

1. The bandwidth of a control system can be increased by using
A. Phase-lead network
B. Phase-lag network
C. Both Phase-lead network and Phase-lag network
D. Cascaded amplifier in the system

## Ans. A

Sol. A phase lead network is equivalent to high pass filter, so bandwidth of a control system increases by use of phase lead network.
2. Consider a practical pair of conductors i.e. conductor (i) and conductor (ii), which have three parallel loops $A A^{\prime}, B^{\prime}$ and $C C^{\prime}$. In which of the following loop the inductance effect is maximum if the current goes in the same direction?

(i)

(ii)
A. $A A^{\prime}$
B. $B^{\prime}$
C. $\mathrm{CC}^{\prime}$
D. All will have same effect

Ans. C
Sol. According to proximity effect, if two conductors are running parallel then the current density will be maximum at inner surface that means inductance effect is minimum at inner surface. As we move outwards the inductance effect increases.
3. The value of shunt resistance is $\qquad$ $\Omega$, if a $100 \mu \mathrm{~A}$ meter movement with an internal resistance of $500 \Omega$ is converted to an ammeter having ( $0-200 \mathrm{~mA}$ ) range.
A. 0.25
B. 0.5
C. 0.75
D. 1

Ans. A
Sol. Multiplication factor $(\mathrm{m})$ is given as
$\mathrm{m}=\frac{\mathrm{I}}{\mathrm{I}_{\mathrm{m}}}=\frac{200 \mathrm{~mA}}{100 \mu \mathrm{~A}}=2000$
Therefore, shunt resistance required will be
$R_{s}=\frac{R_{m}}{m-1}=\frac{500}{2000-1}=\frac{500}{1999}=0.25 \Omega$
4. What is the minimum number of NAND gates required to implement $A+A \bar{B}+A \bar{B} C$ ?
A. 0
B. 1
C. 4
D. 7

Ans. A

Sol.

$$
\begin{aligned}
& F=A+A \bar{B}+A \bar{B} C \\
& =A(1+\bar{B})+A \bar{B} C=A+A \bar{B} C=A(1+\bar{B} C) \rightarrow F=A
\end{aligned}
$$

So, zero NAND gates are required.
5. A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is known as
A. fuel cell
B. electrolytic cell
C. dynamo
D. Ni-Cd cell

Ans. A
Sol. A fuel cell converts energy of combustion of fuels like hydrogen and methane directly into electrical energy.

Electrolytic cell converts electrical energy into chemical energy.
Dynamo is an electrical generator which produces direct current with the help of a commutator.
Ni-Cd cell is a type of rechargeable battery which consists of a cadmium anode and a metal grid containing $\mathrm{NiO}_{2}$ acting as a cathode.
6. Which of the following motors should not be allowed to run at no-load.
A. Separately excited dc motor
B. Shunt motor
C. Series motor
D. All of the above

Ans. C
Sol. In series motor at no-load, the motor current and flux per pole tends to zero. Due to this, motor speed tends to infinity which is a dangerous situation.
7. A 220 V shunt motor has an armature resistance of $0.5 \Omega$ and takes an armature current of 40 A on a certain load. By how much the main flux be reduced to raise speed by $50 \%$.If the developed torque remains constant.
A. $50 \%$
B. $57 \%$
C. $63 \%$
D. $60 \%$

Ans. A
Sol. $\mathrm{T}_{1}=\mathrm{T}_{2} ; \varphi_{1} \mathrm{I}_{\mathrm{a} 1}=\varphi_{2} \mathrm{I}_{\mathrm{a} 2}$
$\frac{\phi_{2}}{\phi_{1}}=\frac{\mathrm{I}_{\mathrm{a} 1}}{\mathrm{I}_{\mathrm{a} 2}}=\frac{\mathrm{I}_{\mathrm{a} 1}}{2 \mathrm{I}_{\mathrm{a} 1}}$
So, $\phi_{2}=\frac{1}{2} \phi_{1}$
$P_{1} N_{2}=P_{2} P_{1}$
$\mathrm{V}_{1} \mathrm{I}_{\mathrm{a} 1} \mathrm{~N}_{2}=\mathrm{V}_{2} \mathrm{I}_{\mathrm{a} 2} \mathrm{~N}_{1}\left[\because \mathrm{~N}_{2}=2 \mathrm{~N}_{1}\right]$
$\frac{I_{a 2}}{I_{a 1}}=\frac{N_{2}}{N_{1}}=2$
$\therefore \%$ change $=\frac{\phi_{1}-\phi_{2}}{\phi_{1}}=\frac{2 \phi_{2}-\phi_{2}}{2 \phi_{2}}=50 \%$
8. A load of 0.8 power factor implies
A. Reactive power demand of 0.75 KVAR per KW of power B. Reactive power demand of
0.8 KVAR per KW of power
C. Reactive power demand of 1.2KVAR pe KW of power
D. Reactive power demand of 1KVAR per KW of power.

Ans. A
Sol. Let Apparent power = P
Hence,
Active power $=\mathrm{P} \times 0.8=0.8 \mathrm{P}$
Reactive power $=\mathrm{P} \times \sqrt{1-0.8^{2}}=0.6 \mathrm{P}$
$\frac{\text { Reactive Power }}{\text { Active Power }}=\frac{0.6 \mathrm{P}}{0.8 \mathrm{P}}=\frac{0.75}{1}$
Hence 0.75KVAR power KW
9. Find the equivalent capacitance of the network shown in the figure.

A. 2 F
B. 3 F
C. 4 F
D. 6 F

Ans. A
Sol.


4 F and 2 F are in parallel so they will get added up.
So, circuit looks like


Now, all there are in series.

So, $C_{e q}=\frac{6}{3}=2 F$
10. If the commutation angle of a diode rectifier (due to source inductance effect) is ' $\mu$ ', then the inductive voltage regulation will be
A. $\frac{1+\cos \mu}{2}$
B. $1+\frac{\cos \mu}{2}$
C. $1-\frac{\cos \mu}{2}$
D. $\frac{1-\cos \mu}{2}$

Ans. D
Sol. For diode rectifier at full load $\mathrm{V}_{0}=\frac{2 \mathrm{~V}_{\mathrm{m}}}{\pi}-\frac{\mathrm{wL} \mathrm{I}_{\mathrm{s}} \mathrm{I}_{0}}{\pi}$
At No Load $\mathrm{I}_{0}=0, \mathrm{~V}_{\text {onL }}=\frac{2 \mathrm{~V}_{\mathrm{m}}}{\pi}$
So, $\cos \mu=1-\frac{\mathrm{wL}_{\mathrm{s}} \mathrm{I}_{0}}{\mathrm{~V}_{\mathrm{m}}}$
[Voltage regulation $=\frac{V_{\mathrm{NL}}-\mathrm{V}_{\mathrm{FL}}}{\mathrm{V}_{\mathrm{FL}}}=\frac{\omega L_{\mathrm{s}} \mathrm{I}_{0}}{2 \mathrm{~V}_{\mathrm{m}}}=1+\cos \mu$ ] (from (i))
$V \cdot R=\frac{1-\cos \mu}{2}$
11. For the circuit shown in the figure, the energy stored by the inductor in the steady state $(t \rightarrow \infty)$ is

A. 20 Joules
B. 30 Joules
C. 40 Joules
D. 60 Joules

Ans. C
Sol. At $t=\infty$, the circuit will be in steady state with a total supply voltage of 20 V . Inductance will act as a short circuit for this voltage source.
So $\mathrm{i}(\mathrm{t})=\frac{20}{5}=4 \mathrm{~A}$


Energy stored in inductor
$=\frac{1}{2} L i^{2}=\frac{1}{2} \times 5 \times(4)^{2}=40$ Joules
12. Characteristic equation of a system is $s^{2}+4 s+K=0$, for what values of $K$ the poles will lie left side of $s=-1$ is
A. $K>0$
B. $K>3$
C. $K>-3$
D. $K>2$

Ans. B
Sol. We have to put $z=1+1_{z}$
$\Rightarrow(z-1)^{2}+4(z-1)+K=0$
$z^{2}+2 z+(K-3)=0$
$\Rightarrow K-3>0$
$\Rightarrow K>3$
13. In order to minimize both $5^{\text {th }}$ and $7^{\text {th }}$ harmonics, the coil span in 3- 9 AC machines must be
A. $144^{\circ}$
B. $6 / 7 \times$ pole pitch
C. $120^{\circ}$
D. $5 / 6 \times$ pole pitch

Ans. D
Sol. To eliminate $5^{\text {th }}$ harmonic coil span $=180 \times 4 / 5=144^{\circ}$
To eliminate $7^{\text {th }}$ harmonic coil span $=180 \times\left(\frac{n-1}{n}\right)=180 \times \frac{6}{7}=154.28^{\circ}$
To eliminate both $5^{\text {th }}$ and $7^{\text {th }}$ harmonic (average of both taken)
$\frac{144+154.28}{2}=149.14 \approx 150^{\circ}\left(\right.$ Pole pitch $\left.=180^{\circ}\right)$
So, $150^{\circ}=\frac{5}{6} \times 180=\frac{5}{6} \times$ pole pitch
14. In a single phase induction motor
A. Both main and auxillary windings are placed on stator
B. Main winding is placed on stator and auxiliary winding on rotor
C. Both the main and auxillary windings are placed on rotor
D. Auxillary winding is placed on stator and main winding on rotor.

Ans. A
Sol. Both main and auxillary winding of single phase IM are placed on the stator.
15. In the circuit shown below, find the value of current supplied by 8 V source.

A. 2 A
B. 3 A
C. $-2 A$
D. $-3 A$

Ans. B
Sol.


Current through $1 \Omega$ resistance $=\frac{8-4}{1}=4 \mathrm{~A}$
Applying KCL at Upper node
$\mathrm{I}+1=4$
$\mathrm{I}=3 \mathrm{~A}$
16. A moving iron type ammeter has fewer turns of thick wire so that
A. Resistance is high
B. Sensitivity is high
C. Damping is effective
D. Resistance is less

Ans. D
Sol. When the ammeter has fewer turns of thick wire, it has low resistance, so that it can produce the necessary magnetic field by the ampere turns of a current carrying coil.
17. A system is described by the following state matrix:-

$$
\left[\begin{array}{l}
\dot{x}_{1} \\
\dot{x}_{2}
\end{array}\right]=\left[\begin{array}{ll}
0 & 0 \\
1 & 0
\end{array}\right]\left[\begin{array}{l}
x_{1} \\
x_{2}
\end{array}\right]
$$

The state transition matrix for the following system is-
A. $\left[\begin{array}{ll}1 & 0 \\ t & 1\end{array}\right]$
B. $\left[\begin{array}{ll}1 & \mathrm{t} \\ 0 & 1\end{array}\right]$
C. $\left[\begin{array}{ll}1 & 0 \\ 0 & t\end{array}\right]$
D. $\left[\begin{array}{ll}\mathrm{t} & 0 \\ 0 & 1\end{array}\right]$

Ans. A
Sol. STM $[\varphi(\mathrm{t})]=\mathrm{L}^{-1}[\mathrm{sI}-\mathrm{A}]^{-1}$
$A=\left[\begin{array}{ll}0 & 0 \\ 1 & 0\end{array}\right]$

$$
\begin{aligned}
& (s I-A)=\left[\begin{array}{cc}
s & 0 \\
-1 & s
\end{array}\right] \\
& {[s I-A]^{-1}=\frac{1}{s^{2}}\left[\begin{array}{ll}
s & 0 \\
1 & s
\end{array}\right]} \\
& \Phi(t)=L^{-1}[s I-A]^{-1} \\
& \Phi(t)=\left[\begin{array}{ll}
\frac{1}{s} & 0 \\
\frac{1}{s^{2}} & \frac{1}{s}
\end{array}\right] \\
& \Phi(t)=\left[\begin{array}{ll}
1 & 0 \\
t & 1
\end{array}\right]
\end{aligned}
$$

18. A power station has a maximum demand of 10000 KW . The annual load factor is $60 \%$ and plant capacity factor is $50 \%$. What is the reserve capacity of the plant?
A. 8333.34 KW
B. 1666.67 KW
C. 12000 KW
D. 2000 KW

Ans. D
Sol. As we known,
PLF $=\frac{\text { Average load }}{\text { Maximum dem and }}=0.6$
Plant capacity factor $=\frac{\text { Average load }}{\text { Plant capacity }}=0.5$
$\frac{\text { PLF }}{P C F}=\frac{\text { Plant capacity }}{\text { Maximum demand }}=\frac{0.6}{0.5}$
Plant capacity $=\frac{0.6}{0.5} \times 10000=12000 \mathrm{~kW}$
Reserve capacity $=12000-10000=2000 \mathrm{~kW}$
19. Asynchronous tie line is a :
A. AC transmission line
B. DC transmission line
C. Either (A) or (B)
D. None of the above

Ans. B
Sol. When two areas with different frequency are connected by DC transmission line to exchange power from one end to other end is called as asynchronous tie line.
20. Which of the below commonly used as DC bridge ?
A. Desauty and Wagner
B. Schering and Anderson
C. Maxwell and Hay's
D. Wheat stone and kelvin

Ans. D
Sol. Wheatstone and kelvin bridge are used as DC bridge for the Measurement of resistance.
21. The resistance of the series RCL circuit is doubled and inductance is halved, then band width becomes.
A. Double
B. Half
C. Four time
D. No change

Ans. C
Sol. For a series RCL circuit $B W=R / L$
Now new resistance $=2 \mathrm{R}$
And new inductance $=\mathrm{L} / 2$
So new Bandwidth $=\frac{\frac{2}{L}}{2}=\frac{4 R}{L}$ hence it becomes 4 times of the original circuit.
22. The range of decimal number that can be represented using 5 bit 2 's compliment
A. -7 to +7
B. -8 to +7
C. -16 to +16
D. -16 to +15

Ans. D
Sol. Using 2 's compliment the range of decimal number for ' $n$ ' bit is
$-\left(2^{n-1}\right)$ to $+\left(2^{n-1}-1\right)$
Here $\mathrm{n}=5$
$-\left(2^{5-1}\right)$ to $+\left(2^{5-1}-1\right)$
$-2^{4}$ to $+\left(2^{4}-1\right)$
-16 to +15
23. An 800 kV 3-phase transmission line is having per phase inductance of $1.1 \mathrm{mH} / \mathrm{km}$ and per phase line capacitance of $11.68 \mathrm{nF} / \mathrm{km}$. Its power transfer capability under surge impedance loading is-
A. 2085 MW
B. 2605 MW
C. 1205 MW
D. 15.5 MW

Ans. A
Sol. Characteristic impedance $=\sqrt{\frac{L}{C}}$
$Z_{c}=\sqrt{\frac{1.1 \times 10^{-3}}{11.68 \times 10^{-9}}}=306.88 \Omega$
Power transfer capability
$P_{\text {SIL }}=\frac{V^{2}}{Z_{c}}=\frac{\left(800 \times 10^{3}\right)^{2}}{306.88}$
$P_{\mathrm{sII}}=2085.47 \mathrm{MW}$
24. Which one of the following statements is correct?
A. Phase margin is always positive for stable feedback system.
B. Phase margin is always negative for stable feedback system.
C. Phase margin can be negative or positive for stable feedback system.
D. None of the above

## Ans. A

Sol. Both phase margin and gain margin are positive for stable system.
25. A 220 V single phase circuit supplies a choke coil that allows a power dissipation of 5MW at 0.6 p.f lagging. With the help of static capacitor the load p.f increases to 0.8 lagging. Due to the addition of static capacitor the changes in losses will be.
A. $21.73 \%$
B. $43.75 \%$
C. $77.77 \%$
D. No change

Ans. B
Sol. $\frac{\text { Current with capacitor }=I_{2}}{\text { Current without capacitor }=I_{1}}=\frac{\cos \phi_{1}}{\cos \phi_{2}}$
Since, loss ${ }^{\alpha}$ (current) ${ }^{2}$
Hence $\frac{I_{2}^{2}-I_{1}^{2}}{I_{1}^{2}} \times 100$

$$
\begin{aligned}
& =\left[\left(\frac{I_{2}}{I_{1}}\right)^{2}-1\right] \times 100 \\
& =\left[\left[\frac{\cos \phi_{1}}{\cos \phi_{2}}\right]^{2}-1\right] \times 100 \\
& =\left[\left(\frac{0.6}{0.8}\right)^{2}-1\right] \times 100 \\
& =-43.75 \%
\end{aligned}
$$

Hence change of $43.75 \%$
26. A $3-\varphi, 33 \mathrm{kV}$ circuit breaker is rated 1200 A, 2000 MVA, 3s. The rated making current capacity is-
A. 79.25 kA (rms)
B. 89.25 kA (peak)
C. 79.25 kA (peak)
D. 89.25 kA (rms)

Ans. B
Sol. Rated symmetrical breaking current $\left(I_{B}\right)=\frac{S}{\sqrt{3} V_{L}}$
$I_{B}=\frac{2000 \times 10^{6}}{\sqrt{3} \times 33 \times 10^{3}}=35 \mathrm{kA}$
Rated making current $=2.55 \times$ symmetrical breaking current
$\mathrm{I}_{\mathrm{m}}=2.55 \times 35 \mathrm{kA}$
$\mathrm{I}_{\mathrm{m}}=89.25 \mathrm{kA}$ (peak)
Making current of $C B$ is the peak value of the maximum current loop during sub-transient condition when breaker closes.
27.I n a single pulse modulation of PWM inverters, the pulse width is $120^{\circ}$. For an input voltage of 220 V dc, the rms value of output voltage is $\qquad$ .
A. 179.63 V
B. 254.04 V
C. 127.02 V
D. 185.04 V

Ans. A
Sol.
$\mathrm{V}_{\mathrm{ac}}=\mathrm{Vs} \sqrt{\frac{2 \mathrm{~d}}{\pi}}=220 \sqrt{\frac{2 \pi / 3}{\pi}}=220 \sqrt{\frac{2}{3}}=179.63\left\{\because 2 \mathrm{~d}=\frac{2 \pi}{3}=120^{\circ}\right\}$
28. A Boost regulator has an input voltage of 5 V and the average output voltage of 15 V . The duty cycle is
A. $3 / 2$
B. $2 / 3$
C. $5 / 2$
D. $15 / 2$

Ans. B
Sol. Boost regulator is a step-up chopper
$V_{0}=\frac{V_{s}}{1-\alpha} \Rightarrow$
$1-\alpha=\frac{5}{15}$
$\Rightarrow \alpha=\frac{2}{3}$
29. An alternator with fixed source voltage of 300 V , delivers power to a load of $10 \mathrm{KVA}, 0.5$ lag P.F with load current of 25 Amp . What will be the system utilization factor if the load is connected with an alternator through transmission line with line reactance of 10ohm ?
A. 0.42
B. 0.667
C. 0.91
D. 1.33

Ans. B
Sol. System utilization factor $=\frac{\text { Load Power }}{\text { Maximum Possible rating }}$
Load Power $=\left(10 \times 10^{3}\right) \times(0.5)=5000 \mathrm{~W}$
Maximum Possible rating $=\mathrm{V}_{\mathrm{s}} \mathrm{I}_{\mathrm{s}} \cos \varphi$
Here we will take $\cos \varphi=1$. (Because It is maximum possible rating)
$=300 \times 25 \times 1$
$=7500 \mathrm{~W}$
$S U F=\frac{5000}{7500}=0.667$
30. The potential function in free space is $V(x, y, z)=(x+2 y+x y z)$ volts. What will be the expression for Electric field at $(1,2,3)$ ?
A. $-[5 a \hat{x}+4 a \hat{y}+\hat{z}]$
B. $-[7 a \hat{x}+5 a \hat{y}+2 a \hat{z}]$
C. $-[9 a \hat{x}+8 a \hat{y}+6 a \hat{z}]$
D. $-[2 a \hat{x}+6 a \hat{y}+2 a \hat{z}]$

Ans. B
Sol. We know
$E=-\nabla V=-\left[\frac{\partial V}{\partial x} a \hat{x}+\frac{\partial V}{\partial y} a \hat{y}+\frac{\partial V}{\partial z} a \hat{z}\right]$
$E=-[(1+y z) a \hat{x}+(2+x z) a \hat{y}+(x y) a \hat{z}]$
$E$ at $(1,2,3)$
$E=-[(7) a \hat{x}+(5) a \hat{y}+(2) a \hat{z}]$
31. Positive edge triggered $S R$ flip flop with clock pulse $=0$ and input combinations is $S=1, R$ $=0$. The output state will be
A. Set
B. Reset
C. Hold
D. Invalid

Ans. C
Sol. Since clock pulse $=0$ that means no clock pulse is applied. Hence the flip-flop will not work and output remains same. Therefore, it is considered as a Hold state.
32. The connected configuration of Distribution Transformer is
A. Star-Star
B. Delta-Delta
C. Star-Delta
D. Delta-Star

Ans. D
Sol. Primary side of transformer are connected with transmission line where neutral is not present while secondary side of transformer connected in distribution line where neutral is present. Hence the transformer should be in Delta-Star configuration.
33. In the below given network, the power delivered by 10 V source will be:

A. 35 Watt
B. 27Watt
C. 12Watt
D. No power delivered

Ans. D

Sol.


Appling kVL on ABCDEF
$-10+[(3+\mathrm{I}) \times 1]+[(3+\mathrm{I}) \times 1]+[(2+\mathrm{I}) \times 1]+[(2+\mathrm{I}) \times 1]=0$
$10=[6+2 \mathrm{I}]+[4+2 \mathrm{I}]$
$10=10+4 \mathrm{I}$
$\mathrm{I}=0$
Since I $=0$, Hence power delivered by 10 V source $=\mathrm{VI}=10 \times 0=0 \mathrm{Watt}$
No power delivered by 10 V source
34. Which of the following insulator is practically used for railway crossings?
A. Pin insulator
B. Strain insulator
C. String insulator
D. All of the Above

Ans. B
Sol. Strain insulator is designed to work in mechanical tension, to with stand the pull of a suspended electrical wire or cable. It is used to reduce sag in the transmission lines connected between the two towers and it is practically used in railway crossing, raced crossing, river crossing and in the dead end towers.
35. A system consisting of a point charge between two semi-infinite perfect conducting grounded plane inclined at an angle of $60^{\circ}$, the number of images charged formed will be
A. 4
B. 5
C. 6
D. 7

Ans. B
Sol. No. Of image charges: $\frac{360^{\circ}}{\phi}-1$
Here $\varphi=$ inclined angle
$\varphi=60^{\circ}$
Hence No. Of image charges: $\frac{360}{60}-1$
$=6-1$
$=5$
36. Atul is married to Lata who has has only son Sambit. Lata is the daughter of Karthik who is the husband of Nupur. How's Nupur related to Sambit?
A. Sister-in-law
B. Mother
C. Paternal Grand-mother
D. Maternal Grand-mother

Ans. D
Sol. Information given in the question can be drawn in the diagram given below:
$\operatorname{Karthik}(+) \xrightarrow{\mathbf{h} / \mathbf{w}} \operatorname{Nupur}(-)$.


From the above figure, its clear that Nupur is the Maternal Grand-mother of Sambit. Hence, option D is the correct answer.

37 In the following question, two statements are given followed by two conclusions I and II. You have to consider the statements to be true even if they seem to be at variance from commonly known facts. You have to decide which of the given conclusions, if any, follow from the given statements.

## Statements:

1. Some books are mobiles.
2. Some calculators are mobiles.

## Conclusions:

I. Some mobiles are calculators.
II. Some mobiles are books.
A. Only conclusion I follows
B. Only conclusion II follows
C. Both conclusions I and II follow
D. Neither conclusion I nor II follows

Ans. C
Sol. The least possible Venn diagram for the given statements is as follows,


## Conclusions:

I. Some mobiles are calculators. (follows). As some calculators are mobiles.
II. Some mobiles are books. (follows). As some books are mobiles.

Hence, option C is the correct answer.
38. If REPUBLIC can be written as CRIELPBU, then how CULCUTTA can be written?
A. ACTUTLUC
B. UEPUEAA
C. NHENHJJS
D. ATTUCLUC

Ans. A
Sol. REPUBLIC can be written as CRIELPBU

| Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| word | R | E | P | U | B | L | I | C |
| Code | 8 | 1 | 7 | 2 | 6 | 3 | 5 | 4 |
| Coded <br> word | C | R | I | E | L | P | B | U |

Similarly

| Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| word | C | U | L | C | U | T | T | A |
| Code | 8 | 1 | 7 | 2 | 6 | 3 | 5 | 4 |
| Coded <br> word | A | C | T | U | T | L | U | C |

Therefore 'CULCUTTA' is written as 'ACTUTLUC'.
Hence, option A is the correct answer.
39. Ramesh went 20 m to the east, then he turned left and after 15 m turned right and went 25 m and then turned right and went 15 m . How far was Ramesh from the starting point?
A. 60 m
B. 35 m
C. 40 m
D. 45 m

Ans. D

Sol.


Required distance $(P T)=P Q+Q T$
$=(20+25) \mathrm{m}=45 \mathrm{~m}$
Hence, he is 45 m far from the starting point.
40. N is more intelligent than $\mathrm{M} . \mathrm{M}$ is not as intelligent as $\mathrm{Y} . \mathrm{X}$ is more intelligent than Y but not as good as N . Who is the most intelligent of all?
A. N
B. M
C. X
D. $Y$

Ans. A
Sol. According to the question,
$\mathrm{N}>\mathrm{M}$
Y > M
$N>X>Y$
On arranging the above data, we get
$\because \cong \mathrm{X}>\mathrm{Y}>\mathrm{M}$
So, N is the most intelligent among them.
41. Who is the author of "Agni Bina"?
A. Amit Chaudhary
B. Abdul Fazal
C. Kazi Nazrul Islam
D. Amar Singh

Ans. C
Sol. Kazi Nazrul Islam was a Bengali poet, writer, and musician. He is the national poet of Bangladesh. Other works of Kazi Nazrul Islam are Mrityukshuda (1930), Sanchita, Chakrabak.
42. With which of the following sports is the term 'twiddle' associated?
A. Table Tennis
B. Cricket
C. Rugby
D. Hockey

Ans. A
Sol. • The term 'Twiddle' is associated with Table Tennis.

- Twiddling in table tennis is the act of flipping the paddle so that the ball is played with the rubber on the other side to gain a competitive advantage.

43. Which of the following is a political right ?
A. Right to Work
B. Right to Education
C. Right to Freedom of Expression
D. Right of Vote

Ans. D
Sol. Right to vote forms one of the constitutions of political participations, the bedrock of democracy it is a political right
44. A market in which there are a few number of large firms is called as
A. Duopoly
B. Competition
C. Oligopoly
D. Monopoly

Ans. C
Sol. An oligopoly is a market structure in which a few firms dominate. When a market is shared between a few firms, it is said to be Difficultly concentrated. Although only a few firms dominate, it is possible that many small firms may also operate in the market.
45. Sewing machine was invented by $\qquad$ .
A. Alfred P. Southwick
B. Isaac Singer
C. Murasaki Shikibu
D. Hanaoka Seishu

Ans. B
Sol. Isaac Merritt Singer (October 27, 1811 - July 23, 1875) an American inventor, actor, and businessman, of Singer Manufacturing Company, invented an affordable Sewing machine for use in the home.
46. |||Common||| In the sentence, identify the segment which contains the grammatical error. If the sentence has no error, then select 'No error'. |||End||| Citizens cannot afford to take the law out of their hands.
A. Citizens cannot afford
B. to take the law
C. out of their hands
D. No error

Ans. C
Sol. Option C has the grammatically incorrect part. The error is in the use of 'out of'.

- The phrase "take the law into your own hands" means to do something illegal in order to punish somebody for doing something wrong, instead of letting the police deal with them.
- e.g. One day, after years of violent abuse from her husband, she took the law into her own hands.
- Hence, "into their hands" should be used instead of 'out of their hands' to make the sentence grammatically sound.
- The correct sentence will be: Citizens cannot afford to take the law into their hands.

47. 

|||Common|||
Select the most appropriate option to fill in the blank.
|||End|||
He said I $\qquad$ use his car whenever I wanted.
A. could
B. can
C. will
D. would

Ans. A
Sol. The given sentence is in indirect speech form. Since the reporting verb is in the past tense, the reported verb should also be in the past form. Options B and $C$ are eliminated on this basis. The correct verb is "could" as the sentence indicates the possibility of using a car whenever one wanted. Hence, option A is the correct answer.
48. |||Common||| Directions: In the following questions. 1st and the last sentences / parts of the passage / sentence are numbered 1and 6 . The rest of the passage/sentence is split into four parts and named $P, Q, R$ and $S$. These four parts are not given in their proper order.

Read the sentence and find out which of the four combinations is correct. Then find the correct answer. |||End|||

1. Marie chose to study Physics
P. that investigates the four forces at work
Q. in the universe
R. which is a branch of science
S. both on a large scale as in the solar system
2. or on a small scale as in atoms.A. RQPS
B. RPQS
C. PSRQ
D. SPRQ

Ans. B
Sol. The correct sequence is as following
R. which is a branch of science
P. that investigates the four forces at work
Q. in the universe
S. both on a large scale as in the solar system
6. or on a small scale. as in atoms.
49. |||Common|||

Identify the best way to improve the underlined part of the given sentence. If there is no improvement required, select 'no Improvement'.
|||End|||
Only me can solve the problem.
A. No improvement
B. Me can only
C. Only me could
D. Only I can

Ans. D
Sol. The underlined segment must be replaced with option D because "I" is always used as a subject, while "me" is used as an object and here we are talking about the subject. Hence, option $D$ is the correct answer.
50. Choose the correctly spelt word.
A. finencially
B. financialy
C. finantially
D. financially

Ans. D
Sol. Option D has the correctly spelt word "Financially" which in a way relates to finance. Hence option D is correct.

