F$. $V = Q/C$, hence $V = 4/2 = 2V$.

79). Calculate the energy in the 2F capacitor.



a) 8.6Kj

b) 64kj

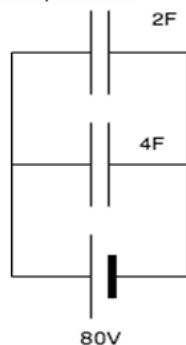
c) 64J

d) 6.4kj

View Answer: d

Explanation: From the expression: $W = CV^2 / 2 = 2 \times 80^2 / 2 = 6400J = 6.4kJ$.

80). Calculate the energy in the 4F capacitor.



a) 128kj

b) 1.28kj

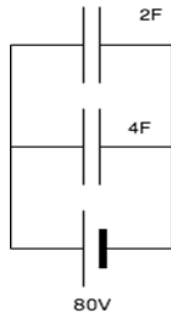
c) 12.8kj

d) 1280J

View Answer: c

Explanation: From the expression: $W = CV^2 / 2 = 4 \times 80^2 / 2 = 12800J = 12.8kJ$.

81). Calculate the energy stored in the combination of the capacitors.



- a) 192kJ
- b) 1.92kJ
- c) 19.2kJ
- d) 1920J

View Answer: c

Explanation: The equivalent capacitance is: $C_{eq} = 4 + 2 = 6F$. From the expression:
 $WD = CV^2/2 = 80^2/2 = 19200J = 19.2kJ$.

82). Calculate the capacitance if the dielectric constant=4, area of cross section= $10m^2$ and the distance of separation between the plates is 5m.

- a) $7.08 \times 10^{-11}F$
- b) $7.08 \times 10^{-11}F$
- c) $7.08 \times 10^{-12}F$
- d) $7.08 \times 10^{-10}F$

View Answer: a

Explanation: The expression to find capacitance when a dielectric is introduced between the plates is: $C = keOA/d$. Substituting the given values in the equation, we get $C = 7.08 \times 10^{-11}F$.

83). A dielectric is basically a _____

- a) Capacitor
- b) Conductor
- c) Insulator
- d) Semiconductor

View Answer: c

Explanation: A dielectric is basically an insulator because it has all the properties of an insulator.

84). What happens to the potential difference between the plates of a capacitor as the thickness of the dielectric

slab increases?

- a) Increases
- b) Decreases
- c) Remains the same
- d) Becomes zero

View Answer: b

Explanation: When a dielectric is introduced between the plates of a capacitor, its potential difference decreases. New potential difference= potential difference without dielectric-potential difference of dielectric. Hence as the thickness of the dielectric slab increases, a larger value is subtracted from the original potential difference.

85). Which of the following depends on charging and discharging rate of a capacitor?

- a) Time constant
- b) Current
- c) Power
- d) Voltage

View Answer: a

Explanation: The time constant in a circuit consisting of a capacitor is the product of the resistance and the capacitance. Smaller the time constant, faster is the charging and discharging rate and vice versa.

86). What is the initial current while charging a capacitor?

- a) High
- b) Low
- c) 0
- d) Cannot be determined

View Answer: a

Explanation: The initial current of a capacitor is very high because the voltage source will transport charges from one plate of the capacitor to the other plate.

87). What is the final current while charging a capacitor?

- a) High
- b) Zero
- c) Infinity
- d) Low

View Answer: b

Explanation: The final current is almost equal to zero while charging a capacitor because the capacitor is charged up to the source voltage.

88). A capacitor is charged to a voltage of 400V and has a resistance of 20ohm. Calculate the initial value of charging current.

- a) 10A
- b) 0A
- c) Infinity
- d) 20A

View Answer: d

Explanation: When the capacitor is charging the initial value if the current is $V/R = 400/20 = 20A$.

89). A capacitor is charged to a voltage of 400V and has a resistance of 20ohm. Calculate the initial value of the discharge current.

- a) 10A
- b) 0A
- c) Infinity
- d) 20A

View Answer: b

Explanation: When the capacitor is discharging the value of the initial current is zero.

90). A capacitor is charged to a voltage of 400V and has a resistance of 20ohm. Calculate the final value of the discharge current.

- a) 10A
- b) 0A
- c) Infinity
- d) 20A

View Answer: d

Explanation: In a discharging circuit, the final voltage is equal to zero for capacitor. For a resistor, final voltage is 400V. So, final current = $V/R = 400/20 = 20A$.

91). When will be capacitors fully charged?

- a) When voltage is zero
- b) When the supply voltage is equal to the capacitor voltage
- c) When voltage is infinity
- d) When capacitor voltage is equal to half the supply voltage

View Answer: b

Explanation: When the capacitor voltage is equal to the source voltage, it means that all the charges have moved from one plate of the capacitor to the other.

92). What happens to the capacitor when the capacitor voltage is equal to the source voltage?

- a) The charging phase of the capacitor is over
- b) The discharging phase of the capacitor is over
- c) The capacitor is switched off
- d) The capacitor is switched on

View Answer: c

Explanation: When the capacitor voltage is equal to the source voltage, it means that all the charges have moved from one plate of the capacitor to the other. Hence the capacitor is fully charged and we say it gets switched off.

93). A capacitor is charged to a voltage of 400V and has a resistance of 20ohm. Calculate the final value of charging current.

- a) 10A
- b) 0A
- c) Infinity
- d) 20A

View Answer: b

Explanation: When the capacitor is charging, the final voltage of the capacitor becomes equal to the voltage of source. Hence, the current becomes equal to zero.

94). A capacitor which is also known as a condenser is an arrangement of two conductors separated by-----

- a) Conductor
- b) semiconductor
- c) **Insulator**
- d) silver

95). The electric field between the conductors of capacitors is proportional to the-----

- a) current 'I'
- b) charge 'Q'
- c) area 'A'
- d) distance 'd'

96). Potential difference between two metal plates is defined as ---- in bringing unit positive charge from plate B to plate A against electric field.

- a) work done
- b) force applied
- c) time taken
- d) efforts taken

97). Potential difference between two metal plates of capacitor is----- strength of the charge 'Q' on conductor.

- a) directly proportional to
- b) inversely proportional to
- c) not proportional to
- d) equal to

98). Capacitance of capacity of a conductor is defined as the (CO1)

- a) ratio of potential to charge
- b) sum of potential and charge
- c) Product of charge and potential
- d) ratio of charge to potential

99). Capacitance of a capacitor is given by-----

- a) $C = V/Q$
- b) $C = Q/v$
- c) $C = QV$
- d) $V = QC$

100). capacitor of large capacitance holds-----

- a) small amount of charge at small potential
- b) large amount of charge at large potential
- c) large amount of charge at small potential
- d) small amount of charge at large potential

101). The maximum electric field that a dielectric medium can withstand without breakdown is called as -

- a) saturation field
- b) dielectric strength
- c) utmost field
- d) optimized field

102). For a capacitor to store large amount of charge without leakage its capacitance should be high but-

- a) potential difference (electric field) should be within breakdown limit.
- b) potential difference (electric field) should not be less than certain limit.
- c) potential difference (electric field) should be equal to certain limit.
- d) none of these

103). Capacitor stores -----

- a) large charge at lower potential
- b) small charge at higher potential
- c) small charge at small potential
- d) large charge at higher potential

104). Capacity of parallel plate condenser is given by

- a) $C = \epsilon_0 kAd$
- b) $C = \frac{kA}{\epsilon_0 d}$
- c) $C = \frac{\epsilon_0 kA}{d}$
- d) $C = \frac{\epsilon_0 kd}{A}$

- 105). Capacitance of a condenser is directly proportional to-----
a) area of metal plate
b) distance between two plates
c) potential difference between plates
d) current through the circuit.
- 106). Capacitance of a condenser is directly proportional to-----
a) distance between two plates
b) dielectric material between them
c) potential difference between plates
d) current through the circuit.
- 107). Capacitance of a condenser is inversely proportional to-----
a) area of metal plate
b) dielectric material between them
c) potential difference between plates
d) current through the circuit
- 108). Dipole moment produced in dielectric material does not cancel external electric field but-----
a) only reduces it
b) increases it
c) maintains it
d) none of these
- 109) Capacitance of Capacitor with dielectric material 'k' is ----- capacitance of a capacitor
Without dielectric {i.e. air}
a) K times more than
b) k times less then
c) Equal to
d) twice
- 110) Law of condensers in series states that reciprocal of equivalent capacitance of series combination is equal to-----
a) sum of reciprocal of capacitances of condensers in series
b) sum of capacitances of condensers in series
c) product of capacitances of condensers in series
d) ratio of capacitances of condensers in series
- 111). Equivalent capacitance of series combination is given by-----
a) $C_s = C_1 + C_2 + C_3$
b) $C_s = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$
c) $\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$
d) $\frac{1}{C_s} = \frac{1}{C_1 \times C_2 \times C_3}$
- 112). Law of condensers in parallel states that reciprocal of equivalent capacitance of parallel combination is equal
to-----
a) sum of capacitances of condensers
b) product of capacitances of condensers
c) sum of reciprocals of individual capacitances
d) ratio of individual capacitances
- 113). Equivalent capacitance of parallel combination is given by-----
a) $C_p = C_1 + C_2 + C_3$
b) $C_p = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$
c) $\frac{1}{C_p} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$
d) $\frac{1}{C_p} = \frac{1}{C_1 \times C_2 \times C_3}$
- 114). Energy of charged condenser is given by
a) $E = 2CV^2$
b) $E = 1/2 CV$
c) $E = 1/2 CV^2$
d) $E = 1/2 C^2 V$
- 115). Energy of charged condenser is given by
a) $E = 2Q^2/C$
b) $E = Q^2/2 C$
c) $E = Q/2 C^2$
d) $E = 1/2 QC$
- 116) E.M.F of a cell is defined as the potential difference between two terminals of the cell when

- a) The circuit is close b) the circuit is open
c) High current is drawn d) low resistance is connected
- 117). The opposition offered by electrolyte to flow of charges from negative electrode to positive electrode of a cell through electrolyte is called as.....
a) External resistance b) circuit resistance
c) Internal resistance of cell d) none of these
- 118). Kirchhoff's 1st Law or junction rule state that in any network of conductor in an electrical circuit
a) Product of current is 0 b) algebraic sum of potential is 0
c) Algebraic sum of current is 0 d) product of potential is 0
- 119). Kirchhoff's 2nd Law or loop rule state's that in a close loop of network of conductor , the algebraic sum of product of current and resistance of each part of close loop is
a)product of e. m. f. in the circuit b) ratio of e. m. f. in the circuit
c) algebraic sum of e. m. f. in the circuit d)sum of currents
- 120). Balancing condition of wheatstone's network with R_1, R_2, R_3 and R_4 in cyclic order is.....
a) $\frac{R_1}{R_2} = \frac{R_3}{R_4}$ b) $\frac{R_1}{R_2} = \frac{R_4}{R_3}$
c) $\frac{R_1}{R_4} = \frac{R_3}{R_2}$ d) $R_1 R_2 = R_3 R_4$
- 121). Principle of potentiometer is fall of potential is.....
a) directly proportional to length of wire b) inversely proportional to length of wire
c) directly proportional to area of wire d) inversely proportional to area of wire
- 122). If area of metal plates of capacitor with capacitance C is doubled then capacitance will become—
a) C b) 2C
c) 3C d) C/2
- 123). If area of metal plates of capacitor with capacitance C is reduced to half then capacitance will become—
a) C b) 2C
c) 3C d) C/2
- 124). If distance between two metal plates of capacitors with capacitance C is doubled then capacitance will become—
a) C b) 2C
c) 3C d) C/2
- 125). If distance between two metal plates of capacitors with capacitance C is halved then capacitance will become—
a) C b) 2C
c) 3C d) C/2
- 126).A capacitor of capacitance 'C' having air as a dielectric is taken , Now dielectric material of dielectric constant k=3 is introduced between two metal plates, then capacitance will become----
a)C/3 b) 3C c)C/6 d) 6C
- 127).If area of parallel plat condenser is 1m^2 and distance between plates is 0.1mm then capacitance

of condenser if its dielectric constant is 5 and $\epsilon_0 = 8.9$ will be.....

- a) 44.5 b) 44.5 c) 44.5 d) 44.5

128) If two capacitors of capacitance $6 \mu\text{F}$ each are connected in series then its equivalent capacitance will be.....

- a) $1 \mu\text{F}$ b) $2 \mu\text{F}$
c) $3 \mu\text{F}$ d) $4 \mu\text{F}$

129) If three capacitors of capacitance $9 \mu\text{F}$ each are connected in series then its equivalent capacitance will be.....

- a) $1 \mu\text{F}$ b) $2 \mu\text{F}$
c) $3 \mu\text{F}$ d) $4 \mu\text{F}$

130). If two capacitors of capacitance C each are connected in series then its capacitance will be.....

- a) C b) $C/3$
c) $C/2$ d) $C/4$

130). If three capacitors of capacitance C each are connected in series then its capacitance will be.....

- a) C b) $C/3$
c) $C/2$ d) $C/4$

130). If four capacitors of capacitance C each are connected in parallel then its equivalent capacitance will be.....

- a) $1 C$ b) $2 C$
c) $3 C$ d) $4 C$

131). If a capacitor of capacity $20 \mu\text{F}$ is connected across 10V battery then charge drawn by a capacitor will be.....

- a) $50 \mu\text{C}$ b) $100 \mu\text{C}$
c) $200 \mu\text{C}$ d) $300 \mu\text{C}$

132) Two condensers have equivalent capacitance of $8 \mu\text{F}$ when connected in parallel and $2 \mu\text{F}$ when connected in series then individual capacitances will be.....

- a) $2 \mu\text{F}$, $4 \mu\text{F}$ b) $4 \mu\text{F}$, $4 \mu\text{F}$
c) $1 \mu\text{F}$, $8 \mu\text{F}$ d) $1 \mu\text{F}$, $1 \mu\text{F}$

133). If a battery of e.m.f. 10V is connected across a resistance of 100 ohm drop a resistance observed across a resistance is 9.8V , then internal resistance of a cell will be.....

- a) 2 ohm b) 5 ohm
c) 10 ohm d) 20 ohm

134). When a number of capacitances connected in series then effective capacitance.....

- a) Increases b) decreases
c) remain same d) Increases or decreases

135). A $10 \mu\text{F}$ capacitor is connected to 10V battery, electrostatic energy stored in the capacitor will be...

- a) $100 \times 10^{-6} \text{ J}$ b) $500 \times 10^{-6} \text{ J}$

- c) $1000 \times 10^{-6} J$ d) $250 \times 10^{-6} J$
- 136). Two capacitance $4\mu F$ and $8\mu F$ are first connected in series and then parallel their equivalent capacitance are _____ and _____ respectively.
- a) $2.66\mu F$, $12\mu F$ b) $12\mu F$, $2.66\mu F$
 c) $4\mu F$, $12\mu F$ d) $12\mu F$, $4\mu F$
- 137) Three capacitors each of capacity C are connected. The resultant capacity ($2C/3$) can be obtained by connecting _____.
- a) all of them in series
 b) all of them in parallel
 c) Two of them in parallel and third in series with this combination
 d) Two of them in series and third in parallel across this
- 138) If the area of metal plates of capacitor with capacitance C is doubled, then capacitance will become _____.
- a). C b) $2C$
 c) $4C$ d) $C/2$
- 139). A capacitor of capacity $50\mu F$ is connected across a supply of $5V$. Find the energy stored in the capacitor.
- a) $625\mu J$ b) $6.25 J$
 c) $62.5 J$ d) $125\mu J$
- 140). When condensers are connected in parallel, _____ gets divided into a number of parts.
- a) charge b). current
 c) Both (A) and (B) d) potential
- 141). The algebraic sum of voltages around any closed path in network is equal to _____.
- a) Infinity b) -1
 c) 0 d) $+1$
- 142). The unit for dielectric strength is _____
- a) V/m^2 b) MV/m^2
 c) MV/m d) Vm

Answer: c

Explanation: Dielectric strength is the potential gradient required to cause a breakdown in the material. Potential gradient is the ratio of voltage and length, its unit is MV/m .

143) If the Voltage increases, what happens to dielectric strength?

- a) Increases b) Decreases
 c) Remains the same d) Becomes zero

Answer: a

Explanation: Dielectric strength is the potential gradient required to cause a breakdown in the material. Potential gradient is the ratio of voltage and length. Hence as potential increases, dielectric strength also increases.

144). If the potential difference in a material is $4MV$ and the thickness of the material is $2m$, calculate the dielectric strength.

- a) $2MV/m$ b) $4MV/m$
 c) $6MV/m$ d) $8MV/m$

Answer: a

Explanation: Dielectric strength is the potential gradient required to cause a breakdown in the material. Potential gradient is the ratio of voltage and thickness. Dielectric strength= $V/t = 4/2 = 2\text{MV/m}$.

145). If the dielectric strength of a material is 4MV/m and its potential difference is 28MV, calculate the thickness of the material.

- | | |
|-------|--------|
| a) 4m | b) 7m |
| c) 5m | d) 11m |

Answer: b

Explanation: Dielectric strength is the potential gradient required to cause a breakdown in the material. Potential gradient is the ratio of voltage and thickness. $V/\text{dielectric strength} = t = 28/4 = 7\text{m}$.

146). If the thickness of the material increases, what happens to the dielectric strength?

- | | |
|---------------------|-----------------|
| a) Increases | b) Decreases |
| c) Remains the same | d) Becomes zero |

Answer: b

Explanation: Dielectric strength is the potential gradient required to cause a breakdown in the material. Potential gradient is the ratio of voltage and thickness. Hence as thickness increases, dielectric strength decreases.

147). The thickness of a material having dielectric strength 10MV/m is 5m, calculate the potential difference.

- | | |
|---------|----------|
| a) 2MV | b) 10MV |
| c) 50MV | d) 100MV |

Answer: c

Explanation: Dielectric strength is the potential gradient required to cause a breakdown in the material. Potential gradient is the ratio of voltage and thickness. $V = t * \text{dielectric strength} = 5 * 10 = 50\text{MV}$.

148). Which medium has the highest dielectric strength?

- | | |
|----------|----------|
| a) Water | b) Mica |
| c) Air | d) Glass |

Answer: c

Explanation: The better material is to prevent electrical conductivity, higher the dielectric strength. And the air is the best insulator so it has high dielectric strength.

149). Leakage in capacitors is primarily caused by _____

- | | |
|----------------|--------------|
| a) Transistors | b) Resistors |
| c) Inductors | d) DC motors |

View Answer: a

Explanation: Leakage is primarily caused due to electronic devices, such as transistors, connected to the capacitors. Transistors conduct a small amount of current even when they are turned off, hence they are responsible for leakage current.

150). What is the conduction current when a capacitor is fully charged?

- | | |
|-------------|----------|
| a) Infinity | b) Zero |
| c) 100A | d) 1000A |

Answer: b

Explanation: When a capacitor is fully charged, there is no conduction of electrons from one plate of the capacitor to another, hence there is no conduction current and conduction current is equal to zero.

151). The flow of electrons in dielectric is due to _____

- | | |
|---------------|-------------------------|
| a) Conduction | b) Potential difference |
| c) Breakdown | d) Resistance |

Answer: c

Explanation: There is, under normal circumstance, no flow of electrons in a dielectric since a dielectric is basically an insulator. Hence, there is a flow of electrons in a dielectric only at breakdown voltage.

152). The flow of electrons which does not pass through the battery is known as _____

- a) Displacement current
- b) Leakage current
- c) Either displacement or leakage current
- d) Neither displacement nor leakage current

Answer: a

Explanation: Displacement current is the flow of electrons from the positive plate of the capacitor to the negative plate of the capacitor, not through the battery. Hence the type of current which flows without passing through the battery is displacement current.

153). The free electrons in practical dielectrics is due to _____

- a) There are no free electrons
- b) Conductors
- c) Impurities
- d) Both conductors and impurities

Answer: c

Explanation: Ideally, dielectrics are insulators and do not contain any free electrons. But no dielectric is a perfect dielectric, hence the free electrons are due to impurities present in each dielectric.

154). The current in conductors connecting the voltage source to the plates of a capacitor is _____

- a) Conduction current
- b) Leakage current
- c) Charging current
- d) Zero

Answer: c

Explanation: The current in conductors connecting the voltage source to the plates of a capacitor is the charging current and not the conduction or leakage current.

155). What is the type of current where the electrons actually move?

- a) Displacement current
- b) Conduction current
- c) Both conduction and displacement current
- d) Neither conduction nor displacement current

current

Answer: b

Explanation: Conduction current is the current caused by the actual flow of electrons and displacement current is the current where no charge carriers are involved.

156). What is the type of current caused due to variations in the field?

- a) Displacement current
- b) Conduction current
- c) Both conduction and displacement current
- d) Neither conduction nor displacement current

Answer: a

Explanation: Displacement current is the current where no charge carriers are involved. It is caused due to variations in the electric field.

157). Under normal conditions capacitors have _____

- a) Displacement current
- b) Conduction current
- c) Both conduction and displacement current
- d) Neither conduction nor displacement current

Answer: a

Explanation: Under normal conditions capacitors contain an insulating material called dielectric sandwiched between the plates of the capacitor. Since insulators can carry only an electric field but not moving carriers, therefore normally a capacitor has displacement current and not conduction current.

158). If a large amount of voltage is applied to a capacitor, what is the current that flows through it?

- a) Displacement current
- b) Conduction current
- c) Both conduction and displacement current
- d) Neither conduction nor displacement current

Answer: b

Explanation: When a large amount of voltage is applied between the plates of a capacitor, the dielectric between the plates does not behave as an insulator anymore and starts conducting and conduction currents flow through it.

159). The current in conductors connecting the voltage source to the plates of a capacitor is _____

- a) Conduction current
- b) Leakage current

c) Charging current

d) Displacement current

Answer: c

Explanation: The current in conductors connecting the voltage source to the plates of a capacitor is the charging current and not the conduction or leakage current.

160). The flow of electrons which does not pass through the battery is known as _____

a) Conduction current

b) Leakage current

c) Charging current

d) Displacement current

Answer: a

Explanation: Conduction current is the flow of electrons from the positive plate of the capacitor to the negative plate of the capacitor, not through the battery. Hence the type of current which flows without passing through the battery is conduction current.

161). Paper capacitor is a type of _____

a) Fixed capacitor

b) Variable capacitor

c) Either fixed or variable depending on its usage

d) Neither fixed nor variable

Answer: a

Explanation: Paper capacitors are fixed capacitors because, like fixed capacitors, its capacitance value remains constant. In paper capacitors, paper is used as the dielectric.

162). A capacitor using chemical reactions to store charge is _____

a) Paper capacitor

b) Ceramic capacitor

c) Polyester capacitor

d) Electrolyte capacitor

Answer: d

Explanation: Electrolyte capacitors use chemical processes like pyrolysis to store charge between its plates.

163). Which, among the following, is the odd one out?

a) Ceramic capacitor

b) Electrolyte capacitor

c) Tuning capacitor

d) Paper capacitor

Answer: c

Explanation: Ceramic capacitor, electrolyte capacitor and paper capacitor are fixed capacitors whereas tuning capacitors is a variable capacitor, hence it is the odd one out.

164). In a variable capacitor, capacitance can be varied by _____

a) Turning the rotatable plates in or out

b) Sliding the rotatable plates

c) Changing the plates

d) Changing the

material of plates

Answer: a

Explanation: As the plates are rotated, the area of the plates between which the field exists, will vary. Capacitance depends on area, hence as area varies, capacitance also varies.

165). The simplest kind of capacitor is _____

a) Ceramic capacitor

b) Electrolyte capacitor

c) Tuning capacitor

d) Paper capacitor

Answer: d

Explanation: The paper capacitor consists of two strips of aluminium foil separated by sheets of waxed paper. This whole setup is rolled up into the form of a cylinder. Since the materials required for its construction are easily available, it is the simplest kind of capacitor.

167). Capacitor preferred when there is high frequency in the circuits is _____

a) Electrolyte capacitor

b) Mica capacitor

c) Air capacitor

d) Glass capacitor

Answer: b

Explanation: Mica capacitors are preferred for high frequency circuits because they have low ohmic losses and less reactance.

168). The type of capacitors used in communication transmitters are?

- a) Electrolyte capacitor
- b) Variable capacitor
- c) Air capacitor
- d) Glass capacitor

Answer: b

Explanation: Variable capacitor is used to tune all the circuits to same frequency i.e. resonance frequency so they are used in communication transmitters.

169). Which capacitors relatively costly?

- a) Electrolyte capacitor
- b) Mica capacitor
- c) Air capacitor
- d) Glass capacitor

Answer: b

Explanation: Mica capacitors are relatively expensive because it consists either of alternate layers of mica and metal foil clamped tightly together, or of thin films of silver on the two sides of a mica sheet. Silver is an expensive metal, hence mica capacitors are expensive.

170). _____ capacitors usually have a colour code to find its value.

- a) Electrolyte capacitor
- b) Variable capacitor
- c) Polyester capacitor
- d) Glass capacitor

Answer: c

Explanation: Polyester capacitors usually come with a colour code because they are very small and their values cannot be printed on its body.

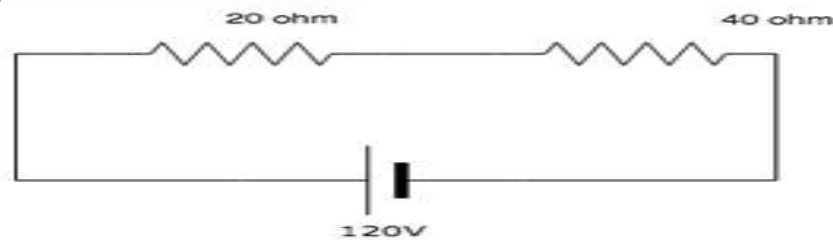
180). _____ capacitors have a high leakage voltage.

- a) Electrolyte capacitor
- b) Variable capacitor
- c) Air capacitor
- d) Polyester capacitor

Answer: d

Explanation: Polyester capacitors can operate at high voltages, that is, a few thousand volts and the leakage resistance is high, that is, usually 100 M.

181) Find the current in the circuit.



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

Answer: b

Explanation: $I = V/R$. Total resistance $R = 20 + 40 = 60 \text{ ohm}$. $V = 120 \text{ V}$. $I = 120/60 = 2 \text{ A}$.

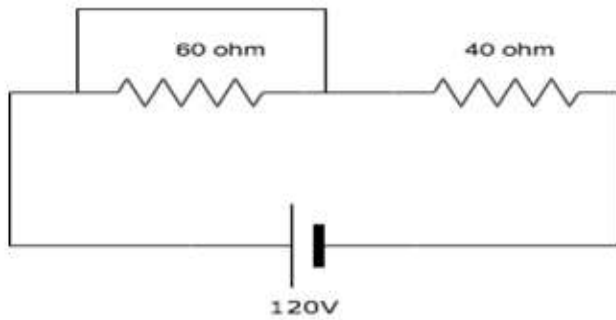
182). In a series circuit, which of the parameters remain constant across all circuit elements such as resistor, capacitor and inductor etcetera?

- a) Voltage
- b) Current
- c) Both voltage and current
- d) Neither voltage nor current

Answer: b

Explanation: In a series circuit, the current across all elements remain the same and the total voltage of the circuit is the sum of the voltages across all the elements.

183). Voltage across the 60ohm resistor is_____

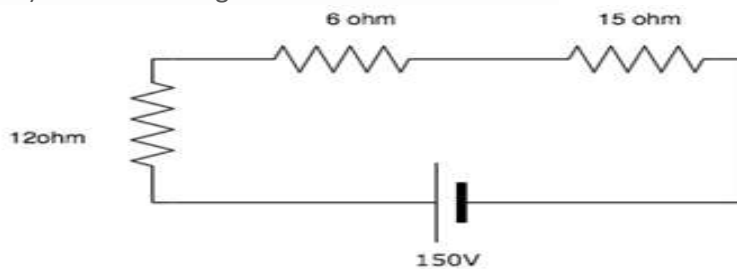


- a) 72V
c) 48V
- b) 0V
d) 120V

Answer: b

Explanation: The 60ohm resistance is shorted since current always choses the low resistance path. Voltage across short circuit is equal to zero, hence voltage across the resistor is 0.

184). Find the voltage across the 6 ohm resistor.



- a) 150V
b) 181.6V
c) 27.27V
d) 54.48V

Answer: c

Explanation: Total current $I = 150 / (6 + 12 + 15) = (150 / 33) \text{ V}$.

$$V \text{ across } 6 \text{ ohm} = 6 * I = 6 * (150/33)V = 27.27V.$$

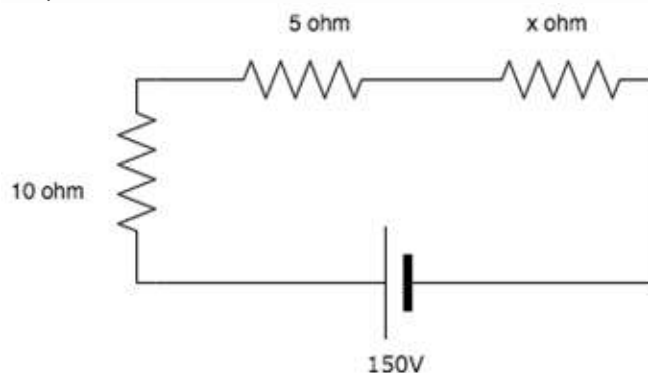
185). If there are two bulbs connected in series and one blows out, what happens to the other bulb?

- a) The other bulb continues to glow with the same brightness
- b) The other bulb stops glowing
- c) The other bulb glows with increased brightness
- d) The other bulb also burns out

Answer: b

Explanation: Since the two bulbs are connected in series, if the first bulb burns out there is a break in the circuit and hence the second bulb does not glow.

186). What is the value of x if the current in the circuit is 5A?



- a) 15 ohm
- c) 55 ohm

- b) 25 ohm
- d) 75 ohm

Answer: a

Explanation: Total voltage=sum of voltages across each resistor. $\Rightarrow 150 = 10 \cdot 5 + 5 \cdot 5 + 5 \cdot x$. Solving the equation, we get $x = 15$ ohm.

187). A voltage across a series resistor circuit is proportional to?

- a) The amount of time the circuit was on for
- b) The value of the resistance itself
- c) The value of the other resistances in the circuit
- d) The power in the circuit

Answer: b

Explanation: $V = IR$ hence the voltage across a series resistor circuit is proportional to the value of the resistance.

188). Many resistors connected in series will?

- a) Divide the voltage proportionally among all the resistors
- b) Divide the current proportionally
- c) Increase the source voltage in proportion to the values of the resistors
- d) Reduce the power to zero

Answer: a

Explanation: In a series circuit, the current remains the same across all resistors hence the voltage divides proportionally among all resistors.

189). What is the voltage measured across a series short?

- a) Infinite
- b) Zero
- c) The value of the source voltage
- d) Null

Answer: b

Explanation: A short is just a wire. The potential difference between two points of a wire is zero hence the voltage measured is equal to zero.

190). What happens to the current in the series circuit if the resistance is doubled?

- a) It becomes half its original value
- b) It becomes double its original value
- c) It becomes zero
- d) It becomes infinity

Answer: a

Explanation: $I = V/R$. If R becomes $2R$ then I becomes $I/2$ i.e. half of its original value.

191). If two bulbs are connected in parallel and one bulb blows out, what happens to the other bulb?

- a) The other bulb blows out as well
- b) The other bulb continues to glow with the same brightness
- c) The other bulb glows with increased brightness
- d) The other bulb stops glowing

Answer: b

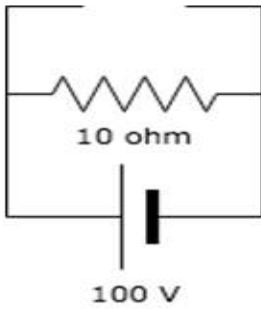
Explanation: If one bulb blows out, it acts as an open circuit. Current does not flow in that branch but it continues to flow in the other branch of the parallel circuit. Hence the other bulb continues to glow. Also the voltage across other bulb remains the same due to which power delivered to it remains the same so it continues to glow with the same brightness.

A circuit diagram showing a 200V DC voltage source connected in series with a parallel combination of three resistors. The resistors are labeled 20 ohm, 10 ohm, and 30 ohm.

-
- 120 V
- 4 ohm
- 3 ohm
- 2 ohm
- 1 ohm
- 5 ohm

- Explanation: The 1 ohm and 2 ohm resistor are in series which is in parallel to the 3 ohm resistor. The equivalent of these resistances ($3/2$ ohm) is in series with the 4 ohm and 5 ohm resistor. Total $R = 21/2$ ohm. $I = V/R = 120 / (21/2) = 240/21 = 11.43$ A.

196). The voltage across the open circuit is?



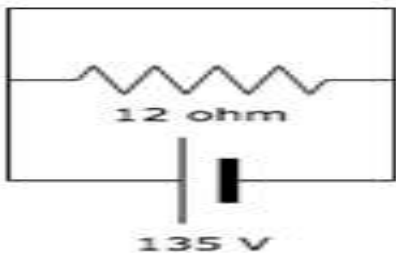
- a) 100V
- c) 90V

- b) Infinity
- d) 0V

Answer: a

Explanation: The voltage across all branches in a parallel circuit is the same as that of the source voltage. Hence the voltage across the 10 ohm resistor and the open circuit is the same=100V.

197). The voltage across the short is?



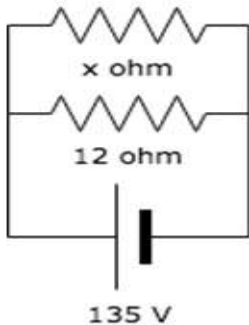
- a) 135V
- c) Zero

- b) Infinity
- d) 11.25V

Answer: c

Explanation: The voltage across a short is always equal to zero whether it is connected in series or parallel.

198). If the current through x ohm resistance in the circuit is 5A, find the value of x.



- a) 27 ohm
- c) 12 ohm

- b) 5 ohm
- d) 135 ohm

Answer: a

Explanation: $R = V/I$. In this circuit $I = 5A$ and $V = 135V$. Therefore, $R = 135/5 = 27$ ohm.

199). The currents in the three branches of a parallel circuit are 3A, 4A and 5A. What is the current leaving it?

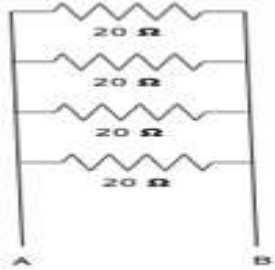
- a) 0A
- c) The largest one among the three values

- b) Insufficient data provided
- d) 12A

Answer: d

Explanation: The total current leaving a node is the same as the current that enters it. Total $I = I_1 + I_2 + I_3 = 3 + 4 + 5 = 12\text{A}$.

200). The total resistance between A and B are?



- a) 20 ohm
- b) 5 ohm
- c) 80 ohm
- d) 0 ohm

Answer: b

Explanation: The resistors are connected in parallel, hence the equivalent resistance = $1/(1/20 + 1/20 + 1/20 + 1/20) = 5\text{A}$.

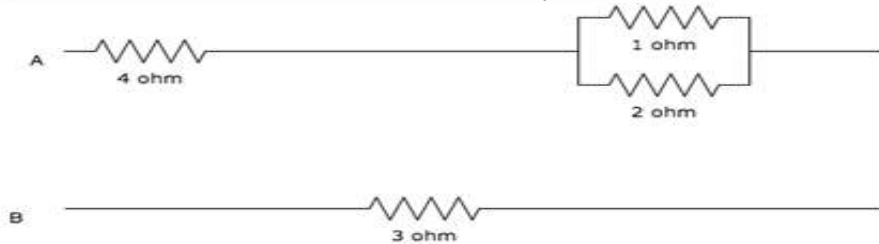
201). It is preferable to connect bulbs in series or in parallel?

- a) Series
- b) Parallel
- c) Both series and parallel
- d) Neither series nor parallel

Answer: b

Explanation: Bulbs are connected in parallel so that even if one of the bulbs blow out, the others continue to get a current supply.

202). Calculate the total resistance between the points A and B.

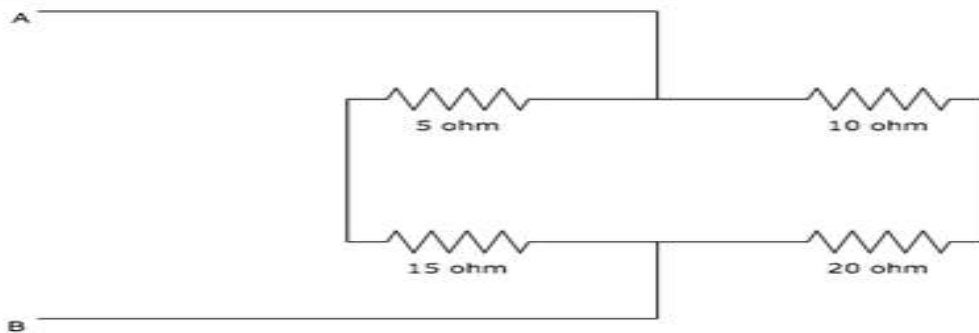


- a) 7 ohm
- b) 0 ohm
- c) 7.67 ohm
- d) 0.48 ohm

Answer: c

Explanation: 1 ohm in parallel with 2 ohm give $2/3$ ohm equivalent which is in series with 4 ohm and 3 ohm so total resistance between A and B = $4 + 2/3 + 3 = 23/3 = 7.67$ ohm.

203). Calculate the equivalent resistance between A and B.

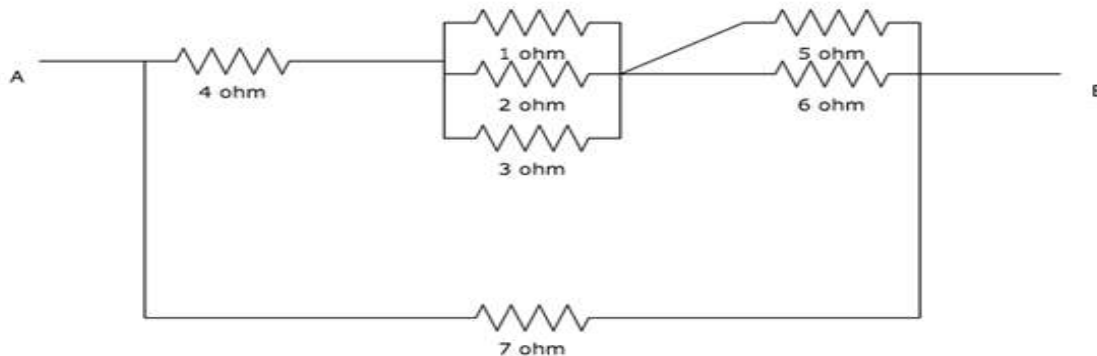


- a) 60 ohm
- b) 15 ohm
- c) 12 ohm
- d) 48 ohm

Answer: c

Explanation: 5 ohm and 15 ohm are connected in series to give 20 ohm. 10 ohm and 20 ohm are connected in series to give 30 ohm. Now both equivalent resistances (20 ohm and 30 ohm) are in parallel to give equivalent resistance $20 \times 30 / (20 + 30) = 12$ ohm.

204). Calculate the resistance between A and B.



- a) 3.56 ohm
- c) 14.26 ohm

- b) 7 ohm
- d) 29.69 ohm

Answer: a

Explanation: The 1 ohm, 2 ohm and 3 ohm resistors are connected in parallel. Its equivalent resistance is in series with the 4 ohm resistor and the parallel connection of the 5 ohm and 6 ohm resistor. The equivalent resistance of this combination is $80/11$ ohm. This is in parallel with 7 ohm to give equivalent resistance between A and B is 3.56 ohm.

205). Batteries are generally connected in _____

- a) Series
- c) Either series or parallel

- b) Parallel
- d) Neither series nor parallel

Answer: a

Explanation: Batteries are generally connected in series so that we can obtain the desired voltage since voltages add up once they are connected in series.

206). In a _____ circuit, the total resistance is greater than the largest resistance in the circuit.

- a) Series
- c) Either series or parallel

- b) Parallel
- d) Neither series nor parallel

Answer: a

Explanation: In series circuits, the total resistance is the sum of all the resistance in the circuit, hence the total is greater than the largest resistance.

207). In a _____ circuit, the total resistance is smaller than the smallest resistance in the circuit.

- a) Series
- c) Either series or parallel

- b) Parallel
- d) Neither series nor parallel

parallel

Answer: b

Explanation: in a parallel circuit, the equivalent resistance = $1 / \text{sum of the reciprocals of all the resistances in the circuit}$. Hence it is smaller than the smallest resistance in the circuit.

208). Which is the most cost efficient connection?

- a) Series
- c) Either series or parallel

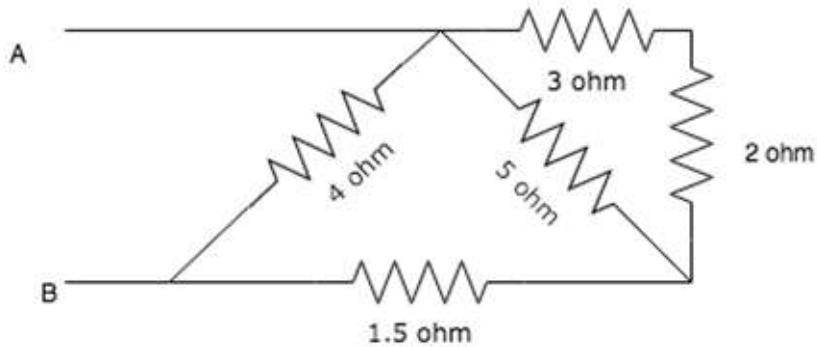
- b) Parallel
- d) Neither series nor parallel

parallel

Answer: a

Explanation: The advantage of series-connections is that they share the supply voltage, hence cheap low voltage appliances may be used.

209). Calculate the equivalent resistance between A and B.

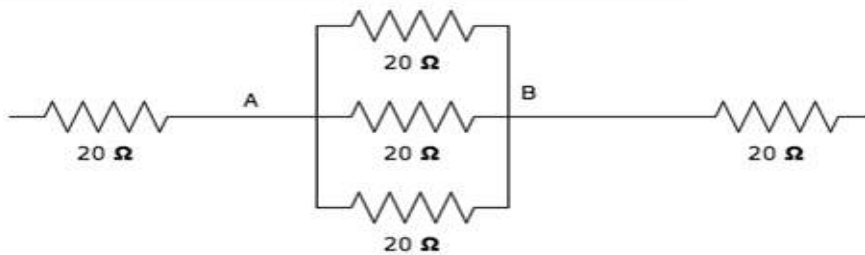


- a) 2 ohm
b) 4 ohm
c) 6 ohm
d) 8 ohm

Answer: a

Explanation: $R = ((2+3) \parallel 5) + 1.5 \parallel 4$. The 2 and the 3 ohm resistor are in series. The equivalent of these two resistors is in parallel with the 5 ohm resistor. The equivalent of these three resistances is in series with the 1.5 ohm resistor. Finally, the equivalent of these resistances is in parallel with the 4 ohm resistor.

210). Calculate the equivalent resistance between A and B.

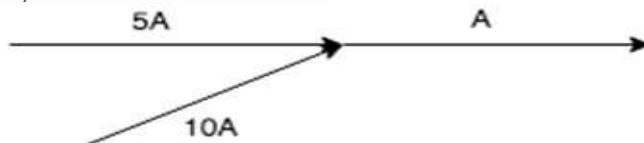


- a) 6.67 ohm
b) 46.67 ohm
c) 26.67 ohm
d) 10.67 ohm

Answer: a

Explanation: $R = 20 \parallel 20 \parallel 20 = 6.67$ ohm. The three 20 ohm resistors are in parallel and resistance is measured across this terminal.

211). Calculate the current A.

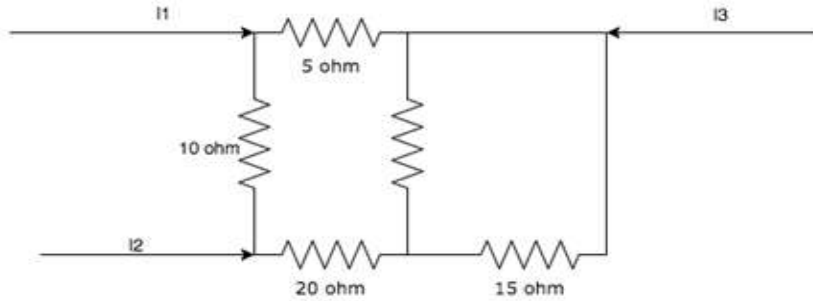


- a) 5A
b) 10A
c) 15A
d) 20A

Answer: c

Explanation: KCL states that the total current leaving the junction is equal to the current entering it. In this case, the current entering the junction is $5A + 10A = 15A$.

212). Calculate the value of I_3 , if $I_1 = 2A$ and $I_2 = 3A$.



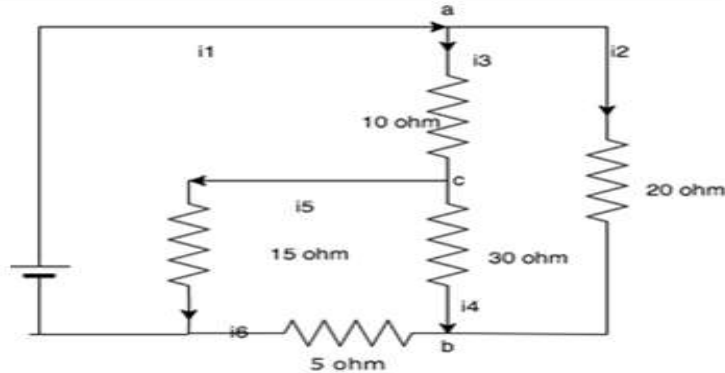
- a) -5A
- c) 1A

- b) 5A
- d) -1A

Answer: a

Explanation: According to KCL, $I_1 + I_2 + I_3 = 0$. Hence $I_3 = -(I_1 + I_2) = -5A$.

213). Find the value of i_2 , i_4 and i_5 if $i_1 = 3A$, $i_3 = 1A$ and $i_6 = 1A$.



- a) 2, -1, 2
- c) 2, 1, 2

- b) 4, -2, 4
- d) 4, 2, 4

Answer: a

Explanation: At junction a: $i_1 - i_3 - i_2 = 0$. $i_2 = 2A$.

At junction b: $i_4 + i_2 - i_6 = 0$. $i_4 = -1A$.

At junction c: $i_3 - i_5 - i_4 = 0$. $i_5 = 2A$.

214). What is the value of current if a 50C charge flows in a conductor over a period of 5 seconds?

- a) 5A
- c) 15A

- b) 10A
- d) 20A

Answer: b

Explanation: $\text{Current} = \text{Charge} / \text{Time}$. Here charge = 50c and time = 5seconds, so current = $50/5 = 10A$.

215). KCL deals with the conservation of?

- a) Momentum
- c) Potential Energy

- b) Mass
- d) Charge

Answer: d

Explanation: KCL states that the amount of charge entering a junction is equal to the amount of charge leaving it, hence it is the conservation of charge.

216). KCL is applied at _____

- a) Loop
- c) Both loop and node

- b) Node
- d) Neither loop nor node

Answer: b

Explanation: KCL states that the amount of charge leaving a node is equal to the amount of charge entering it, hence it is applied at nodes.

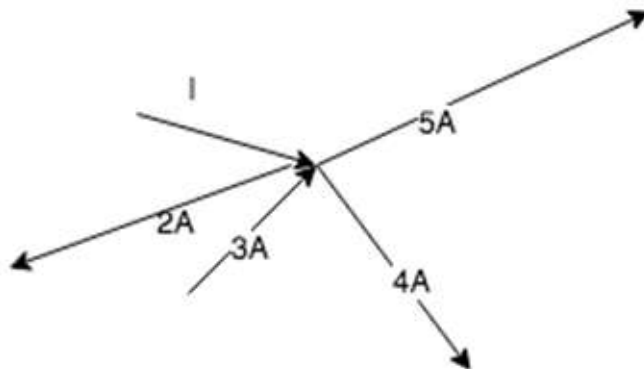
217). KCL can be applied for _____

- a) Planar networks
- b) Non-planar networks
- c) Both planar and non-planar
- d) Neither planar nor non-planar

Answer: c

Explanation: KCL is applied for different nodes of a network whether it is planar or non-planar.

218). What is the value of the current I?

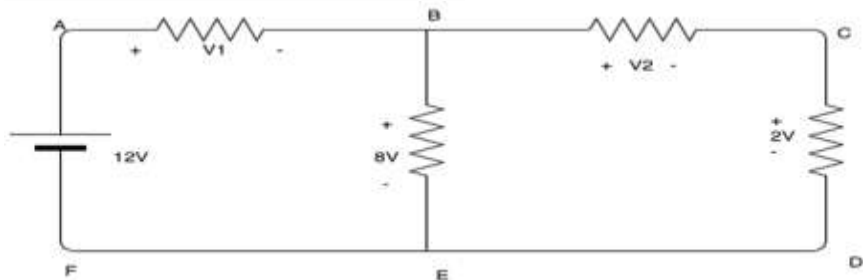


- a) 8A
- b) 7A
- c) 6A
- d) 5A

Answer: a

Explanation: At the junction, $I - 2 + 3 - 4 - 5 = 0$. Hence $I = 8A$.

219). Calculate the value of V_1 and V_2 .



- a) 4V, 6V
- b) 5V, 6V
- c) 6V, 7V
- d) 7V, 8V

Answer: a

Explanation: Using KVL, $12 - V_1 - 8 = 0$. $V_1 = 4V$.

$8 - V_2 - 2 = 0$. $V_2 = 6V$.

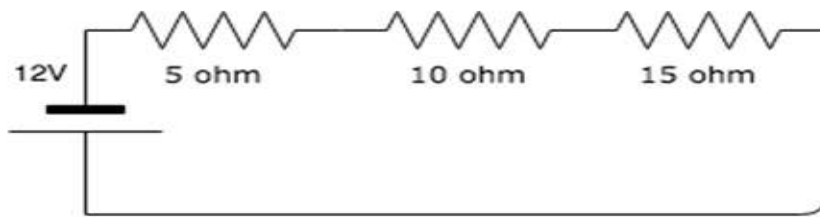
220). KVL deals with the conservation of?

- a) Mass
- b) Momentum
- c) Charge
- d) Energy

Answer: d

Explanation: KVL states that the sum of the potential energy and taken with the right sign is equal to zero, hence it is the conservation of energy since energy doesn't enter or leave the system.

221). Calculate the voltage across the 10 ohm resistor.



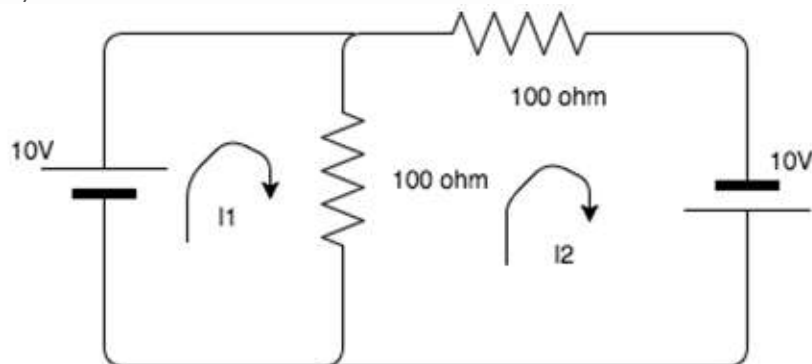
- a) 12V
- b) 4V
- c) 10V
- d) 0V

Answer: b

Explanation: Total resistance = $5 + 10 + 15 = 30$ ohm. Current in the circuit is $12/30$ A.

Voltage across 10 ohm resistor is $10 \cdot (12/30) = 4$ V.

222). Find the value of the currents I_1 and I_2 .



- a) 0.3, 0.1
- b) -0.1, -0.3
- c) -0.3, -0.1
- d) 0.1, 0.2

Answer: d

Explanation: Using KVL in loop 1, $10 - 100 i_1 = 0$. $i_1 = 0.1$ A

Using KVL in outer loop, $-100 i_2 + 20 = 0$ $i_2 = 0.2$ A.

223). The sum of the voltages over any closed loop is equal to _____

- a) 0V
- b) Infinity
- c) 1V
- d) 2V

Answer: a

Explanation: According to KVL, the sum of the voltage over any closed loop is equal to 0.

224). What is the basic law that has to be followed in order to analyze the circuit?

- a) Newton's laws
- b) Faraday's laws
- c) Ampere's laws
- d) Kirchhoff's law

Answer: d

Explanation: Kirchhoff's laws, namely Kirchhoff's Current Law and Kirchhoff's Voltage law are the basic laws in order to analyze a circuit.

225). Every _____ is a _____ but every _____ is not a _____

- a) Mesh, loop, loop, mesh
- b) Loop, mesh, mesh, loop
- c) Loop, mesh, loop, mesh
- d) Mesh, loop, mesh, loop

Answer: a

Explanation: According to Kirchhoff's Voltage Law, Every mesh is a loop but every loop is not a mesh. Mesh is a special case of loop which is planar.

Diagram for Question 1: A circuit with a 20V DC source. The positive terminal is connected to a 25 ohm resistor (labeled A). This resistor is in series with a 15 ohm resistor. This series combination is connected to a node that branches to a 40 ohm resistor (labeled B) and a 10 ohm resistor in series. Both branches rejoin at the negative terminal, which is labeled C.

- Explanation: Cable faults in telephones can be located by telephone companies by making use of a

Wheatstone bridge. Telephonic resistances are determined using suitable techniques. Dialtone is maintained through optical fiber technology.

232). By using the variations on a Wheatstone bridge we can

- a) measure quantities such as voltage, current and power
- b) measure high resistance values
- c) measure quantities such as complex power
- d) measure quantities such as capacitance, inductance and impedance

Answer: d

Explanation: In its simplest form a Wheatstone bridge consists of resistive arms. A Wheatstone bridge is used for the measurement of quantities such as capacitance, inductance and impedance by making use of the variations.

233). One of the simplest applications of a Wheatstone bridge is _____

- a) voltage measurement
- b) current measurement
- c) light measurement
- d) power measurement

Answer: c

Explanation: Wheatstone bridge consists of simple resistances in the ratio arms. One of the simplest applications of a Wheatstone bridge is the measurement of light by making use of a photoresistive device.

234) EMF is an abbreviation of

- a) electromotive force
- b) electrical motive force
- c) electronic motive force
- d) both a and b

235) Electromotive force of a battery can be defined with formula of

- a) $E = IR$
- b) $E = IR + I$
- c) $E = IR + r$
- d) $E = IR + Ir$

236) Potential difference of a battery is 2.2 V when it is connected across a resistance of 5 Ω , if suddenly potential difference falls to 1.8 V, its internal resistance will be

- a) 1 Ω
- b) 1.1 Ω
- c) 2 Ω
- d) 2.1 Ω

237). What property of sound waves acts like the principle of ultrasound?

- a) Reflection and Refraction
- b) Reflection only
- c) Refraction only
- d) Propagation

Answer: a

Explanation: The ultrasound works on the principle of reflection and refraction. While it is necessary that sound waves need a medium to travel, so we can say propagation is important but it is only because the sound wave gets refracted when the medium changes and are reflected back that the image is formed. Thus, the principle for ultrasound is reflection and refraction.

UNIT-2-Radioactivity

- 1). The process of spontaneous emission of radioactive substance is known as.....
 - a) Photoelectric emission
 - b) thermo emission
 - c) radioactivity
 - d) LASER
- 2). The process by which an unstable atomic nucleus losses energy by emitting radiations, such as radiations is known as
 - a) Photoelectric emission
 - b) thermo emission
 - c) radioactivity
 - d) LASER
- 3). which of the following is not an example of radioactive substance-----
 - a)uranium
 - b)Radium
 - c) Thorium
 - d) Calcium
- 4). which of the following is not an example of radioactive substance-----
 - a) polonium
 - b)Boron
 - c) Radon
 - d) Actinium
- 5).All naturally occurring element whose atomic number are greater thanare radioactive.
 - a) 12
 - b) 32
 - c) 52
 - d) 82
- 6) Doubly ionized helium atoms are.....
 - a) Particles
 - b) particles
 - c) particles
 - d) photons
- 7). Photons having higher frequency (energy) i. e. higher penetration power than X-ray are known as-----
 - a) Radio waves
 - b) micro waves
 - c) -rays
 - d) infra rays
- 8). Which of the following is not a property of radioactive radiation ()----
 - a) highly penetrating
 - b) affect photographic plate
 - c)produce scintillations on florescent screen
 - d) produce elasticity
- 9). When radioactive element radiate radiations then it get converted into new element which is.....
 - a) Also radioactive
 - b) not a radioactive
 - c) compound
 - d) a mixture
- 10). when a radioactive element radiates radiation then it gets converted into new element which Is also radioactive. This change is
 - a) Reversible
 - b) irreversible
 - c) stimulated
 - d) none of these
- 11). The emission of radiation in radioactivity is -----
 - a) Stimulated
 - b) spontaneous
 - c) reversible
 - d)rechargeable
- 12). The emission of radiation from radioactive element is ----- process.
 - a) instantaneous
 - b) short time
 - c) not instantaneous i.e. prolonged
 - d)momentary

- 13).-rays are heavily charged particles with----
- a) one negative charge
b) one Positive charge
c)Two negative charge
d) two Positive charge
- 14). The mass of Particles is.....
- a) $6.645 \times 10^{-27} kg$
b) $6.645 \times 10^{27} kg$
c) $2.2 \times 10^{-10} kg$
d) $2.2 \times 10^{10} kg$
- 15).The charge of Particles is.....
- a) $3.2 \times 10^{19} C$
b) $3.2 \times 10^{-19} C$
c) $3.2 \times 10^{14} C$
d) $3.2 \times 10^{-14} C$
- 16). Particles are represented as.....
- a) ${}_1\text{He}^2$
b) ${}_2\text{He}^3$
c) ${}_2\text{He}^4$
d) ${}_2\text{He}^2$
- 17).-rays are.....
- a) negatively charged
b) Positively charged
c) neutral
d) none of these
- 18). Speed of Particles ranges from----- to ----- of speed of light.
- a) $\frac{1}{100}^{\text{th}}, \frac{1}{10}^{\text{th}}$
b) $10^{\text{th}}, 100^{\text{th}}$
c) 2,3
d) $\frac{1}{2}, \frac{1}{3}$
- 19).Penetrating power of Particles is less and it is times than particles.
- a) 10
b) 100
c) $\frac{1}{10}$
d) $\frac{1}{100}$
- 20). Penetrating power of Particles is less and it is times than particles.
- a) 10
b) 100
c) $\frac{1}{10,000}$
d) $\frac{1}{100}$
- 21).The range of Particles is..... Particles, its range in air at N.T.P.is 1meter.
- a) Equal to
b) less than
c) more than
d) less than or equal to
- 22). γ -rays have-rays are.....
- a) Positively charged
b) negatively charged
c) more than
d) none of these
- 23). γ -rays have-rays have.....penetrating power.
- a)poor
b) very less
c) very high
d) no
- 24) γ -rays have.-rays shoes the phenomenon of -----
- a) less production
b) high production
c) no production
d) pair production
- 25) The range of Particles is..... Particles, its range in air at N.T.P.is 1meter.
- a) Equal to
b) less than
c) more than
d) less than or equal to
- 26) The spontaneous breaking up of the nucleus is known as-----

- a) radioactive disintegration
c) fusion
- b) radioactive integration
d) refusion
- 27). When radioactive element emits Particle then it converts into other element with mass number ---- and atomic number -----
- a) less by 2, less by 1
c) less by 4, less by 2
- b) more by 4, more by 1
d) more by 4, more by 2
- 28) As per law of radioactive disintegration (decay), there is --- of atom of radioactive element and it converts into new radioactive element.
- a) Stimulated disintegration
c) stimulated integration
- b) spontaneous disintegration
d) spontaneous integration
- 29). As per law of radioactive disintegration (decay) which atom will disintegrate first is.....
- a) not predicted
c) estimated
- b) accurately predicted
d) roughly calculated
- 30) As per law of radioactive disintegration (decay), the number of atoms that disintegrate in one second (per second) is ----- to the number of remaining radioactive atoms.
- a) directly proportional
c) not proportional
- b) inversely proportional
d) equal
- 31) The Radioactive disintegration --- physical as well as chemical condition i.e. pressure, temperature and chemical combination.
- a) directly proportional
c) does not depend on
- b) inversely proportional
d) depend on
- 32) The rate of decay of radioactive atoms is Number of atoms present.
- a) Equal to
c) Directly proportional
- b) inversely proportional
d) not proportional
- 33). Radioactive disintegration equation is.....
- a) $\frac{dt}{t} = -\lambda dN$
c) $\frac{dN}{N} = \lambda dt$
- b) $\frac{dt}{dt} = -\lambda dN$
d) $\frac{dN}{N} = -\lambda dt$
- 34). Radioactive disintegration equation is -----
- a) $t = t_0 e^{-\lambda N}$
c) $N = N_0 e^{-\lambda t}$
- b) $t = t_0 e^{\lambda N}$
d) $N = N_0 e^{\lambda t}$
- 35) The number of radioactive substance decreases with time.
- a) exponentially
c) speedily
- b) linearly
d) slowly
- 36). The ratio of amount of radioactive substance disintegrated in unit time to the amount of substance present is called -----
- a) Rutherford constant
c) Rutherford's ratio
- b) radioactive decay constant
d) Soddy's constant
- 37). The decay constant is defined as the reciprocal of that time duration in which the number of atoms of radioactive substance falls to of its original value.
- a) 12%
c) 37%
- b) 25%
d) 50%

- 41) The time in which half of the radioactive sustenance is disintegrated is called as.....
- Reduced life
 - life time
 - double life period
 - half-life period
- 42). Half-life period of radioactive substance is given by $T_{1/2}$ is equal to.....
- $\frac{0.693}{\lambda}$
 - $\frac{\lambda}{0.693}$
 - $\frac{\lambda}{2}$
 - $\frac{2}{\lambda}$
- 44) Longitudinal sound wave travel in the form of alternate
- Crest and trough
 - compression and rarefactions
 - crest and compression
 - trough and rarefaction
- 45). The maximum displacement of particle (in S.H.M.) from its mean position is called as-----
- Frequency
 - period
 - wavelength
 - amplitude
- 46). The number of oscillations performed by a particle (in S.H. M.) in one second is called---- of oscillation.
- Frequency
 - period
 - wavelength
 - amplitude
- 45) The time taken by a particle to complete one oscillation is called as Of oscillation.
- Frequency
 - period
 - wavelength
 - amplitude
- 46) The distant between the center of to successive cooperation is called as.....
- frequency
 - period
 - wavelength
 - amplitude
- 47). The distance covered by the disturbance or wave in one second called as----- of wave.
- frequency
 - period
 - wavelength
 - velocity
- 48). The relation between velocity, frequency and wavelength is.....
- $n = v \lambda$
 - $v = n \lambda$
 - $v = n/\lambda$
 - $v = \lambda/n$
- 49). The relation between velocity, period and wavelength is.....
- $\lambda = v/T$
 - $v = T/\lambda$
 - $v = \lambda/T$
 - $T = v \lambda$
- 50). Ultrasonic are the sound waves having frequency-----
- more than 20 kHz
 - more than 20 Hz
 - less than 20 Hz
 - less than 20 kHz
- 51) The sound wave of frequency less than 20 Hz are known as-----
- infrasonic
 - audible sound
 - ultrasonic
 - supersonic
- 52) The sound wave of frequency between 20 Hz to 20 kHz is known as-----
- infrasonic
 - audible sound
 - ultrasonic
 - supersonic
- 53) The sound wave of frequency more than 20 Hz are known as-----
- infrasonic
 - audible sound

- c)ultrasonic d)supersonic
- 54)The normal healthy human ear can hear the sound wave of frequency-----
 a) less than 20 Hz b) 20 Hz to 20kHz
 c) more than 20 kHz d) more than 50kHz
- 55) which of the following is not a property of ultrasonic waves----
 a) has shorter wavelength b) carry high amount of sound energy
 c) show negligible diffraction d) travel with considerable loss
- 56)Jacques and Peirre Curie found that crystal like quartz develop electric charges across their faces when mechanical Pressure is applied to it is called----
 a)Piezo-electric effect b) converse piezo-electric effect
 c)pressure effect d) electric effect
- 57). When electric field is applied across quartz crystal then dimension of crystal change across and if alternating P. D. is applied then crystal sets into vibrations which is called as-----
 a)Piezo-electric effect b) converse piezo-electric effect
 c)pressure effect d) vibration effect
- 58) Piezo-electric effect is -----
 a)reversible b)irreversible
 c)reversible under high pressure d)irreversible under high pressure
- 59) The direct piezo-electric effect is used to-----
 a) generates photoelectrons b)detect photoelectric current
 c)generate ultrasound d)detect ultrasound
- 60) The converse piezo-electric effect is used to-----
 a) generates photoelectrons b)detect photoelectric current
 c)generate ultrasound d)detect ultrasound
- 61) Which of the following is not a piezo-electric material?
 a) quartz b) Rochelle Salt
 c) topaz d) Uranium
- 62) Which of the following is not a natural piezo-electric material?
 a) quartz b) Rochelle Salt
 c) topaz d) Gallium phosphate
- 63) Which of the following is not an application of ultrasonic?
 a)material analysis b)detection of flaws of material
 c)SONAR d) sonography
- 64) SONAR is abbreviation of
 a)small navigation and random b)sky navigation and ranging
 c)sun nuclear ranging d)**sound navigation and ranging**
- 65) Sound waves are
 a)**Longitudinal** b)Transverse
 c)Electromagnetic d)Only magnetic
- 66) Sound waves are produced by---
 a)linear motion b)circular motion
 c)**vibrating bodies** d)transitional motion

67) Speed of sound varies with-----

- a) humidity
- b) temperature
- c) **both humidity and temperature**
- d) none of the above

68). Which of the following is not an application of ultrasonic?

- a) to detect and locate submarine objects
- b) alcohol detector
- c) to break stones in kidney
- d) to determine depth of sea

69). There is an apparent change in frequency (pitch) of a note (siren) because of the relative motion between observer and source of sound is known as-----

- a) Piezo-electric effect
- b) converse piezo-electric effect
- c) Doppler's effect
- d) Sabine's effect

70). If sound source and observer both are stationary then apparent frequency----- true frequency.

- a) is more than
- b) is less than
- c) is equal to
- d) is less than or equal to

71). If sound source or observer or both are moving towards each other then apparent frequency----- true frequency.

- a) is more than
- b) is less than
- c) is equal to
- d) is less than or equal to

72). If sound source or observer or both are moving away from each other then apparent frequency----- true frequency.

- a) is more than
- b) is less than
- c) is equal to
- d) is less than or equal to

73). General formula for apparent frequency considering Doppler effect is-----

- a) $n' = n \times \frac{v-v_o}{v-v_s}$
- b) $n' = n \times (v-v_o) \times (v-v_s)$
- c) $n' = n \times \frac{v+v_o}{v+v_s}$
- d) $n' = n \times (v_o-v_s)$

74). Which of the following is not an application of Doppler effect?

- a) to calculate velocity of moving aeroplanes and submarines
- b) in estimating the speed of distant stars and planets
- c) to measure speed of cars on highway
- d) to detect flaws in aeroplanes

75). A tuning fork of frequency 480 Hz produces a wave of 68 cm, velocity of sound in air will be-----

- a) 235.5m/s
- b) 280.82m/s
- c) 326.4 m/s
- d) 420.20m/s

76). A tuning fork vibrates with a frequency of 512Hz if the velocity of the wave is 330m/s, distance travelled in 5 vibrations will be---

- a) 1.2m
- b) 3.2m
- c) 5.2m
- d) 7.2m

77). A siren producing a pitch of 330Hz is moving towards the observer with a velocity of 150m/s. The velocity of sound is 330m/s. The frequency of sound heard by a stationary observer is-----

- a) 550Hz
- b) 600Hz
- c) 650Hz
- d) 700Hz

78)). A tuning fork of frequency 90 Hz is sounded and moved towards stationary observer with a velocity equal to $(1/10)^{\text{th}}$ of the velocity of sound, the note heard by the observer will have frequency---

- a) 25Hz
- b) 50Hz
- c) 75Hz
- d) 100Hz

79). An observer is moving towards siren of frequency 400Hz with a velocity of 150m/s The velocity of sound is 330m/s The frequency of sound heard by observer will be-----

- a) 581.8Hz
- b) 540Hz
- c) 600.5Hz
- d) 620.5Hz

80) A siren producing a pitch of 330Hz is moving away from stationary observer with a velocity of 100m/s The velocity of sound is 330m/s, The pitch of sound heard by observer is-----

- a) 120Hz
- b) 180Hz
- c) 230.2Hz
- d) 260.5Hz

81) An observer is moving away from siren of frequency 350Hz with a velocity of 150m/s The velocity of sound is 330m/s The frequency of sound heard by observer will be-----

- a) 125.50Hz
- b) 150.25Hz
- c) 175.5Hz
- d) 190.9Hz

82) A siren producing a frequency of 400Hz is moving towards observer with a velocity of 100m/s and An observer is moving towards siren with a velocity of 50m/s The velocity of sound is 330m/s The frequency of sound heard by observer will be-----

- a) 555.5Hz
- b) 575.5Hz
- c) 660.86Hz
- d) 725.5Hz

83) A siren producing a frequency of 400Hz is moving away from the observer with a velocity of 50m/s and the observer is moving away from the siren with a velocity of 100m/s The Velocity of sound is 330m/s The frequency of sound heard by observer will be-----

- a) 180Hz
- b) 200Hz
- c) 220Hz
- d) 242Hz

84). _____ have the same mass number, but different nuclear charge

- a) Isotones
- b) Isobars
- c) Isotopes
- d) Isoentropic

View Answer: b

Explanation: Isobars have the same mass number, but different nuclear charge.

85). Atoms with same number of neutrons, but different number of nucleons are called

- a) Isobars
- b) Isotones
- c) Isotopes
- d) Isoters

View Answer: b

Explanation: Atoms with same number of neutrons, but different number of nucleons are called Isotones.

86). Percentage of U-238 in natural uranium is around

- | | |
|----------|----------|
| a) 29.71 | b) 99.29 |
| c) 0.015 | d) 0.71 |

View Answer: c

Explanation: Natural Uranium contains around 0.015% of U-238.

87).. A radioactive isotope undergoes decay with respect to time following _____ law

- | | |
|-------------------|----------------|
| a) logarithmic | b) exponential |
| c) inverse square | d) linear |

View Answer: b

Explanation: A radioactive isotope undergoes decay with respect to time following exponential law.

88).. U-235 content in enriched uranium, that is normally used in power reactors (e.g., at Tarapur atomic power plant), is about _____ percent.

- | | |
|-------|-------|
| a) 50 | b) 3 |
| c) 85 | d) 97 |

View Answer: b

Explanation: U-235 content in enriched uranium, that is normally used in power reactors (e.g., at Tarapur atomic power plant), is about 3 percent.

89). The half-life period of a radioactive element is 100 days. After 400 days, one gm of the element will be reduced to _____ gm.

- | | |
|------------------|-------------------|
| a) $\frac{1}{2}$ | b) $\frac{1}{4}$ |
| c) $\frac{1}{8}$ | d) $\frac{1}{16}$ |

View Answer: d

Explanation: The half-life period of a radioactive element is 100 days. After 400 days, one gm of the element will be reduced to $\frac{1}{16}$ gm.

90) Who of the following is associated with radioactivity?

- | | |
|--------------------|-----------------|
| a) Henry Becquerel | b) Issac Newton |
| c) Albert Einstein | d) C. V. Raman |

91) The half-life period of a radioactive element is 5 years. If the number of atoms present initially (at $t=0$ years) is 20,000; how many atoms would remain after 20 years?

- | | |
|-----------|-----------|
| a) 10,000 | b) 7,500 |
| c) 5,000 | d) 20,000 |

92) Half-life period of a radioactive element is given by $T = \frac{0.693}{\lambda}$ where all symbols have usual meanings.

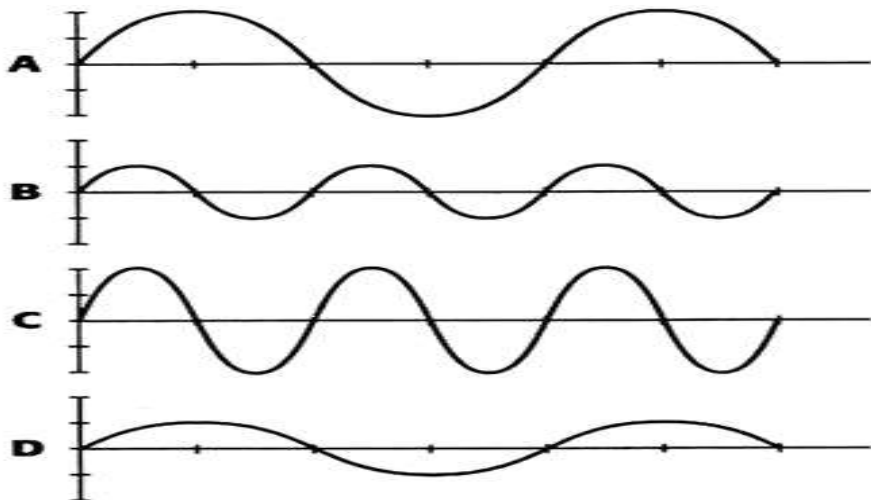
a) $0.693/\lambda$

b) 0.693λ

c) $0.693/N$

d) $0.693 N$

93) Which wave has same frequency and periodic time as wave A



a) Wave B

b) Wave C

c) Wave D

d) Both (B) and (C)

94) Which of the following statement is not true?

- a) When the observer moves away from the stationary source, then the pitch of sound decreases
- b) When the observer moves towards the stationary source, then the pitch of sound increases
- c) When the source moves away from stationary observer then the pitch of the sound decreases
- d) When the source moves towards the stationary observer then the pitch of the sound decreases

95) A siren of police car emits pure tone at a frequency of 640 Hz. Find the frequency that a stationary person would hear when the car approaches him. The police car is moving towards him at 20 m/s.

(Velocity of sound in air = 340 m/s)

a) 680 Hz

b) 604.45 Hz

c) 1360 Hz

d) 1208.89 Hz

96). Ultrasound is also useful for _____

- i. detecting fault in metal sheets
- ii. imaging marine depths
- iii. looking for metals beneath the earth's surface
- iv. detecting distances v. detecting earthquakes

a) ii, iii, vb) i, iv, vc) i, ii, ivd) ii, iii

Answer: c

Explanation: Ultrasound is used for detecting the fault in metal sheets, imaging marine depths and detecting distances. If the metal sheets have faults like cracks or deformity, the reflected sound waves will not be uniform. SONAR and RADAR are used to detect distances and work on the principle of ultrasound.

97). A piezoelectric crystal is used to produce the ultrasound waves. What kind of ultrasound is produced?

- a) Pressure wave ultrasound
- b) Electrical wave ultrasound
- c) Sound wave ultrasound
- d) Simple ultrasound

Answer: a

Explanation: A piezoelectric crystal is a special transducer which converts mechanical energy into electrical energy and vice-versa. Thus, when the electrical impulses are given to the transducer, it is converted into mechanical energy. The transducer starts vibrating causing a pressure difference and the ultrasound waves are produced.

98). Which of the following relations are true?

- a) γ increases, penetration of sound increases, resolution decreases
- b) γ increases, penetration of sound decreases, resolution decreases
- c) γ increases, penetration of sound decreases, resolution increases
- d) γ decreases, penetration of sound increases, resolution increases

Answer: a

Explanation: When the frequency (γ) of the sound waves increases, it gains more energy to overcome the impedance barrier and so is able to penetrate deeper. However, the penetration may not be uniform in all places and reflection may be uneven thus it affects the resolution of the image

99)What type of waves are Sound Waves?

- a). Latitudinal waves
- b). Longitudinal waves
- c). Latitudinal mechanical waves
- d). Longitudinal waves

Ans. d

Sound Waves are longitudinal mechanical waves.

100). Which of the following is/ are not applications of Ultrasonic Waves?

- (a) For measuring the depth of Sea.
- (b) In sterilizing of a liquid.
- (c) In Ultrasonography
- (d) In sterilizing a needle.

Options are:

- A. Both (a) and (b)
- B. Only (d)
- C. Both (c) and (d)
- D. Only (b)

Ans. B

Applications of Ultrasonic Waves are: sending signals, for measuring the depth of sea, for cleaning cloths, aeroplanes, machinery parts of clocks, for removing lamp-shoot from the chimney of factories, in sterilizing of liquid and in Ultrasonography.

101). What is the speed of sound in air?

- a). 330 m/s
- b). 332 m/s
- c). 334 m/s
- d). 336 m/s

Ans. B

The speed of Sound in Air (0C) is 332 m/s and in Air (20C) is 343 m/s.

102). What will be the effect of temperature on speed of sound?

- a). The speed of sound decreases with the increases of temperature of the medium.
- b). The speed of sound decreases with the decrease of temperature of the medium.

- c). The speed of sound increases with the decrease of temperature of the medium.
d). The speed of sound increases with the increase of temperature of the medium.

Ans. D

The speed of sound increases with the increase of temperature of the medium. The speed of sound in air increases by 0.61 m/s when the temperature is increased by 1°C.

103}. Due to which phenomena sound is heard at longer distances in nights than in day?

- a). Reflection b). Refraction c). Interference of sound d). Diffraction of sound

Ans. B

Due to refraction, sound is heard at longer distances in nights than in day.

104). When a motor boat in a sea travels faster than sound, then waves just like shock-waves are produced on the surface of water. These waves are called

- a). Shock waves b). Doppler's waves c). Refracted waves d). Bow waves

Ans. D

When a motor boat in a sea travels faster than sound, then waves just like shock-waves are produced on the surface of water. These waves are called bow waves.

105). What is Intensity of Sound?

- a). It is inversely proportional to the square of the distance of point from the source.
b). It is directly proportional to the square of amplitude of vibration, square of frequency and density of the medium.
c). Both A and B
d). Neither A nor B

Ans. C

Intensity of any sound at any point in space is the amount of energy passing normally per unit area held around that point per unit time. S.I unit of intensity is watt/m^2 .

106) . What is the unit of loudness?

- a). Bel b). Phon c). Decibel d). All of the above

Ans D

The sensation of a sound perceived in a ear is measured by another term called loudness which depends on intensity of sound and sensitiveness of the ear. Unit of loudness is bel. A practical unit of loudness is decibel (dB) which is 1/10th of bel. Another unit of loudness is phon.

107). Which of the following statement is or are correct about longitudinal mechanical waves?

- a). The longitudinal mechanical waves which lie in the frequency range 20 Hz to 20000 Hz are called audible or sound waves.
b). The longitudinal mechanical waves having frequencies less than 20 Hz are called infrasonic.
c). The longitudinal mechanical waves having frequencies greater than 20,000 Hz are called ultrasonic waves.
d). All of the above are correct

Ans. D

Sound or Audible waves are sensitive to human ear and are generated by the vibrating bodies like tuning fork, vocal cords etc. Infrasonic waves are produced by sources of bigger size such as earth quakes, volcanic eruptions, ocean waves etc. Human ear cannot detect Ultrasonic waves. But dog, cat, bat etc can detect these waves. Bat not only detect but also produce ultrasonic waves.

108) When a wave travels through a medium

1.	particles are transferred from one place to another
2.	energy is transferred in a periodic manner
3.	energy is transferred at a constant speed

4.	none of the above statements is applicable
----	--

109) The minimum distance between the source and the reflector, so that an echo is heard is approximately equal to _____.

- a). 10 m
- b). **17 m**
- c). 34 m
- d). 50 m

110): Bats detect the obstacles in their path by receiving the reflected _____.

- a). infrasonic waves
- b). radio waves
- c). electro-magnetic waves
- d). **ultrasonic waves**

111): When sound travels through air, the air particles _____.

- a). vibrate along the direction of wave propagation
- b). vibrate but not in any fixed direction
- c). vibrate perpendicular to the direction of wave propagation
- d). do not vibrate

112) The relation between wave velocity 'v', frequency 'f', and wavelength 'λ' is _____.

- a). $v = \frac{f}{\lambda}$
- b). $v = f \lambda$
- c). $v = \frac{\lambda}{f}$
- d). $v = \frac{1}{f \lambda}$

113). The frequency of a wave travelling at a speed of 500 ms⁻¹ is 25 Hz. Its time period will be ----

- a). **20 s**
- b). 0.05 s
- c). 25 s
- d). **0.04 s**

114) The amplitude of a wave is _____.

- a). the distance the wave moves in one second
- b). the distance the wave moves in one time period of the wave
- c). **the maximum distance moved by the medium particles on either side of the mean position**
- d). the distance equal to one wave length

115): Which of the following is not a characteristic of a musical sound?

- a). Pitch
- b). **Wavelength**
- c). Quality
- d). Loudness

116) Sound waves do not travel through

- a). solids

b). liquids

c). gases

d). vacuum

117) The physical quantity, which oscillates in most waves, is

a). mass

b). energy

c). amplitude

d). wavelength

118) Sound waves are

a) longitudinal

b). transverse

c). partly longitudinal and partly transverse

d). sometimes longitudinal and sometimes transverse

119) The frequency which is not audible to the human ear is

a) 50 Hz

b) 500 Hz

c) 5000 Hz

d) 50000 Hz

120) The speed of sound in medium depends upon

a) amplitude

b). frequency

c). wavelength

d). properties of the medium

121) Which of the following will remain unchanged when a sound wave travels in air or in water?

a). Amplitude

b). Wavelength

c). Frequency

d). Speed

122) A sound source sends waves of 400 Hz. It produces waves of wavelength 2.5 m. The velocity of sound waves is

a). 100 m/s

b). 1000 m/s

c). 10000 m/s

d). 3000 km/s

123) The time period of a vibrating body is 0.05 s. The frequency of waves it emits is

a). 5 Hz

b). 20 Hz

c). 200 Hz

d). 2 Hz

124) A source of frequency of 500 Hz emits waves of wavelength 0.4 m, how long does the waves take to travel 600 m?

a). 3 s

- b). 6 s
- c). 9 s
- d). 12 s

125) Sound and light waves both

- a). have similar wavelength
- b). obey the laws of reflection**
- c). travel as longitudinal waves
- d). travel through vacuum

126): The method of detecting the presence, position and direction of motion of distant objects by reflecting a beam of sound waves is known as _____.

- a). RADAR
- b). SONAR**
- c). MIR
- d). CRO

127) The technique used by bats to find their way or to locate food is _____.

- a) SONAR
- b) RADAR
- c) Echolocation**
- d) Flapping

128) An ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the sending and receiving of the wave is 1.6 s. What is the depth of the sea, if the velocity of sound in the seawater is 1400 m/s?

- a) 1120 m**
- b) 560 m
- c) 1400 m
- d) 112 m

129) An example for mechanical wave.

- a) Radio wave
- b) Light wave
- c) Infrared radiation
- d) Sound wave**

130) Which of the following quantities is transferred during wave propagation?

- a) Speed
- b) Mass
- c) Matter
- d) Energy**

131) If a vibrator strikes the water 10 times in one second, then the frequency of wave is _____.

- a) 10 Hz**
- b) 0.5 Hz
- c) 5 Hz
- d) 0.1 Hz

132) Unit of wavelength is _____.

- a) newton
- b) erg
- c) dyne
- d) angstrom**

133) The distance between a compression and the next rarefaction of a longitudinal wave is ____.

- a) $\frac{\lambda}{4}$
- b) 2λ
- c) $\frac{\lambda}{2}$**
- d) $\frac{\lambda}{8}$

134) SI Unit of time period is ____.

- a) second**
- b) hour
- c) minute
- d) nanosecond

135) The vibrations or the pressure variations inside the inner ear are converted into electrical signals by the ____.

- a) cochlea**
- b) tympanic membrane
- c) pinna
- d) anvil

136) Vibrations inside the ear are amplified by the three bones namely the ____ in the middle ear.

- a) hammer, anvil and stirrup**
- b) hammer, anvil and pinna
- c) hammer, cochlea and stirrup
- d) auditory bone, anvil and stirrup

137) The persistence of audible sound due to the successive reflections from the surrounding objects even after the source has stopped to produce that sound is called ____.

- a) reflection**
- b) echo
- c) reverberation
- d) rarefaction

UNIT-3-Photo electricity

1). In photoelectric effect ----- energy converted in to -----energy.

- | | |
|----------------------|----------------------|
| a) light, electrical | b) electrical, light |
| c) light, chemical | d) light, heat |

2). photoelectric effect was detected by-----

- | | |
|-----------|-------------|
| a) Hertz | b) Henry |
| c) Planck | d) Einstein |

3). When the light of suitable frequency is incidence on metallic surface, then electrons are emitted from the metal surface, this effect is know as-----

- | | |
|---------------------------------------|-------------------------|
| a) Thermoelectric effect | b) photoelectric effect |
| c) heating effect of electric current | d) Seebeck effect |

4). According to Plank's theory energy is not emitted and absorbed continuously, but in a discrete units or packets (bundle) These energy packets are called -----

- | | |
|--------------|-------------|
| a) Electrons | b) protons |
| c) photons | d) neutrons |

5). Photons (quanta) are electrically -----

- | | |
|-------------|------------------|
| a) positive | b) negative |
| c) neutral | d) none of these |

6). Photons travel with a speed of ----

- | | |
|--------------------|--------------------|
| a) of sound | b) of light |
| c) less than sound | d) less than light |

7). Energy 'E' associate with a photon is given by-----

- | | |
|------------------------|----------------|
| a) $E = \frac{h}{\nu}$ | b) $h = E \nu$ |
| c) $E = h + \nu$ | d) $E = h \nu$ |

8). The value of 'h' planks constant have value ----- x 10^{-34}

- | | |
|--------------------------------------|--------------------------------------|
| a) $3.36 \times 10^{-34} \text{ Js}$ | b) $6.63 \times 10^{-34} \text{ Js}$ |
| c) $6.63 \times 10^{-34} \text{ Js}$ | d) none of these |

9). Photon is-----

- | | |
|----------------------|--------------------------|
| a) invisible entity | b) divisible entity |
| c) electrical entity | d) electrically negative |

10). Photons -----

a) deflected by electric field

b) deflected by magnetic field

c) do not ionize

d) ionize

11). As per Einstein's theory of relativity-----

a) $E = \frac{m}{c^2}$

b) $E = mc^2$

c) $E = mc$

d) $E = m/c$

12). Mass of photon is given by-----

a) $m = hc\lambda$

b) $m = hc/\lambda$

c) $m = \lambda/hc$

d) $m = h/c\lambda$

13). During the process of photoelectric emission, photon collides with the atom and atom absorbs energy 'hv'. Atom utilizes this energy in two ways----

a) part of energy is used to separate electron from atom and remaining energy to throw electron

b) part of energy to heat atom and remaining energy to throw electron

c) part of energy to separate electron and remaining to heat atom.

d) part of energy is used to attract proton and remaining to throw electron.

14). The amount of energy required to separate electron from atom is called as-----

a) kinetic energy

b) photoelectric work function

c) potential energy

d) light energy

15). The value of photoelectric work function W_0 depends on-----

a) nature of metal

b) Speed of photons

c) medium

d) area of metal plate

16). Threshold frequency ν_0 of a metal is the ----- frequency of the incident light at which -----

a) minimum, emission does not take place

b) maximum, emission does not take place

c) minimum, emission just take place

d) maximum, emission just begins

17). The value of photoelectric work function W_0 and Threshold frequency ν_0 changes from-----

a) place to place

b) time to time

c) one point to other

d) metal to metal

18). The emission of photoelectron takes place if-----

a) $\nu < \nu_0$

b) $\nu_0 > \nu$

c) $\nu > \nu_0$

d) $\nu < \nu_0$

19). The negative potential given to the photoelectric cell at which photoelectric current becomes zero is called as-----

a) photo potential

b) light potential

- c)stopping potential
d)zero potential
- 20). photoelectric current is directly proportional to-----
a)Speed of photon
b)energy of photon
c) frequency of light
d) intensity of incident light.
- 21). The velocity of photoelectron is directly proportional to-----
a) Speed of photon
b)intensity of light
c) frequency of light
d) temperature of metal
- 22). A metal emits photoelectrons only when -----
a) intensity of light is high
b) Speed of photon is high
c) Frequency of incident light is less than threshold frequency ν_0
d) Frequency of incident light is greater than threshold frequency ν_0
- 23). For a given metal surface, stopping potential is-----
a) directly proportional to the intensity of light
b) directly proportional to the frequency of incident light
c) inversely proportional to the intensity of light
d) inversely proportional to the frequency of incident light
- 24).which of the following is not a characteristics of photoelectric effect?
a) this process is instantaneous
b)emission take place only if frequency of incident light is greater than threshold frequency ν_0
c) photoelectric current is directly proportional to intensity of light
d) rate of emission of photoelectrons is directly proportional to temperature
- 25) Einstein's photoelectric equation is given by-----
a) $\frac{1}{2}mv^2 = h(\nu_0 - \nu)$
b) $\frac{1}{2}mv^2 = 2h(\nu - \nu_0)$
c) $\frac{1}{2}mv^2 = h(\nu - \nu_0)$
d) $\frac{1}{2}mv^2 = h / (\nu - \nu_0)$
- 26). In Einstein's equation $\frac{1}{2}mv^2 = h(\nu - \nu_0)$ if $\nu < \nu_0$ then -----
a) emission just begins
b) emission take place
c)no emission
d) rate of emission is high
- 27).In Einstein's equation $\frac{1}{2}mv^2 = h(\nu - \nu_0)$ if $\nu = \nu_0$ then -----
a) emission just begins
b) emission take place
c)no emission
d) rate of emission is high
- 28). In Einstein's equation $\frac{1}{2}mv^2 = h(\nu - \nu_0)$ if $\nu > \nu_0$ then -----

a) emission just begins

b) emission take place

c) no emission

d) rate of emission is high

29). In Einstein's equation $\frac{1}{2}mv^2 = h(\nu - \nu_0)$ as ν increases-----

a) K. E. decreases

b) velocity of photoelectrons decreases

c) velocity of photoelectrons increases

d) mass of photoelectrons increases

30). As per the principle of photoelectric cell-----

a) electrical energy converted into light energy b) light energy converted into electrical energy

c) light energy converted into kinetic energy

d) light energy converted into heat energy

31). Frequency below which no electrons are emitted from metal surface is

a) minimum frequency

b) angular frequency

c) maximum frequency

c) threshold frequency

32). Energy absorbed by electron is used in

a) escaping the metal

b) increasing kinetic energy

c) both A and B

d) increasing frequency

33). In photoelectric effect, electrons should be removed from the

a) inner shells

b) surface

c) from core

d) the nucleus

34). The ratio of photon energy to its frequency is _____

a) its speed Option

b) its velocity Option

c) its wavelength Option

d) plancks constant

35) The work function of a substance is 1.6 eV. Find the longest wavelength of light that can produce photoemission from the substance.

a) 2900 Å

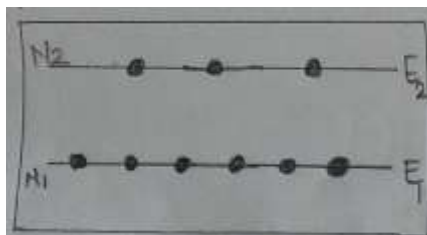
b) 3867 Å

c) 5800 Å

d) 7734 Å

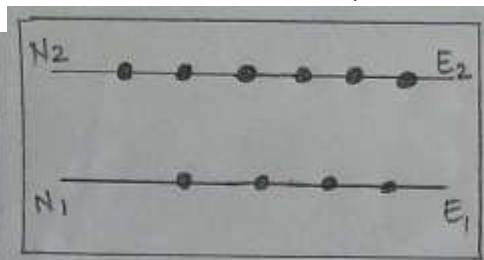
36) Out of the following which diagram explains population inversion -----

Option A

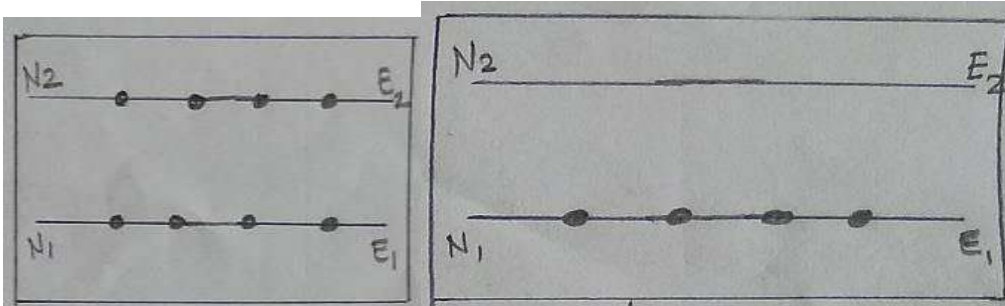


Option C

Option B



Option D



- 37).LASER light is coherent _____
- a) All the waves have same frequency b) All the waves are exactly in the same phase
c) All the waves have same wavelength d) All the waves are exactly in the opposite phase
- 38) In He-Ne LASER, the tube is filled with _____
- a) 10 % He and 90 % Ne b) 20 % He and 80 % Ne
c) 90 % He and 10 % Ne d) 80 % He and 20 % Ne
- 39) The conductivity of LDR increases as -----
- a) intensity of light increases b) intensity of light decrease
c) wavelength of light increases d) None of the above
- 40) In photoelectric effect, by increasing the intensity of incident light on the surface of the metal, --- increase
- a) photoelectric current b) penetration power
c) ionizing power d) stopping potential
- 41) The photoelectric work function of the metal is 3.3eV. Then the threshold frequency of the metal will be-----
- a) 7.96×10^{14} Hz b) 8.96×10^{14} Hz
c) 7.96×10^{15} Hz d) 8.96×10^{15} Hz
- 42) Which of the following are properties of the photon?
- a) indivisible entity b) travels with speed of light
c) Does not get deflected by electric or magnetic field d) All of the above
- 43) The wavelength of 1 keV photon is 1.24×10^{-9} m, then frequency of 1 MeV photon is _____.
- a) 1.24×10^{15} Hz b) 2.4×10^{15} Hz
c) 1.24×10^{20} Hz d) 2.4×10^{20} Hz
- 44) In He-Ne laser, He atom transfer their energy to Ne atom through _____
- a) elastic collision b) inelastic collision
c) absorption d) emission
- 45) A laser consists of active medium of collection of _____
- a) atoms b) molecule
c) ions d) All of these
- 46). In most of the application of photoelectric cell, the property used is-----
- a) speed of photoelectrons frequency of light b) photoelectric current frequency of light
c) photoelectric current intensity of light d) none of these

- 47). Which of the following is not the application of photoelectric cell,-----
- a) Burglar alarm
 - b) lux meter
 - c) automatic street light controller
 - d) to cure diseases like cancer
- 48). The principle of LDR is----
- a) its resistance decrease as intensity of incident light increase
 - b) number of photoelectrons increases with increase in intensity of light
 - c) its resistance increases with intensity of light
 - d) its resistance increases with frequency of light
- 49). Which of the following is not the application of LDR?
- a) used in security alarms
 - b) used as smoke detector
 - c) used in dental surgery
 - d) street light controller
- 50). The energy of photoelectron is 2.4eV. its frequency will be----
- a) 2.4×10^{14} Hz
 - b) 5.79×10^{14} Hz
 - c) 8×10^{14} Hz
 - d) 9.59×10^{14} Hz
- 51). An accelerated electron emits a quantum of radiation with a frequency 9.59×10^{19} cycle per second. Energy of photon will be ----
- a) 5.97×10^{-14} J
 - b) 2.34×10^{-14} J
 - c) 7.6×10^{-14} J
 - d) 9.59×10^{-14} J
- 52). The photoelectric work function of a certain metal is 6×10^{-19} J. Its threshold frequency is-----
- a) 2×10^{14} Hz
 - b) 6×10^{14} Hz
 - c) 9×10^{14} Hz
 - d) 12×10^{14} Hz
- 53). The threshold frequency for a metal is 1.2×10^{15} Hz. Its threshold wavelength will be-----.
- a) 6×10^{-7} m
 - b) 6×10^7 m
 - c) 2.5×10^{-7} m
 - d) 2.5×10^{-7} m
- 54). The threshold frequency for a metal is 1×10^{15} Hz. If a light of frequency 2×10^{15} Hz is made incident on the Metal plate, then the maximum K.E. of the ejected photoelectron is-----
- a) 1×10^{-19} J
 - b) 6.63×10^{-19} J
 - c) 9.5×10^{-19} J
 - d) 12.5×10^{-19} J
- 55). The threshold wavelength for silver is 3800 \AA . Its photoelectric work function will be----
- a) 5.2×10^{-19} J
 - b) 1.1×10^{-19} J
 - c) 7.2×10^{-19} J
 - d) 9.5×10^{-19} J
- 56). The threshold wavelength for silver is 4000 \AA . When ultraviolet light of wavelength 2000 \AA is incident on it, then the energy of photoelectrons will be-----
- a) 1.23×10^{-19} J
 - b) 4.97×10^{-19} J
 - c) 8.23×10^{-19} J
 - d) 9.23×10^{-19} J
- 57). If photoelectric work function of a certain metal is 2×10^{-19} J, then its threshold frequency will be----
- a) 3×10^{12} Hz
 - b) 3×10^{13} Hz
 - c) 3×10^{14} Hz
 - d) 3×10^{15} Hz
- 58). The energy of photon is 6×10^{-19} J. its wavelength will be----
- a) 3.3×10^{-9} m
 - b) 3.3×10^{-8} m
 - c) 3.3×10^{-6} m
 - d) 3.3×10^{-7} m
- 59). X-rays are electromagnetic waves of very short wave length in the order of-----

- a) 10^{-10}m to 10^{-1}m
c) 10^{-5}m to 10^{-6}m
- b) 10^{-2}m to 10^{-3}m
d) 10^5m to 10^6m
- 60). when fast moving electrons (or cathode rays) are suddenly stopped then -----
a) laser are produced
c) X-rays are produced
- b) current are produced
d) none of these
- 61).Metal filament is surrounded by molybdenum metal cylinder kept at negative potential to the filament. Because of this electrons emitted from filament are-----
a)sprinkled all around
c) Accelerated
- b) concentrated into fine beam
d) deaccelerated
- 62).In Coolidge X-ray tube, the target (T) material should have some properties. Which of the following property is not required?
a) target (T) material should have high melting point
b) target (T) material have high atomic weight
c)) target (T) material have high thermal conductivity
d)) target (T) material have high ductility
- 63). In Coolidge X-ray tube, electrons are produce due to process known as-----
a) photoelectric emission
c) ultrasonic emission
- b) thermionic emission
d) hydraulic emission
- 64).In the process of x-ray production, the electrons produced from the cathode are accelerated by application of---
a) high voltage between anode and cathode
b) low voltage between anode and cathode
c) electronic motor
d) high current from cathode to anode
- 65). In the process of x-ray production, the intensity of x-ray can be controlled by----
a) adjusting filament current
c) adjusting angle of target
- b) adjusting P.D. between cathode and anode
d) adjusting cooling rate
- 66). In the process of x-ray production, the penetration of x-ray (hard x-rays or soft x-rays) can be adjusted by----
a) adjusting filament current
c) adjusting angle of target
- b) adjusting P.D. between cathode and anode
d) adjusting cooling rate
- 67). Which of the following is not a property of x-rays-----
a) have high penetrating power
c)affect photographic plates
- b)produce photoelectric effect
d)get deflected by magnetic or electric field
- 68). X-rays travel with speed of light. X-rays produce ionization in the gases-----
a) True, True
c) False, True
- b) True, False
d) False, False
- 69). Which of the following is not the application of x-rays----**
a)used to detect cracks in the body of aero plane
b)used to detect smuggling gold at airport
c) used as a sensor in atomization industry
d) to detect cracks in the bridge

70). Which of the following is not the application of x-rays-----

- | | |
|---|--------------------------------------|
| a) used to detect bone fracture in the body | b) used in eye surgery |
| c) used to destroy tumors | d) used to cure diseases like cancer |

71) Which of the following is not the application of x-rays-----

- | | |
|-----------------------------------|---|
| a) used in speedometer of vehicle | b) used to study crystal structure |
| c) used in chemical analysis | d) used to study structure of substances like rubber, plastic |

72). The energy of x-ray photon is 3×10^{-16} J. its frequency is----

- | | |
|------------------------------|------------------------------|
| a) 0.497×10^{16} Hz | b) 18.52×10^{18} Hz |
| c) 18.52×10^{16} Hz | d) 0.497×10^{18} Hz |

73). Calculate operating voltage of x-ray tube which emits x-ray of wavelength 0.25 \AA -----

- | | |
|------------|------------|
| a) 25 kV | b) 30.6 kV |
| c) 35.7 kV | d) 49.6 kV |

74). Which of the following is a unique property of laser?

- | | |
|----------------|---------------|
| a) Directional | b) Speed |
| c) Coherence | d) Wavelength |

[View Answer](#) c

Explanation: Coherence is an important characteristic of laser beam because in laser beams, the wave trains of the same frequency are in phase/ Due to high coherence it results in an extremely high power.

75). Which of the following is an example of optical pumping?

- | | |
|------------------------|----------------------|
| a) Ruby laser | b) Helium-Neon laser |
| c) Semiconductor laser | d) Dye laser |

[View Answer](#): a

Explanation: The atoms of Ruby are excited with the help of photons emitted with the help of photons emitted by an external optical source. The atoms absorb energy from photons and raise to excited state. Therefore Ruby laser is an example of optical pumping.

76). When laser light is focused on a particular area for a long time, then that particular area alone will be heated.

- | | |
|---------|----------|
| a) True | b) False |
|---------|----------|

[View Answer](#): a

Explanation: Laser beam has very high intensity, directional properties and coherence. When it is focussed on a particular area for a long time, then the area alone will be heated and the other area will remain as such. This is called thermal effect.

77). What is the need to achieve population inversion?

- | | |
|--------------------------------|---|
| a) To excite most of the atoms | b) To bring most of the atoms to ground state |
|--------------------------------|---|

c) To achieve stable condition

d) To reduce the time of production of laser

View Answer: a

Explanation: When population inversion is achieved, the majority of atoms are in the excited state. This causes amplification of the incident beam by stimulated emission. Thus the laser beam is produced.

78). Laser is called as a non-material knife.

a) False

b) True

View Answer: b

Explanation: In laser surgery, without knife, bloodless operation, cutting tissues etc can be made, hence laser is called non-material knife.

79). DVD uses the laser.

a) True

b) False

View Answer: a

Explanation: A DVD player contains a laser. By moving the lens longitudinally, different depths can be reached in the disc. In order to make room for a lot of information on every disc, the beam has to be focused on as small an area as possible. This cannot be done with any other light source.

80). He-Ne laser is a

a) **three level laser**

b) four level laser

c) two level laser

d) five level laser

81). The pumping source in He-Ne laser

a) optical

b) electric discharge

c) chemical

d) mechanical

82). The ratio of He to Ne in He-Ne laser is

a) 1:10

b) 2:13

c) 10:1

d) 3:15

83). The active medium in He-Ne laser is

a) He

b) Ne

c) He-Ne

d) All correct

84). The role of He in He-Ne laser is

a) He is an active medium

b) population inversion takes place in He

c) Stimulated emission takes place in He

d) He atoms help in exciting Ne atoms

85). The reason for narrow tube in He-Ne laser

a) atomic collision with tube wall increases

b) atomic collision with tube wall decreases

c) there is no effect of narrow tube on He-Ne Laser

d) atomic collision with tube wall constant

86). Population inversion in laser means

a) number of atoms in ground state are more than number of atoms in excited state

b) number of atoms in ground state are less than number of atoms in excited state

c) number of atoms in ground state is equal to number of atoms in excited state

d) none

87). Metastable state has life time approximately

- a) 10^{-3} s
- b) 10^{-8} s
- c) 10^{-10} s
- d) 10^{-12} s

88). An excited state (except metastable state) has life time about

- a) 10^{-3} s
- b) 10^{-8} s
- c) 10^{-15} s
- d) 10^{-20} s

89). LASER is a short form of

- a) Light Amplification by Spontaneous Emission of Radiation.
- b). **Light Amplification by Stimulated Emission of Radiation.**
- c). Light Absorption by Stimulated Emission of Radiation.
- d). Light Absorption by Spontaneous Emission of Radiation.

90). Laser beam is made a of

- a) Electrons
- b) **Highly coherent photon**
- c). Elastic particles
- d) Excited atoms

91). The material in which the population inversion is achieved is called as

- a) **Active medium**
- b) metastable state
- c) passive medium
- d) stable states

92). The life time of metastable state when compared to excited state is

- a) Smaller
- b) **Greater**
- c) Equal

93). In population inversion process the number of atoms in metastable state is compared to the ground state is

- a) Smaller
- b) **Greater**
- c) Equal

94). The population inversion process is due to the existence of

- a) **Metastable state**
- b) Excited state
- c) Ground state
- d) Underground state

95). In lasing action, the light amplification is due to

- a) **Stimulated emission**
- b) Spontaneous emission
- c) Stimulated Absorption
- d) spontaneous absorption

96). In Laser, stimulated emission depends on

- a) Number of atoms present in metastable state
- b) The intensity of incident light
- c) **Both are correct**
- d) Both are wrong.

97). Which of the following is not a property of laser light?

- a) is coherent
- b) is monochromatic
- c) beam is extremely intense
- d) high penetration power

98). LASER light is coherent means-----

- a) all the waves have same frequency or wavelength
- b) all the waves are exactly in same phase
- c) all the waves are exactly in opposite phase
- d) all the waves carry same energy

99). LASER light is monochromatic means-----

- a) all the wave have same frequency or wavelength
- b) all the waves are exactly in same phase
- c)all the waves are exactly in opposite phase
- d)all the waves are carry same energy

100). Atom in the ground state absorbs energy of incident photon and get excited towards higher energy level. This process is known as -----

- a)Spontaneous emission
- b)Stimulated emission
- c)Stimulated Absorption
- d) photon collision

101). After completion of life time, the excited atom comes to lower energy state on it's own emitting a photon. This is known as-----

- a)Spontaneous emission
- b)Stimulated emission
- c)Stimulated Absorption
- d) photon collision

102) when an atom is in excited state and before coming to ground state if the atom is triggered due to an action of incident photon. The interaction between the excited atom and incident photon can trigger excited atom to make transition to ground state. This process is called as----

- a)Spontaneous emission
- b)Stimulated emission
- c)Stimulated Absorption
- d) photon collision

103). An atom remains in excited state for very very small time (10^{-8} sec) and comes to the ground state immediately. This state is known as-----

- a) short excited state
- b)temporary excited state
- c)metastable excited state
- d)ordinary excited state

104). life time of hydrogen is-----

- a) 10^{-3} sec
- b) 10^{-8} 10^{-3} s
- c) 10^3 sec
- d) ten years

105) The relaxation time for metastable state is-----

- a)ten years
- b)1 year
- c) 10^2 to 10^4 sec
- d) 10^{-6} sec to 10^{-3} sec

106). Which of the following is not a application of LASER-----

- a)used for engraving and embossing
- b) used for cutting and drilling metals
- c) used for chemical analysis
- d) used for computer printers

107).Making population of higher level more than that of ground state is called---

- a) population hiker
- b) population inversion
- c)crowd maker
- d) none of these

108).A system in which population inversion achieved is called-----

- a) inverse system
- b) active system
- c)perfect system
- d) none of these

109). The process of raising atom from lower energy level(state) to higher energy state (level) is called---

--

- a)lifting
- b)hiking

d) pumping

b) electrical pumping

d) jet pumping

b) electrical pumping

d) chemical pumping

b) Two energy level laser system

d) none of these

a) high monochromaticity and stability of frequency

c) high speed of lasers

114).In He-Ne laser, the tube is filled with-----

b) 90% He and 10% Ne

d) 60%He and 40% Ne

a) 20.61 eV and 20.66 eV

b) 18.7eV and 20.66eV

d) 18.7eV and 18.82eV

a) Helium

b) Neons

d)Oxygens

a)reduce

b) subtract

d) decrease

a) X-ray tube

b) Monochromator

c) Collimator

d) Detector

Explanation: In X-ray spectrometers, the specimen or the sample is placed after the X-ray tube. The X-ray tube is the source of the X-ray.

a) Meyer tube

- b) West tube
- c) Anger tube
- d) Coolidge tube

Answer: d

Explanation: Coolidge tube is used to generate X-rays. It is the source of X-rays. Coolidge tube requires stabilised current and high voltage.

120). Using which of the following components is the generated x-rays focussed upon the specimen?

- a) X-ray tube
- b) Monochromator
- c) Collimator
- d) Detector

Answer: c

Explanation: Collimator is used to focus the generated x-rays upon the specimen. The collimator is in between the specimen under analysis and the Coolidge tube.

121). The cathode in the Coolidge tube is made of which of the following elements?

- a) Quartz
- b) Iron
- c) Tungsten
- d) Barium

Answer: c

Explanation: The cathode in the Coolidge tube is made of tungsten. The anode is made of copper.

122). The cathode in the Coolidge tube is kept in an inclined manner.

- a) True
- b) False

Answer: b

Explanation: The anode in the Coolidge tube is kept in an inclined manner. The anode is made of copper.

123). Which of the following is not a target metal used in the Coolidge tube?

- a) Rhodium
- b) Cobalt
- c) Gold
- d) Silver

Answer: c

Explanation: Gold is not used as a target metal in the Coolidge tube. The other target metals are copper, molybdenum and chromium.

124). When x-rays emitted from molybdenum are allowed to pass through a zirconium filter, which of the following occurs?

- a) It absorbs radiation of shorter wavelength
- b) It absorbs radiation of longer wavelength
- c) It allows radiation of shorter wavelength to pass through
- d) It allows radiation in a particular band to pass through

Answer: b

Explanation: When x-rays emitted from molybdenum are allowed to pass through a zirconium filter, it absorbs radiation of shorter wavelength. It allows radiation of a stronger wavelength to pass through.

125) Which of the following crystals are not suited for x-ray grating?

- a) Topaz
- b) Lithium fluoride
- c) Calcium fluoride
- d) Sodium fluoride

Answer: d

Explanation: The crystal which is not suited for x-ray grating is sodium fluoride. Other crystals which are suitable for x-ray grating are gypsum and sodium chloride.

Sample Questions APPLIED SCIENCE (22211)

(For Term End Online Examination, there will be 25 (15 x 1Mark questions + 10 x 2Marks questions = 35 Marks) questions each on Physics and Chemistry.)

Topic 1

1) Question: - Two capacitance $4\mu\text{F}$ and $8\mu\text{F}$ are first connected in series and then parallel their equivalent capacitance are _____ and _____ respectively.

Option A: - $2.66\mu\text{F}$, $12\mu\text{F}$

Option B: - $12\mu\text{F}$, $2.66\mu\text{F}$

Option C: - $4\mu\text{F}$, $12\mu\text{F}$

Option D: - $12\mu\text{F}$, $4\mu\text{F}$

2) Question: - Three capacitors each of capacity C are connected. The resultant capacity ($2C/3$) can be obtained by connecting _____.

Option A: - all of them in series

Option B: - all of them in parallel

Option C: - Two of them in parallel and third in series with this combination

Option D: - Two of them in series and third in parallel across this

3) Question: - If the area of metal plates of capacitor with capacitance C is doubled, then capacitance will become _____.

Option A: - C

Option B: - $2C$

Option C: - $4C$ Option D: - $C/2$

4) Question: - A capacitor of capacity $50\mu\text{F}$ is connected across a supply of 5V . Find the energy stored in the capacitor.

Option A: - $625\mu\text{J}$ Option B: - 6.25J

Option C: - 62.5J Option D: - $125\mu\text{J}$

5) Question: - When condensers are connected in parallel, _____ gets divided into a number of parts.

Option A: - charge Option B: - current

Option C: - Both (A) and (B) Option D: - potential

6) Question: - The algebraic sum of voltages around any closed path in network is equal to _____.

Option A: - Infinity Option B: - -1

Option C: - 0 Option D: - $+1$

Topic 2

7) Question: - Who of the following is associated with radioactivity?

Option A: - Henry Becquerel Option B: - Issac Newton

Option C: - Albert Einstein Option D: - C. V. Raman

8) Question: - The half-life period of a radioactive element is 5 years. If the number of atoms present initially (at $t=0$ years) is 20,000; how many atoms would remain after 20 years?

Option A: - 10,000 Option B: - 7,500

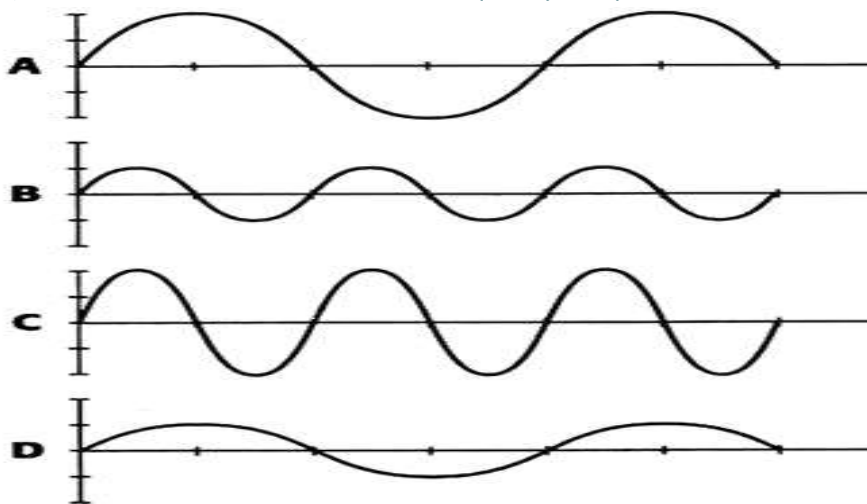
Option C: - 5,000 Option D: - 20,000

9) Question: - Half-life period of a radioactive element is given by $T = \frac{0.693}{\lambda}$ where all symbols have usual meanings.

Option A: - $0.693/\lambda$ Option B: - 0.693λ

Option C: - $0.693/N$ Option D: - $0.693 N$

10) Question: - Which wave has same frequency and periodic time as wave A



Option A: - Wave B

Option B: - Wave C

Option C: - Wave D

Option D: - Both (B) and (C)

11) Question: - Which of the following statement is not true?

Option A: - When the observer moves away from the stationary source, then the pitch of sound decreases

Option B: - When the observer moves towards the stationary source, then the pitch of sound increases

Option C: - When the source moves away from stationary observer then the pitch of the sound decreases

Option D: - When the source moves towards the stationary observer then the pitch of the sound decreases

12) Question: - A siren of police car emits pure tone at a frequency of 640 Hz. Find the frequency that a stationary person would hear when the car approaches him. The police car is moving towards him at 20 m/s. (Velocity of sound in air = 340 m/s)

Option A: - 680 Hz

Option B: - 604.45 Hz

Option C: - 1360 Hz

Option D: - 1208.89 Hz

13) Question: - In photoelectric effect, by increasing the intensity of incident light on the surface of the metal, _____ increases

Option A: - photoelectric current

Option B: - penetration power

Option C: - ionizing power

Option D: - stopping potential

14) Question: - The photoelectric work function of the metal is 3.3eV. Then the threshold frequency of the metal will be _____.

Option A: - 7.96×10^{14} Hz

Option B: - 8.96×10^{14} Hz

Option C: - 7.96×10^{15} Hz

Option D: - 8.96×10^{15} Hz

15) Question: - Which of the following are properties of the photon?

Option A: - indivisible entity

Option B: - travels with speed of light

Option C: - Does not get deflected by electric or magnetic field

Option D: - All of the above

16) Question: - The wavelength of 1 keV photon is 1.24×10^{-9} m, then frequency of 1 MeV photon is _____.

Option A: - 1.24×10^{15} Hz

Option B: - 2.4×10^{15} Hz

Option C: - 1.24×10^{20} Hz

Option D: - 2.4×10^{20} Hz

17) Question: - In He-Ne laser, He atom transfer their energy to Ne atom through _____

Option A: - elastic collision

Option B: - inelastic collision

Option C: - absorption

Option D: - emission

18) Question: - A laser consists of active medium of collection of _____

Option A: - atoms

Option B: - molecule

Option C: - ions

Option D: - All of these

19) Question: - The ratio of photon energy to its frequency is _____

Option A: - its speed

Option B: - its velocity

Option C: - its wavelength

Option D: - plancks constant

20) Question: - The work function of a substance is 1.6 eV. Find the longest wavelength of light that can produce photoemission from the substance.

Option A: - 2900 Å

Option B: - 3867 Å

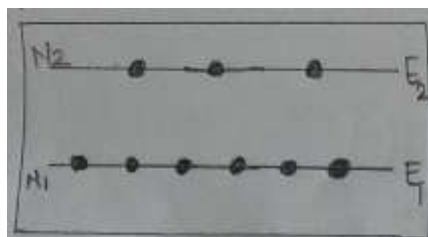
Option C: - 5800 Å

Option D: - 7734 Å

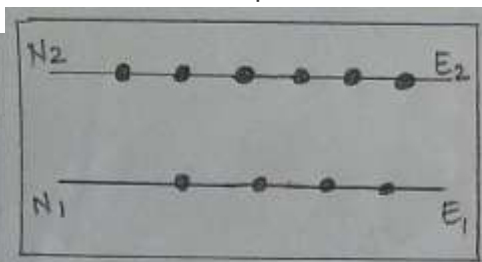
21) Question: - Out of the following which diagram explains population inversion _____

Option A

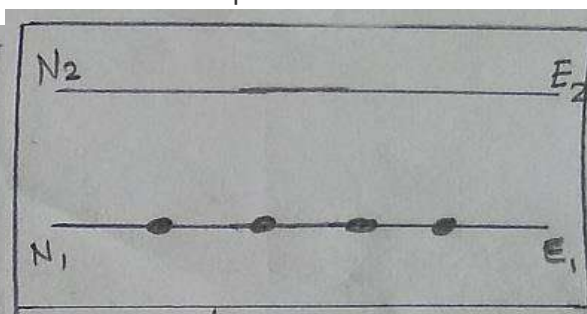
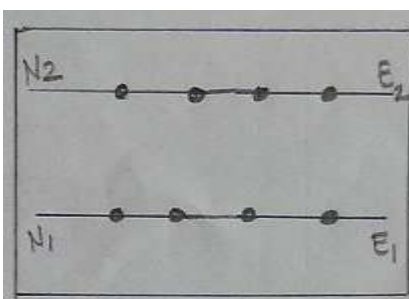
Option B



Option C



Option D



22) Question: - LASER light is coherent _____

Option A: - All the waves have same frequency

Option B: - All the waves are exactly in the same phase

Option C: - All the waves have same wavelength

Option D: - All the waves are exactly in the opposite phase

23) Question: - In He-Ne LASER, the tube is filled with _____

Option A: - 10 % He and 90 % Ne

Option B: - 20 % He and 80 % Ne

Option C: - 90 % He and 10 % Ne

Option D: - 80 % He and 20 % Ne

24) Question: - The conductivity of LDR increases as

Option A: - intensity of light increases

Option B: - intensity of light decrease

Option C: - wavelength of light increases

Option D: - None of the above

QUESTION BANK ...22211- APPLIED SCIENCE(CHEMISTRY)

MCQS:-UNIT –IV – WATER TREATMENT& ANALYSIS

1) The process of removing Ca&Mg from hard water is known as.....

- a)filtration b)flocculation
- c) sedimentation d)water softening'.

2)The metallic constituent of hard water are.....

- a)Mg ;Sn&Fe b)Ca , Mg &Fe
- c)Fe, Sn&Ca d)Mg Ca&Sn

3) Which of the following is NOT a property of hard water?

- a)it leathers easily with soap solution b)It has nice taste
- c)It is not good for steam generation d)it causes scale formation in kettles

4) Zeolite SOFTINING PROCESS REMOVES....

- a)Only temporary hardness of water b) Only permanent hardness of water
- c) Both temporary & permanent hardness of water d) none of this..

5 Harhness of water does not....

- a) Have any bad effect in boiler b) make cooking of foods difficult
- c) make unfit for drinking d)causes difficulty on washing of cloths with soaps

6) Sedimentation is a physical process to remove

- a)colloidal particles b)suspended particles
- c) MICROORGANISM d)ALL OF THEASE .

7) permanent hardness of water be removed by the addition of

- a)Lime b)soda ash
- c) potassium -permagnate d)sodium bicarbonate

8) Purest form of naturally occurring water is

- a) Rain water b) river water c) lake water d)well water.

9)BOD stands for...,...

- a)biochemical oxygen demand b) british oxygen demand
- c)) Chemical oxygen demand d) None of above

10)) water which does not produce leathers easily with soap is....

- a)mineral water b)hard water c)soft water d)distilled water.

11) permanent hardness is hardness that cannot be removed..

- A)boiling b)adding lime c)coagulation d)all of these

12) The liquid waste from kitchen ,bathrooms & wash basins are not called .

- a) liquid waste b)sludge c) sewage d) none of these

13)) The standard BOD of water is taken for..

- a)1 day b) 2days c) 5 days d)10 days.

14) permanent hardness of water is known as ...

- a) carbonate hardness b)non carbonate hardness
- c)both a& b d) non e of these

15)Scale in boiler are formed duo to.....

- a)deposition of CaCO_3 b)deposition of CaSO_4
- C)Hydrolysis OF Mg. d) all the above

16) The most commonly used unit to express hardness is...

- a)drgree French b)ppm
- c)degree clarks d)gallon

17) Lime soda process uses..

- a)Ca (OH)₂ b)Na₂ CO₃
- C)BOTH CaCO_3 & Na_2co_3 d)chloramine.

18) Residual hardness in ion exchange process is...

- a)10-15ppm b)30-60ppm c)15-20 ppm d)0-2 ppm

19) Alkalinity of water is due to

- a) OH^- b) CO_3 c) HCO_3 d) All the above

20) COD STANDS FOR

- a) chemical oxygen demand b) biochemical oxygen demand
c) chem -oxy demand d) all above

21) Which is not used for disinfection of water?

- a) chlorination b) electro-dialysis
c) ozonization d) Addition of KMnO_4

22) Acceptable pH range for drinking water is....

- a) 07-8.5 b) 06-07 c) 08-10 d) 6.5 -9.2

23) Bicarbonates of calcium & magnesium cause

- a) softness b) permanent hardness
c) temporary hardness d) all the above..

24) temporary hardness of water can be removed by...

- a) boiling b) filtration c) sedimentation d) solvent extraction

25) Ultraviolet rays are used in water treatment for ...

- a) illumination b) disinfection c) coagulation d) sedimentation

26) Fresh sewage may become stale in....

- a) one hour b) 2-3 hours c) 3-4 hours d) 6 –hours

27) FOR domestic use of water must be...

- a) sparkling b) free from salt
c) HYGIENICALLY PURE d) free from chlorine

28) COAGULATION PROCESS REMOVES...

- a) Floating materials b) suspended particles
c) COLLOIDAL PARTICLES d) MICRO ORGANISM.

29)Sterization of water can be done for

- a)chlorination b)aeration c)using UV rays d)all the above

30) In chlorination process , the germs are killed by...

- a)chlorine gas b)chlori amine c)bleaching powder d) all the above

31)In ozonizationis used to sterilize water ...

- a)oxygen gas b)ozone gas c)solid ozone d)chlorine gas

32) Aeration is the process of

- a)spraying water into droplets b)allowing water to flow I ditch
c)STORING water in tanks d) all the above

33)Swimming pool water should be sterilized by..

- a) sedimentation b) filtration c) solvent extraction d)UV rays

34)Ozone acts as....

- a)Sterilising agent b) Decolorising agent c)deodouring agent d)all of these

35)PH range for city water supply...

- a) 1-4 b)6.6-7.5 c) 8-10 d) all the above.

36)When soap is added to hard water, a white ppt ofis formed

- a)sludge b)flux c)Scum d) Scale

37)Secondary treatment usesto consume wastes.

- a) Microorganism b)chemicals c) filtration d) None of these

38)Reverse osmosis is a water purification technic that uses.....

- a)Coagulants b)resins c)semipermeable membrane d)lime soda.

39)Screening is the process of removing From water.

- a)scale& sludge b)colloidal particles
b)suspended particles d) floating materials

40) colloidal particles are responsible for ...

a)Hardness of water b) Turbidity of water

c)odors of water d)ALL the above

41)Hot lime soda process produces water of hardness of

a)30-60ppm b)0-2ppm c)15-30ppm d)5-10ppm

42) cold lime soda process produces water of hardness of

a)30-60ppm b)0-2ppm c)15-30ppm d)50-60ppm

43)Turbidity is caused by ...

a) clay b)organic matter c)microbes d)ALL the above

44)One ppm....

a) 0.07 fr b).7 fr c)0.1 fr d)0.01 fr

45)Select the unit is used to measure turbidity of water,.....

a)NTU b)ppm c)sec/cm² d)ATU

46)The total dissolved solids(TDS)can be reduced by the following method....

a)Distillation b)Reverse osmosis c)ion exchange d) All the above

47)The Chemical oxygen demand measure the.....

a)amount oxygen required for growth of microorganism in water

b) amount oxygen removed in order to oxidise to organic matter

c)) amount oxygen required to oxidise Ca present in waste water

d)none of these

49) temporary hardness of water is used in the presence of

a) chlorides of Ca& Mg b) sulphates of Ca& Mg

c) cabonates of Ca& Mg d) bi cabonates of Ca& Mg

50)Highly alkaline water in boiler causes

a)corrosion b)scale & sludge formation

c)lubrication d)priming& foaming

51) SELECT THE COMPOUND WHICH IS USED IN THE MAIN PART OF ION EXCHANGE PROCESS

USED FOR softening of hard water

- a) Brine solution b) Na-zeolite c) Resins d) all the above

52) Alum is added to water to facilitate the process of ...

- a) condensation b) melting
c) sedimentation d) evaporation

53) Pollution of water bodies can be controlled by...

- a) releasing industrial waste into water
b) throwing plastics into water
c) dumping waste in water
d) treatment of sewage waste before disposal

54) Water that is good enough to drink is called

- a) Potable water b) ground water c) surface water d) Artesian water

55) Hardness of water is due to the salts of ...

- a) Potassium b) Chlorine c) Mg d) Boron

56) According to WHO, the soft water has 0 to ...mg per litre as CaCO_3 ...

- a) 30 b) 60 c) 90 d) 129

57) Fluorides can be removed by.... all the above

- a) Reverse osmosis b) lime-softening c) ion exchange d) all the above

58) Which of the following ions get released from the cation exchange column

- a) H^+ b) Na^+ c) K^+ d) Ca^{++}

59) Which of the following ions get released from the anion exchange column

- a) CO_3 b) OH^- c) Cl^- d) F^-

60) Ion-free water get released from exchange is known as....

- a) Potable water b) drinking water

c)Coagulated water c)demineralised water

61)The total hardness of drinking water is...

a)500ppm b)700ppm c)900ppm d)1000ppm

62) THE example of brackish water is.....

a) Potable water b) drinking water
c) Sea water d) underground water

63) Reverse osmosis is a water purification technic is known as...

a) hyper –filtration b) double filtration
c) double - osmosis d) hyper – osmosis

64) Water is mainly used in boilers' for generation of,....

a)power b)elasticity c) steam d)current

65)Select an anion exchanger from the following...

a) Amberlite IR 120 B) Amberlite 400
C)DOWEX -50 d) None of these

66) Select an cation exchanger from the following...

a) Amberlite 400 b) Amberlite IR 120
c))DOWEX -50 d) triolite

67)Which one of theses not cation exchanger.....

a) Amberlite 400 b) Amberlite IR 120
c))DOWEX -50 d) triolite

68)Disposal to sewage in large cities , is done in....

a)Oxidation b)irrigation c)dilution d) reduction

69) the coagulant widely used for sewage treatment is...

a)alum b)ferric chloride c)ferric- sulphate d)chlorine

70)Removal of oil & gas from sewage , is known as...

a) screening b) skimming c) filtration d)) None of these

71) For the COD test of sewage, d) organic matter is oxidized by potassium chromate, in the presence of ...

a) H_2SO_4 B) HNO_3 C) HCl d) None of these

72) Scale formation in water causes...

a) no loss of heat b) wastage of heat c) increase in efficiency d) None of these

73) What is the chemical formula of slaked lime....

a) $\text{Ca}(\text{OH})_2$ b) CaO c) CaCO_3 d) CaCl_2

74) The gas which may cause explosion in sewage is....

a) carbon monoxide b) carbon dioxide c) carbon d) METHANE

75) Flocculated particles do not change their

a) Size b) shape c) weight d) None of these

76) The detention period for plain sedimentation water tanks, is usually

a) 16-24 hours b) 4-8 hours c) 8-16 hours d) 24-36 hours

77) The standard BOD of water is taken for....

a) 2 –days b) 3- days c) 1- day d) 5-days

78) Blow-down operation causes the removal of....

a) scales b) sludges c) Bacteria d) Turbidity

79) The formation of Wet steam in boiler is called as ...

a) Foaming B) PRIMING
C) Scale & Sludge formation d) None of these

80) In a nephelometer turbidity meter the light detectors are at

a) 180 b) 360 c) 90 d) 270

81) Which is not used for desalination of water.....

- a) boiling b) Lime soda process
- c) electrodialysis d) flash evaporation

82) flash evaporation is a method of getting pure water from....

- a)) Potable water b) drinking water
- c) Sea water d) underground water

83) temporary hardness of water is removed by...

- a) chlorination b)electo dialysis
- c)Boiling d)sedimentation

84)UV –RAYS ARE used in water treatment for

- a)sedimentation b) filtration c) solvent extraction) disinfection

85) Which of the following is not hazardous chemical present in water.....

- a) Cadmium b) calcium c)chromium d)Arsenic

86)Sterilization of water can be done by using....

- a)oxygen b)hydrogen peroxide c)potash d)ozone

87) Distilled water can be obtained by.....

- a)boiling b) Lime soda process
- c)Zeolite process d)Ion exchange process

88) Which of the following substances are commonly used in a filter....

- a) charcoal b) sand c) both charcoal & sand d)alumina

89)The ultimate sources of water is

- a)Rivers &lakes b)Dew & forests
- c)Rain &snow d)surface & ground water

90)Acidity of water is caused due to....

- a) mineral acids b)free CO₂
- c)iron sulphate d)all the above

91) Turbidity of Raw water is measure of ...

- a)suspended solids b) acidity of water
- c)microbes d)ALL the above

92))The maximum depth of sedimentstion tank is

- a)2- m b)6- m c)4-m d)5-m

93) Which one of the following is NOT a property of water....

- a) It Boils at 80. b)It is a good solvent
- c) density is low d)It clings to glass by capillary action)

94)The principle of chlorination is.....

- a) Formation OF Nasent oxygen b) Formation of oxygen molecule
- c) Formation OF HCL d)Formation of CHLORINE gas

95).....is not consequence of scale & sludge formation in the boiler.

- a)Abrasion b)wastage of fuel
- c)danger of explosion d)decrease in efficiency

MCQS:-UNIT –V- ELECTROCHEMISTRY AND BATTTERIES

1) Sodium chloride is a.....

- a)metallic conductor b)electrolytic conductor
- c)both a& b d) none of these

2)) Sodium chloride is called an electrolyte , because.....

- a)its molecules are made of charged particles
- b) it is decomposed when an E.C.is passed through it
- c)it breaks up into ions, when a current is passed through it
- d)it ionizes, when fused or dissolved in porper solvent.

3)Which of the following is an electrolyte ?

- a)benzene b)chloroform c)alcohol d) Sodium chloride

4) Which one of the following is not a strong electrolyte ?

- a)NaCl b)NaOH c)NH₄OH d)H₂SO₄

5) Ionisation of electrolyte in aqueous solution is due to.....

- a)instability of the compound in aqueous solution
b) hydrolysis of electrolyte
c)Decrease in electrostatic force of attraction between oppositely charged ions
d) increase in electrostatic force of attraction between ions

6)) Which of the following does not conduct electricity ?

- a)molecule NaCl b)NaCl crystal
c)solution of NaCl d) none of these

7) An ionizing solvent has.....

- a)Low value of dielectric constant b) high value of dielectric constant
c) a dielectric constant is equal to 1 d) has high M.P.

8) NaOH is considered as a strong base because

- a)it is highly caustic substance b)it is readily soluble in water
c)it ionizes completely in aq. Solution d)highly soluble in water

9)Acetic –acid is a weak electrolyte because.....

- a) its molecular weight is high b)it is a covalent compound
c) IT does not dissociate much d)highly unstable

10)SULPHURIC ACID is stronger acid than acetic because.....

- a)it dissociates completely b) it has high molecular weight
c) IT does not ionise d) acetic acid ionizes less

11) Sodium chloride is a bad conductor of electricity

- a)Contains a one molecule b) it does not have ions
c)the ions present in it are not free d) none of above

12) Acetic –acid is a weaker than sulphuric acid because.....

- a)) it dissociate much at low temperature
- b) it ionizes to smaller extent
- c) it is readily soluble in water
- d)It gives only one hydrogen atom

13) pure water does not conduct electricity because it is....

- a) neutral b) has low boiling point
- c) almost not ionized d) decomposes easily

14) Conductivity of a solution is directly proportional to its...

- a) Concentration b) number of ions c) current density d) vol. of solution

15) Specific conductance is conductance of solution of volume.....

- a) 1 cm³ b) 10 cm³ c) 1000 cm³ d) 10000 cm³

16) Conductivity of an electrolyte in solution....

- a) increases with concentration & temperature
- b) decreases with increase of conc. & increase with increase of temperature
- c) decrease with concentration & temperature
- d)) none of above

17) the unit Specific conductance is..

- a) ohm cm³ b) ohm⁻¹ cm c) ohm cm d) ohm⁻¹ cm⁻¹

18)) the unit Specific conductance of an electrolyte on dilution

- a) decreases b) increase c) remain unchanged d)) none of above

19) the unit Specific conductance is..

- a) ohm cm² b) ohm cm c) mhos cm⁻¹ MHOS⁻¹ CM

20) The electrode potential is the tendency of metal

- a) to gain electron b) to lose the electron

c) either to lose or gain of electron d) none of above

21) Calomel is constructed using a solution of.....

a) SATURATED KCl b) SATURATED CaCl_2

c) SATURATED NH_4Cl d) SATURATED NaCl

22) A Galvanic cell converts.....

a) Electrical energy into chemical energy

b) chemical energy into electrical energy

c) Electrical energy into heat energy

d) chemical energy into heat energy

23) The unit EQUIVALENT conductance is..

a) $\text{ohm}^{-1} \text{cm}^2 \text{eq}^{-1}$ b) $\text{ohm} \text{cm}^2 \text{eq}^{-1}$

c) $\text{ohm}^{-1} \text{cm}^2 \text{eq}$ d) $\text{ohm}^{-1} \text{cm}^{-2} \text{eq}^{-1}$

24) EQUIVALENT conductance of a weak electrolyte on dilution.....

a) decreases b) increase c) remain unchanged d)) none of above

25) Calomel is

a) Mercuric chloride b)) Mercurous chloride

c)) Mercurous sulphide d) Mercuric iodide

26) The unit of cell constant is

a) cm^{-1} b) cm c) cm^2 d) none of above

27) During charging of a lead acid cell.....

a) a voltage increases

b) a give a out energy

c) its cathode becomes dark brown colour

d) Specific conductance decreases

28) During charging the specific gravity of a electrolyte of a lead acid cell.....

a)decreases b) increase c)remain unchanged d)) becomes zero

29)) During discharging condition the f a lead acid cell acts as.....

a)Voltaic cell or galvanic cell which converts electrical energy into chemical energy.

b)Voltameter which converts electrical energy into chemical energy

c)both mentioned above

d) none of above

30)) When a lead acid cell is fully charges condition , the colour of its +ve plate is.....

a)dark gray b)brown c)dark brown d) blue

31)The best indication about state on a lead acid cell is given by.....

a)output voltage b) temperature of electrolyte

c) specific gravity of electrolyte d) none of above

32) The storage battery generally used in electric power station is,.....

a)Ni-cd battery b)fuel cell c)lead acid battery d)Zn-C –Battery

33)The output voltage of battery charger is....

a)Less than the battery voltage a) higher than the battery voltage

c)the same as the battery voltage

34) Cells are connected in series in order to.....

a)increase the voltage rating b)increase the current rating

c) increase the life of the cell d) For decent appearance.

35) The capacity of battery is expressed in term of....

a)current rating b)voltage rating

c) ampere –hours rating d) none of above

36) The lead storage battery can be revived by.....

a) Adding distilled water b0 Adding so-called battery restorer

c)A USE OF SULPHURIC ACID d) none of above

electricity during charging or discharging are known as...

- 38) in a lead acid cell , dil H₂ SO₄ approximately comprises the following..

- 39) It is noted that During charging the of a lead acid cell.....

- 40) It is noted that During charging the of a lead acid cell

a) The cell absorbs energy b) specific gravity of H_2SO_4 decreases
c) Voltage of cell decreases d) All of these

a)dull b)reddish c)bright d)milky

a) positive active metal b) negative active metal
c) passive metal d)) none of above

a)1.8 V B)1.9V C)2 V D)2.1V

a) Daniel cell b) lead cell c) Leclanche cell d) Edison cell.

45) In alkaline cell, the electrolyte is...

a) Dil H_2SO_4 b) Conc H_2SO_4 c) NaOH d) KOH

46) A fuel cell is used to convert chemical energy into

a) solar energy b) mechanical energy c) electrical energy d) potential energy

47) one ampere hour charge is equivalent to

a) 36 coulombs b) 360 coulombs c) 3600 coulombs d) 36000 coulombs

48) reference electrode is used with glass electrode in measuring pH.

a) hydrogen b) calomel c) copper d) none of these

49) Which batteries are rechargeable?

a) primary b) secondary c) solar cells d) none of these

50) Which battery is used in aeroplanes?

a) Dry cell battery b) lead acid battery

c) Ni-cd battery d) none of these

51) Containers of storage battery are....

a) moulded hard rubber b) ceramics

c) celluloid d) any one of these

52) The -ve pole of dry cell is made up of

a) carbon b) copper c) zinc d) mercury

53) An electrochemical cell is based upon.....

a.) acid-base reaction c.) redox reaction

c). nuclear reaction d). none of the above.

54). Which one of the following will be good conductor of electricity?

a). pure distilled water b). molten NaCl

c.) dilute sol of glucose d.) chloroform

55) . Metallic conductors conduct electricity.....

a) with chemical change b.) without any chemical change

- c). both a & b d) none of these

56) Substances through which electric current cannot pass are called.....

- a) insulators b) conductors c) anode d). cathode.

57). In lead accumulator the electrolyte H_2SO_4 solution is.....

- a.) 30 % b.) 60 % c). 80% d) 90 %

58) When aqueous solution of NaCl is electrolyzed.....

- a) Cl_2 is evolved at the cathode b) H_2 is evolved at cathode
c) Na is deposited at the cathode d) Na appears at the anode

59) Li- ion battery is.....

- a) light weight b) heavy weight c) medium weight d) all of these

60) **THE lead acid cell produces electrical energy b**

- a)12 v b)14 v c)16 v d)20v**

61) **When a lead acid cell is fully charges , the electrolyte assumes..... appearance.**

- A)dull b)reddish c)bright d) none of these**

62) **Which one of the following is not a strong electrolyte ?**

- a)NaOH b)NaCL c)HCl d) $\text{H}_2\text{C}_2\text{O}_4$

63) **Which one of the following is not a weak electrolyte ?**

- a) NH_4OH b) CaCL_2 c)HCl d) $\text{H}_2\text{C}_2\text{O}_4$

64)**Dry cell is modification of**

- a)Daniel cell b)lead cell c) Leclanche cell d) FUEL CELL**

MCQS:-UNIT –VI- Metals, Alloys &insulators

1) The most rugged temperature sensing element listed here is....

- a)thermocouple b)iron metal c) glass electrode d)all of these

2) Type K thermocouple is made of the following metals.....

- a)iron & constantan b)chromel&alumel

c)copper & constantan d)Al & TUNGSTEN

3)Which of the following will give the highest output for the same value of hot & cold junction temperature?

a)pt-pt +Rhodium b) iron & constantan

c) Chromel - constantan d) all of these

4) Which thermocouple can be used to measure a same temperature of around 1400 C

a) copper & constantan b) chromel&alumel

c) pt-pt +Rhodium d) none of these

5) thermocouple is suitable for measuring.....

a)Liquid temperatures only b) very high temperatures only

c) very low temperatures only d)Both high & low temperatures

6) Chromel - constantan maketype of thermocouple .

a) K B)E C) j D) R

7).....is not a nickel alloy.

a) alumel b) constantan c) Chromel d)Amalgam

8)) constantan is also named as.....

a)Advance b)ferry c)eureka d) all of these

9)In conductors , electron can flow because their.....

a)Iron are free b)protons are free

c) electron are free & mobile d)negative ions are free

10)Out of the following , which is insulating material?

a)copper b)gold c) mica d)silver

11) Nichrome wire is an alloy of.....

a)lead & zinc b)Cr &Vanadium c)Ni - Cr d)copper &silver

12)Silicon -fluid is a

a)liquid b)solid insulator c) gaseous insulator d) semi solid insulator

13) Glass is a

a)transperant solid b))transperant super cooled solid

c) coloured solid d) none of these

14) Which of the following monomer give the polymer neoprene on polymerization?

a)H₂C B)CCL₂=Cl₂ c)F₂C=CF₂ D)CH₂-C-CH=CH₂

15) Which tree give out latex to obtain natural rubber?

a)eucahyptus b)heveabrasiliensis c)eanogessus d)astragal us

16))Which of substance is added to the dilute latex y to coagulate rubber?

a)acetic acid b)sodium salt c) Oil d)water

17)) Which of the following monomer in N.R.?

a) vinyal chloride b)ethylene chloride

c)isoprene d)chlorine

18)The milky sap of rubber tree is known as....

a)polymer b)supernatent c)latex d)wax

19)Which type of synthetic rubber are commonly known as thiokols?

a) Polyurathane rubbers b)poly sulphide rubbers

c)fluorocarbon rubbers d) polyacryli rubbers

20)What are the sequential process through which rubber latex

undergo to give natural rubber.

a)tapping- dilution- coagulation b)dilution- tapping- coagulation

c) tapping- coagulation-dilution d) coagulation-dilution-tapping

21)Which is not a polymer ?

a)plastic b)rubber c)Teflon d)water

22) Natural rubber is

a)poly isoprene b)thicol c)chloroprene d) Buna-S

23)Polymerization in which two Or more chemically different monomers take part,is called....

a)addition polymerization b)copolymerization

c)chain polymerization d)None of these

24) Buna-S is obtained from.....

a)butadiene+styrene b)adipic acid +hexdiamine

c)urea +formaldehyde d)chloroprene

25)Chloroprene is the repeating unit in.....

a)polystyrene b)neoprene c)PVC d)Teflon

26)Buna-S is

a) polystyrene b)neoprene

c)styrene rubber d)butyl rubber

27).....is used for manufacturing of motor tyres.

a) styrene rubber d)butyl rubber

c)neoprene rubber c)natural rubber

28)The material which on stretching elongated & resumes its size on releasing the stress is....

a)plastic b)alloys c)elastomer d)all of these

29)Vulcanization is the process of heating crude rubber with.....

a)sodium b)phosphorus c)carbon d)sulphur

30)10nm=.....m

a)10 b)10 c)10 d)10

31)The size of nanoparticles is between nm.

a)100 to 1000 b)0.1 to 10 c)1 to 100 d)1 to 10

32)Carbon atoms makes Types of bond with other carbon atoms

a)covalent b) ionic c)metallic d) hydrogen

33) Fullerene or bulky ball is made of.... Carbon atoms.

- a)100 b)30 c)75 d)60

34) 1m=...nm

- a)10 b)10 c)10 d)10

35) In the structure of fullerene, each carbon atoms forms

covalent bond withother carbon atoms

- a)one b)two c)three d)four

36) Who had invented the famous Geodesic dome structure?

- a)Eric Drexler b)Buckminster fuller c)Richard Smalley d)Faraday

37) The compressive strength of nanotubeits tensile strength.

- a) is less than b)is greater than c)IS EQUAL d))None of these

38) Which of the following is an approach for preparation of graphene from graphite?

- a)etching b)exfoliation c)lithography d)alloying

39) Polymerization in which two or more chemically same monomers

take part repeatedly, is called....

- a)addition polymerization b)copolymerization
c)chain polymerization d)None of these

40) What are the advantages of nano-composite packages?

- a) lighter & biodegradable
b)gas barrier properties
c)enhanced T.C, mechanical strength , conductivity
d) all of these

41) Which of the following is the principle factor which causes the properties of nanomaterials to differ significantly from other materials ?

- a)size distribution b)specific surface area
c)quantum size effect d) all of these

42) IN a molecule of geaphene , atoms of carbon are bonded into.....

- a)spherical structure b)tube structure
- c) honeycomb structure d)) all of these

43)Most grapheme potents have been taken in the would by.....

- a)Samsung b)Oceans king lighting c)IBM d)Nokia

44)The ability of a metal to take exast dimension of the mould is.....

- a)tensile strength b)casting c)stiffness d)refractoriness

45)The property of a metal by which they can be beaten into sheet is called..,

- a)malleability b)ductility c) expansion c)stiffness

46) Which of the folloeing is a good conductor of electricity?

- a)iron b)plastic c)wool d)glass

47) Which metal is found in liquid state at room temperature?

- a)Fe b)Zn c)Hg d) Al

48) Which of the following statement s are correct?

- a)all metals are ductile b) all nonmetals are ductile
- c)generally metals are ductile c)some metals are ductile

49).....is the process of uniting two pieces of metals by means of heat.

- a)casting b)forging c)welding d)brazing

50) The process of joining two thin wires by introducing a molten nonferrous alloy

Between them bellow 400c is known as.....

- a)brazing b) soldering c)welding d) both a& b

51)If a metal is, it can be drawn into wire.

- a)conductive b) malleable c) magnetic d) ductile

52)describe the way a substance reflects light or shines.

- a)Magnetism b)brittleness c)luster d)ductility

53) If metal breaks easily, it is said to be.....

- a) Magnetic b) brittle c) luster d) ductility

54) Which of the following property is not mechanical property?

- a) brazing b) soldering c) welding d) M.P.

55) Which of the following property is not shown by metals?

- a) electrical conduction b) electrical insulation

- c) sonorous in nature d) ductility

56) Which of the following is a good conductor of electricity?

- a) copper b) Aluminium c) platinum d) nickel

57) Which of the following describe metals?

- a) ductile & malleable b) solid, liquid & gases at room temperature

- c) dull & brittle d) semiconductor

58) Aluminium is used for making cooking utensils, which of the following properties of Al are for the same

- 1) Good thermal conductivity 2) Good electrical conductivity

- 3) ductility 4) high melting point

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

59) Which of the following is a Non conductor of electricity?

- a) copper b) Aluminium c) platinum d) wood

60) If an object has luster, it.....

- a) reflects light b) can be stretched into wires

- c) can conduct heat & electricity d) is dense

61) FULLERENE is prepared by.....

- a) exfoliating graphite b) by evaporating graphite

- c) by grinding graphite d) by dissolving graphite

62) Graphene is prepared by.....

- a)exfoliating graphite b)by evaporating graphite
c) by grinding graphite d)) by dissolving graphite

63)..... is building unit of graphite.

- a)silicon b)carbon c)grapheme d)fullerene

64) The equipment used to carry out distillation is.....

- a) converting a solid into gas b) evaporator c)still d)porcelain

65) Condensation is a physical change in which.....

- a)liquid changes to gas b) gas changes into liquid state
c)liquid changes to solid d) solid changes to gaseous state

66) Distillation is the process of.....

- a) converting a solid into gas b) converting a gas into liquid
b) separating a liquid & solid d)separating useful components of substance

67) Unit operation of a unit process may be.....

- a)physical method b)chemical method
c)both (a) &(b) d)None of these

68) Mass balance is a

- a)quantity b)energy c)process d)property

69) Nanoparticles are used asin various chemical reaction.

- a)conductor b)catalyst c)insulator d) None of these

70)..... have application in medicines as drug transport &biosensor.

- a)magnetic materials b) magnetic materials
c)electrical materials d) None of these

71) FULLERENE is

- a)tough & stable b)brittle&nonstable
c)chemicaly unstable d) None of these

72) Buna –N is co polymerization of.....

- a) Butadiene +styrene b) Butadiene +Acrylonitrile
- c)) Butadiene +Thiokol d)) all of these

73) Ceramics arematerials....

- a) Nonmetallic material b) Artificially made
- c) physical materials d) None of these

74) Softening point of ceramics is.....

- a) 1000 b) 1200 c) 1800 d) 1600

75) Ceramics are good

- a) good thermal & electrical insulator b) nonporous
- c) high B.P. d)) None of these

Question Bank

Semester: - II

Course Name: -ASE(22211)

Applied Chemistry(22211)

Q 1) Water which does not produce lather with soap is _____

- a) Mineral water
- b) Hard water
- c) Soft water
- d) Distilled water

Q 2) Permanent hardness of water is caused by the presence of _____

- a) Bicarbonates of calcium and magnesium
- b) Carbonates of sodium and potassium
- c) Chlorides and sulphates of calcium and magnesium
- d) Phosphates of sodium and potassium

Q 3) Highly alkaline water in boilers causes _____

- a) Corrosion
- b) Scale and sludge formation
- c) Priming and foaming
- d) Caustic embrittlement

Q 4) coagulant like alum is added to water to remove _____

- a) biological impurities
- b) floating minerals
- c) colloidal impurities
- d) all of these

Q 5) In ozonization _____ is used to sterilize water.

- a) Oxygen gas
- b) Ozone gas
- c) Solid ozone
- d) Chlorine gas

Q 6) Temporary hardness of water is caused by the presence of _____

- a) Chlorides of calcium and magnesium
- b) Sulphates of calcium and magnesium
- c) Bicarbonates of calcium and magnesium
- d) Carbonates of sodium and potassium

Q 7) screening is the process of removing _____ from water.

- a) Scale and sludge
- b) Floating material
- c) Suspended particles
- d) Hardness

Q 8) In zeolite process for treatment of hard water exhausted zeolites can be regenerated by using _____

- a) 10 % calcium chloride solution
- b) 10 % magnesium sulphate solution

- c) 10 % magnesium chloride solution
- d) 10 % sodium chloride solution

Q 9) Permanent hardness is also known as _____

- a) Carbonate hardness
- b) Non carbonate hardness
- c) Both (a) and (b)
- d) None of these

Q 10) When soft, loose, slimy deposits are formed inside the boiler and do not stick up permanently then they are known as _____

- a) Resins
- b) Zeolites
- c) Scales
- d) Sludges

Q 11) Which of the following chemical is added in the process of coagulation?

- a) Aluminium sulphate
- b) Aluminium oxide
- c) Calcium chloride
- d) None of these

Q 12) In ion exchange process of water softening, exhausted cation exchanger resin is regenerated by using _____

- a) Dilute acid
- b) Alkali
- c) Sand
- d) Coal

Q 13) The amount of oxygen consumed by aerobic bacteria which cause aerobic biological decomposition of sewage is known as _____

- a) Bio chemical oxygen demand (B.O.D.)
- b) Dissolved oxygen (D.O.)
- c) Chemical oxygen demand (C.O.D.)
- d) None of these

Q 14) The principle of chlorination is _____

- a) Formation of nascent oxygen
- b) Formation of oxygen molecules
- c) Formation of chlorine gas
- d) Formation of hydrochloric acid

Q 15) Sedimentation is a physical process used to remove _____

- a) Colloidal particles
- b) Suspended particles
- c) Microorganisms
- d) All of the above

Q 16) The Purest form of naturally occurring water is _____

- a) Rainwater
- b) Riverwater
- c) Pond or Lake water
- d) Well Water

Q 17) Sterilization of water can be done by _____

- a) Chlorination
- b) Aeration
- c) Using UV Rays
- d) All of these

Q 18) Boilers do not the trouble of _____ while using hard water to generate steam.

- a) Scale and sludge formation
- b) Corrosion
- c) lubrication
- d) Priming and foaming

Q 19) Reverse osmosis is a water purification technique that uses _____

- a) Coagulant
- b) Raisins
- c) Semi permeable membrane
- d) Lime soda

Q 20) In ion exchange process of water softening, exhausted anion exchanger resin is regenerated by using _____

- a) Dilute acid
- b) Alkali
- c) Sand
- d) zeolite

Applied Physics (22211)

- 1) Capacitance of capacity of a conductor is defined as the (CO1)
 - a) ratio of potential to charge
 - b) sum of potential and charge
 - c) Product of charge and potential
 - d) ratio of charge to potential

- 2) Capacity of parallel plate condenser is given by (CO1)
 - a) $C = \epsilon_0 k A d$
 - b) $C = \frac{k A}{\epsilon_0 d}$
 - c) $C = \frac{\epsilon_0 k A}{d}$
 - d) $C = \frac{\epsilon_0 k d}{A}$

- 3) Capacitance of Capacitor with dielectric material 'k' is ----- capacitance of a capacitor Without dielectric {i.e. air} (CO1)
 - a) K times more than
 - b) k times less then
 - c) Equal to
 - d) twice

- 4) Capacitor stores ----- (CO1)
 - a) large charge at lower potential
 - b) small charge at higher potential
 - c) small charge at small potential
 - d) large charge at higher potential

- 5) Energy of charged condenser is given by (CO1)
 - a) $E = 2CV^2$
 - b) $E = 1/2 CV$
 - c) $E = 1/2 CV^2$
 - d) $E = 1/2 C^2 V$

- 6) E.M.F of a cell is defined as the potential difference between two terminals of the cell when (CO1)
 - a) The circuit is close
 - b) the circuit is open
 - c) High current is drawn
 - d) low resistance is connected

- 7) The opposition offered by electrolyte to flow of charges from negative electrode to positive electrode of a cell through electrolyte is called as..... (CO1)
 - a) External resistance
 - b) circuit resistance
 - c) Internal resistance of cell
 - d) none of these

- 8) Kirchhoff's 1st Law or junction rule state that in any network of conductor in an electrical circuit (CO1)
 - a) Product of current is 0
 - b) algebraic sum of potential is 0
 - c) Algebraic sum of current is 0
 - d) product of potential is 0

- 9) Kirchhoff's 2nd Law or loop rule state's that in a close loop of network of conductor , the algebraic sum of product of current and resistance of each part of close loop is(CO1)
 - a) product of e. m. f. in the circuit
 - b) ratio of e. m. f. in the circuit
 - c) algebraic sum of e. m. f. in the circuit
 - d) sum of currents

- 10) Balancing condition of wheatstone's network with R_1, R_2, R_3 and R_4 in cyclic order is..... (CO1)
- a) $\frac{R_1}{R_2} = \frac{R_3}{R_4}$ b) $\frac{R_1}{R_2} = \frac{R_4}{R_3}$ c) $\frac{R_1}{R_4} = \frac{R_3}{R_2}$ d) $R_1 R_2 = R_3 R_4$
- 11) Principle of potentiometer is fall of potential is.....
- a) directly proportional to length of wire b) inversely proportional to length of wire
c) directly proportional to area of wire d) inversely proportional to area of wire
- 12) If area of parallel plat condenser is 1m^2 and distance between plates is 0.1mm then capacitance of condenser if its dielectric constant is 5 and $\epsilon_0 = 8.9 \times 10^{-12}$ will be.....
- a) $44.5 \times 10^{-6} F$ b) $44.5 F$ c) $44.5 \times 10^{-9} F$ d) $44.5 \times 10^{-12} F$
- 13) If two capacitors of capacitance C each are connected in series then its capacitance will be.....
- a) C b) $C/3$ c) $C/2$ d) $C/4$
- 14) If a capacitor of capacity $20\mu F$ is connected across 10v battery then charge drawn by a capacitor will be.....
- a) $50\mu C$ b) $100\mu C$ c) $200\mu C$ d) $300\mu C$
- 15) Two condensers have equivalent capacitance of $8\mu F$ when connected in parallel and $2\mu F$ when connected in series then individual capacitances will be.....
- a) $2\mu F, 4\mu F$ b) $4\mu F, 4\mu F$ c) $1\mu F, 8\mu F$ d) $1\mu F, 1\mu F$
- 16) If a battery of e.m.f. 10v is connected across a resistance of 100ohm drop a resistance observed across a resistance is 9.8v , then internal resistance of a cell will be.....
- a) 2ohm b) 5ohm c) 10ohm d) 20ohm
- 17) The maximum electric field that a dielectric medium can withstand without breakdown is called as
- a) Saturation field b) dielectric strength c) utmost field d) optimized field
- 18) When a number of capacitances connected in parallel then effective capacitance.....
- a) Increases b) decreases c) remain same d) Increases or decreases
- 19) capacitance of a condenser is inversely proportional to
- a) area of plate b) dielectric material between them c) Distance between them
d) current through the circuit

20) When a number of capacitances connected in series then effective capacitance.....

- a) Increases b) decreases c) remain same d) Increases or decreases

21) potential difference between two metal plates isin bringing unit positive charge from plate B to A against electric field.

- a) work done b) force applied c) time taken d) efforts taken

22) A $10\ \mu\text{F}$ capacitor is connected to 10V battery, electrostatic energy stored in the capacitor will be...

- a) $100 \times 10^{-6}\text{J}$ b) $500 \times 10^{-6}\text{J}$ c) $1000 \times 10^{-6}\text{J}$ d) $250 \times 10^{-6}\text{J}$

23) energy of charged condenser is given by.....

- a) $E = 2Q^2/C$ b) $E = Q^2/2C$ c) $E = Q/C^2$ d) $E = 1/2QC$

24) law of condenser in parallel state that equivalent capacitance of parallel combination is given by...

- a) Sum of capacitances of condensers b) product of capacitances of condensers
c) Sum of reciprocal of individual capacitances d) ratio of individual capacitances

25) A condenser is an arrangement of two conductors separated by....

- a) conductor b) semiconductor c) insulator d) silver

26) The process of spontaneous emission of radioactive substance is known as.....

- a) Photoelectric emission b) thermo emission c) radioactivity d) LASER

27) The process by which an unstable atomic nucleus losses energy by emitting radiations, such as α, β, γ radiations is known as

- a) Photoelectric emission b) thermo emission c) radioactivity d) LASER

28) All naturally occurring element whose atomic number are greater thanare radioactive.

- a) 12 b) 32 c) 52 d) 82

29) Doubly ionized helium atoms are.....

- a) α Particles b) β particles c) γ particles d) photons

30) When radioactive element radiate radiations then it get converted into new element which is.....

- a) Also radioactive b) not a radioactive c) compound d) a mixture

31) The mass of α Particles is.....

- a) $6.645 \times 10^{-27} \text{ kg}$ b) $6.645 \times 10^{27} \text{ kg}$ c) $2.2 \times 10^{-10} \text{ kg}$ d) $2.2 \times 10^{10} \text{ kg}$

32) The charge of α Particles is.....

- a) $3.2 \times 10^{19} \text{ C}$ b) $3.2 \times 10^{-19} \text{ C}$ c) $3.2 \times 10^{14} \text{ C}$ d) $3.2 \times 10^{-14} \text{ C}$

33) Penetrating power of α Particles is less and it is times than β particles.

- a) 10 b) 100 c) $\frac{1}{10}$ d) $\frac{1}{100}$

34) The range of β Particles is..... α Particles, its range in air at N.T.P. is 1 meter.

- a) Equal to b) less than c) more than d) less than or equal to

35) γ -rays are.....

- a) Positively charged b) negatively charged c) more than d) none of these

36) As per law of radioactive disintegration (decay) which atom will disintegrate first is.....

- a) Directly proportional b) inversely proportional
c) not proportional d) Equal

37) The rate of decay of radioactive atoms is Number of atoms present.

- a) Equal to b) inversely proportional c) Directly proportional d) not proportional

38) The number of radioactive substance decreases with time.

- a) exponentially b) linearly c) speedily d) slowly

39) Radioactive disintegration equation is.....

- a) $\frac{dt}{t} = -\lambda dN$ b) $\frac{dt}{dt} = -\lambda dN$ c) $\frac{dN}{N} = \lambda dt$ d) $\frac{dN}{N} = -\lambda dt$

40) The decay constant is defined as the reciprocal of that time duration in which the number of atoms of radioactive substance falls to..... of its original value.

- a) 12% b) 25% c) 37% d) 50%

41) The time in which half of the radioactive substance is disintegrated is called as.....

- a) Reduced life b) life time c) double life period d) half-life period

42) The distance between the center of two successive crests is called as.....

- a) frequency b) period c) wavelength d) amplitude

43) The time taken by a particle to complete one oscillation is called as Of oscillation.

- a) Frequency b) period c) wavelength d) amplitude

44) Longitudinal sound wave travels in the form of alternate

- a) Crest and trough b) compression and rarefactions
c) crest and compression d) trough and rarefaction

45) Photons having higher frequency that is higher penetrating power than x-ray are known as

- a) Radio waves b) micro waves c) γ -rays d) infra rays

46) Half-life period of radioactive substance is given by $T_{1/2}$ is equal to.....,

- a) $\frac{0.693}{\lambda}$ b) $\frac{\lambda}{0.693}$ c) $\frac{\lambda}{2}$ d) $\frac{2}{\lambda}$

47) The relation between velocity, period and wavelength is.....

- a) $n = v \lambda$ b) $v = n \lambda$ c) $v = n/\lambda$ d) $v = \lambda/n$

48) γ -rays show the phenomenon of

- a) less production b) high production c) no production d) pair production

49) α Particles are represented as.....

- a) ${}_1\text{He}^2$ b) ${}_2\text{He}^3$ c) ${}_2\text{He}^4$ d) ${}_2\text{He}^2$

50) when a radioactive element radiates radiation then it gets converted into new element which is also radioactive. This change is

- a) Reversible b) irreversible c) stimulated d) none of these