

## SSC JE

## 2019-20

## Electrical Engineering

Mini Mock Challenge (June 27- June 28 2020)

## Questions \&

Solutions

1. In the following question, select the related word from the given alternatives. Japan : Yen :: Mongolia : ?
A. Dollar
B. Ringgit
C. Won
D. Togrog

Ans. D
Sol. Yen is the currency of Japan. Similarly, Togrog is the currency of Mongolia.
Hence, option D is the correct response.
2. In the following question, select the odd letters from the given alternatives.
A. NKGB
B. TPLG
C. DAWR
D. BYUP

Ans. B
Sol. As,


Thus TPLG are the odd letters.
Hence, option B is correct.
3. Arrange the given words in the sequence in which they occur in the dictionary.

1) Players
2) Polished
3) Potash
4) Plateau
5) Parabola
A. 51432
B. 51423
C. 51234
D. 54123

Ans. D
Sol. Alphabetical order is:
5. Parabola
4. Plateau

1. Players
2. Polished
3. Potash

Thus the correct sequence is 54123
Hence, option D is the correct answer.

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4. In certain language, RUN is coded as 182114 and BIN is coded as 2914 . How is BRING written in that code?
A. 2189174
B. 2819147
C. 2181974
D. 2189147

Ans. D
Sol. Consider $A=1, B=2, C=3$ $\qquad$ $Z=26$

RUN $\rightarrow$ R $=18, \mathrm{U}=21, \mathrm{~N}=14 \rightarrow 182114$
BIN $\rightarrow \mathrm{B}=2, \mathrm{I}=9, \mathrm{~N}=14 \rightarrow 2914$
Similarly,
BRING $\rightarrow \mathrm{B}=2, \mathrm{R}=18, \mathrm{I}=9, \mathrm{~N}=14, \mathrm{G}=7 \rightarrow 2189147$.
Hence, option D is the correct response.
5. A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.
MPZ, NRC, OTF, PVI, ?
A. QXL
B. RXL
C. QYL
D. $R Y L$

Ans. A
Sol. First letter of series,
$\mathrm{M}+1=\mathrm{N}, \mathrm{N}+1=\mathrm{O}, \mathrm{O}+1=\mathrm{P}, \mathrm{P}+1=\mathrm{Q}$
Second letter of series,
$\mathrm{P}+2=\mathrm{R}, \mathrm{R}+2=\mathrm{T}, \mathrm{T}+2=\mathrm{V}, \mathrm{V}+2=\mathrm{X}$
Third letter of series,
$\mathrm{Z}+3=\mathrm{C}, \mathrm{C}+3=\mathrm{F}, \mathrm{F}+3=\mathrm{I}, \mathrm{I}+3=\mathrm{L}$
So ? = QXL
So, the correct answer is option A.
6. Recently Dinshaw's wife gave birth to his only daughter. he has two childrens. how is other child related to Dinshaw?
A. daughter
B. aunt
C. niece
D. son

Ans. D
Sol.


Dinshaw has a girl and a boy so his other child will be a boy which will be his son.
Hence, option D is the correct response.

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7. From the given answer figures, select the one which is hidden/embedded in the question figure.

A.

B.

C.

D.


Ans. A
Sol. On observing the options we can see that the figure given under option (A) is indeed embedded in the original figure. It has been represented below,

hence, option A is correct.
8. In the following question, select the word which cannot be formed using the letters of the given word.

BANKRUPT
A. BURP
B. TANK
C. RUN
D. CORRUPT

Ans. D
Sol. BANKRUPT has BURP
BANKRUPT has TANK
BANKRUPT has RUN
CORRUPT has C which is not present in the word BANKRUPT.
Hence, option C is the correct answer.
9. If " $\div$ " denotes " $\times$ ", "+" denotes " $\div$ ", " $\times$ " denotes "-" and "-" denotes "+", then $33+11-8 \div 4 \times 12=$ ?
A. 108
B. 23
C. 86
D. 58

Ans. B

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Sol.

| Symbol | $\div$ | + | $\times$ | - |
| :--- | :---: | :---: | :---: | :---: |
| Meaning | $\times$ | $\div$ | - | + |

Substituting symbols with their respective operator, the equation becomes,
$33 \div 11+8 \times 4-12$
Applying BODMAS rule we get,
$33 \div 11+8 \times 4-12$
$=3+8 \times 4-12$
$=3+32-12$
$=3+20$
$=23$
Hence, option B is the correct answer.
10. Select the figure that will come next in the following series.

A.

B.

C.

D.


Ans. B
Sol. After observation, it is clear that, answer figure (b) will be the next figure.
Logic- number of Straight lines increasing by +1 in each step.


Hence, option(B) is the correct answer.
11. Who among the following Mughal Emperors was called Darvesh or a Zinda Fakir?
A. Aurangzeb
B. Shah jahan
C. Humayun
D. Babur

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Ans. A
Sol. • Aurangzeb was called Darvesh or a Zinda Fakir.

- He Was the sixth emperor and last of the great Mughal emperors.
- He was well educated and ambitious
- He banned the consumption of alcohol and singing in court.

12. Who among the following was NOT a minister of Cabinet Mission Plan, 1946?
A. Lord Wavell
B. Sir Pethick Lawrence
C. Sir Stafford Cripps
D. Alexander

Ans. A
Sol. - The Cabinet Mission came to India aimed to discuss the transfer of power from the British government to the Indian leadership, with the aim of preserving India's unity and granting it independence.

- A high-powered mission of three British Cabinet members- Lord Pethick-Lawrence, the Secretary of State for India, Sir Stafford Cripps, President of the Board of Trade, and A. V. Alexander, the First Lord of the Admiralty reached Delhi on $24^{\text {th }}$ March 1946.

13. Amboli Ghat is located in which state?
A. Maharashtra
B. Tamil Nadu
C. Kerala
D. Uttrakhand

Ans. A
Sol. - Amboli ghat is located in the Sahyadri Hills of the Western Ghats in Maharashtra.

- This Ghat connects Kolhapur to Sawantwadi via Amboli.
- This Ghat receives heavy rainfall and is surrounded by thick forest, waterfalls and beautiful natural landscape.
- Other major passes in Maharashtra are- Kumbharli Ghat Pass, Tamhini Ghat, Naneghat Pass etc.

14. Pluto was declared a Dwarf Planet in which of the following year?
A. 2000
B. 2004
C. 2006
D. 2008

Ans. C
Sol. • Pluto was declared Dwarf Planet in 2006 at $26^{\text {th }}$ general assembly of International Astronomical Union which was held at Czech Republic.

- In 2006 International Astronomical Council changed the definition of a planet and excluded Pluto.
- Pluto is primarily made of ice and rock and is relatively small about one-sixth the mass of the Moon and one-third its volume. It takes 5.5 hours for light to reach Pluto from Sun.
- Charon, Styx, Nix, Kerberos and Hydra are five known moons of Pluto. Charon is the largest moon of Pluto.


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15. Each Member of the State Legislative Council (MLC) serves for a $\qquad$ term.
A. 5 year
B. 3 year
C. 4 year
D. 6 year

Ans. D
Sol. - Each Member of the State Legislative Council (MLC) serves for a six-year term, with terms staggered so that the terms of one third of a State Legislative Council's membership expire every two years.

- MLC must be a citizen of India, at least $\mathbf{3 0}$ years old, mentally sound, not an insolvent.
- He/She must be enrolled on the voters' list of the state for which he or she is contesting an election.
- He or she may not be a Member of Parliament at the same time.

16. Ammonia is manufactured on large scale by which process?
A. Haber's process
B. Contact process
C. Dow's process
D. Hoop's process

Ans. A
Sol. * Haber's process is used to prepare ammonia on a large scale.

* Ammonia can prepare by reacting the nitrogen with hydrogen in the presence of a metal catalyst under high temperature and high pressure.
* Haber's Process is an industrial process for producing ammonia from nitrogen and hydrogen, using an iron catalyst at high temperature and pressure.

17. On which date is National Sports Day observed in India?
A. 17 th September
B. 5th July
C. 29th August
D. 4th May

Ans. C
Sol. - National Sports Day is observed on 29 August.

- It is celebrated on 29 August in the honour of hockey legend Major Dhyanchand.
- He won 3 gold medals in Olympics for India in the years 1928, 1932 and 1936.
- He scored over 400 goals in his career, from 1926 to 1948.

18. Zakir Hussain is famous palyer of $\qquad$ ?
A. Tabla
B. Tambura
C. Chenda
D. Mridanda

Ans. A
Sol. Zakir Hussain is famous player of Tabla.

- The Tabla comprises of two drums,
a) The drum that is kept on the right hand is called "dayan"
b) while the left-hand drum is known as "bayan"
- The right hand drum "dayan" can itself make $\mathbf{1 2}$ different types of sounds.


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- Other famous players of Tabla are- Ustad Alla Rakha, Pandit Swapan Chaudhuri, Pandit Anindo Chatterjee Ghosh, Pandit Nayan Ghosh, Ustad Rashid Mustafa Thirakwa, Pandit Kishen Maharaj, Ustad Tari Khan, and Pandit Kumar Bose.

19. Pashupatinath temple is located in $\qquad$ _.
A. Nepal
B. India
C. Cambodia
D. Bangladesh

Ans. A
Sol. * Pashupatinath temple is a Hindu temple complex located on the banks of the Bagmati River in Kathmandu, Nepal.

* It is inscribed in UNESCO World Heritage Sites's list.
* It is dedicated to Lord Shiva.
* It was erected in the 5th century by Licchavi King Prachanda Dev.

20. Which Indian Institute has developed the first made-in-India test kit for COVID-19?
A. ICMR
B. Homi Bhabha Cancer Hospital \& Research Centre
C. Mylab Discovery Solutions Pvt Ltd.
D. Punjab Institute of Medical Sciences

Ans. C
Sol. • Mylab Discovery Solutions Pvt Ltd, has developed the first made-in-India test kit for COVID-19.

- It is a Pune, Maharashtra-based molecular diagnostics company.
- The kit was developed in a record period of six weeks.
- The cost of a single kit is Rs.80,000 and it can test 100 patients.

21. In a $p-n$ junction the potential barrio is due charges on either side of the junction. These charges are:
A. majority carrier
B. Minority carrier
C. Both majority as well as minority carrier
D. Fixed donor and acceptor ions

Ans. D
Sol. These charges are fixed donor and acceptor ions. so, option $D$ is correct.
22. Which method is used for lighting calculations?
A. Watts per square meter method
B. Lumen or light flux method
C. Point to point method
D. All of these

Ans. D
Sol. All the given options are correct.

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23. In cables, the thickness of the layer of insulation on the conductor depends upon.
A. Current carrying capacity
B. Voltage
C. Power factor
D. reactive power

Ans. B
Sol. Voltage variation causes the change required in the thickness of insulation on conductor of cables
24. Which of the following is not distribution which is normally used.
A. 3 phase 4 wire
B. 3 phase -3 wire
C. single phase 3 wire
D. single phase 4 wire

Ans. D
Sol. Single phase 4 wire system are not used normally.
25. An induction motor having, and poles runs at 727.5 rpm , if the supply frequency is 50 Hz the emf in the rotor will have a frequency of
A. 1.5 Hz
B. 48.5 Hz
C. 51.5 Hz
D. 75 Hz

Ans. A
Sol. $\quad N_{s}=\frac{120 \times 50}{8}=750 \mathrm{rpm}$
$S=\frac{750-727.5}{750}=0.03$
$\therefore$ Slip frequency of rotor $=\mathrm{sf}=0.03 \times 50=1.5 \mathrm{~Hz}$
26. In a loaded dc motor, if the brushed are given from the interpole axis in the direction of rotation then the commutation will
A. Improve and the speed falls
B. Deteriorate and speed rises
C. deteriorate and speed falls
D. Improve and speed rises

Ans. C
Sol. In this case, the armature reaction is partially magnetising and partially cross magnetising in nature so it deteriorates and speed falls
27. If in a transformer copper loss is 500 w than how much should be the iron loss for maximum efficiency?
A. 200 W
B. 400 W
C. 500 W
D. 700 W

Ans. C
Sol. For maximum efficiency
100 n loss $=$ copper loss $=500 \mathrm{w}$

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28. Neglecting all losses, how is the developed torque ( $T$ ) of a DC separately excited motor, operating under constants terminal voltage, related to it's output power $(P)$ :
A. $T_{e} \propto \sqrt{P}$
B. $T_{e} \propto P$
C. $\mathrm{T}_{\mathrm{e}}^{2} \propto \mathrm{P}^{3}$
D. $T_{e}$ independent of $P$

Ans. B
Sol. The output power and torque is directly to each other so, option B is current.
29. The deflection expression $\mathrm{Q} \propto \mathrm{V}^{2}=\frac{\mathrm{dc}}{\mathrm{d} \theta}$ corresponds to
A. moving iron type instruments
B. Electrodynamics type instruments
C. Electrostatic type instruments
D. Induction type instruments

Ans. C
Sol. The given expression represents the electrostatic type instruments.
30. In calibration of dynamometer wattmeter by phantom loading arrangement is used because
A. the arrangement gives accurate results.
B. the power consumed in calibration work is minimum
C. the method gives quick results.
D. the onsite calibration is possible.

Ans. B
Sol. Actual loading arrangements would involve a considerable waste of power in order to avoid this 'Phantom' or 'Frictions' loading is done.
31. The ratio and phase angle errors in a well-designed current transformer (CT) are kept within specified limits by using
A. Ferrite Core
B. Strip would core
C. Fractional turn
D. None of these

Ans. A
Sol. Ferrite core is the correct option.
32. The bridge shown in the figure represents

A. Maxwell's bridge
B. Wien's bridge
C. Anderson's bridge
D. Hay's bridge

Ans. A
Sol. The given figure represents Maxwell's bridge which measures inductances.

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33. An ac voltage source 100 sinwt is connected to the load resistor $R$ of $50 \Omega$. The average power in the load resistor R is given as:
A. 100 W
B. 200 W
C. 400 W
D. 1600 W

Ans. A
Sol. $\mathrm{P}=\frac{\left(\mathrm{V}_{\mathrm{rms}}\right)}{\mathrm{R}}$ here $\mathrm{V}_{\mathrm{rms}}=\frac{100}{\sqrt{2}}$
So, $P=\frac{\left(\frac{100}{\sqrt{2}}\right)^{2}}{50}=\frac{10000}{2 \times 50}=100 \mathrm{~W}$
34. What is resonant frequency of 2.7 pf capacitor and a 33 nH inductor?
A. 513 mHz
B. 720 GHz
C. 250 MHz
D. 533 MHz

Ans. D
Sol. Frequency $\mathrm{f}=\frac{1}{2 \pi \sqrt{\mathrm{LC}}}=\frac{1}{2 \times 3.14 \sqrt{33 \times 10^{-9} \times 2.7 \times 10^{-12}}}=533 \mathrm{MHz}$
35. What is the equivalent inductance when inductors are connected in series:
A. Sum of all the individual inductances
B. product of all the individual inductances
C. Sum of the reciprocal of all the individual inductances.
D. Product of the reciprocal of all the individual inductances.

Ans. A
Sol. Sum of all the individual inductances represent the equivalent inductance in series connection.
36. When the sole purpose of an alternating current is heating, the selection of conductor is based on:
A. rms value of current
B. average value of current
C. Peak value of current
D. Any of the above

Ans. A
Sol. rms value of current used for the selection of conductor.
37. The presence of parallel alignment of magnetic dipole moment is given by which materials:
A. Diamagnetic
B. Ferromagnetic
C. Paramagnetic
D. Ferrimagnetic

## Ans. B

Sol. The ferromagnetic maternal are characterized by parallel alignment of magnetic dipole moments. Their susceptibility is very large.

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38. Find the strength of the magnetic field in a conductor 0.5 m long moving with a velocity of $10 \mathrm{~m} / \mathrm{s}$, inducing an emf of 20 V .
A. 1 T
B. 2 T
C. $3 T$
D. 4 T

Ans. D
Sol. The formula for induce emf $E=B l v$. Substitute the value of $E, I, v$ in the equation then $20=B \times 0.5 \times 10$
$B=4 T$
39. The flux linkage in coil 1 is $3 \mathrm{wb}-\mathrm{T}$ and it has $x$ turns and the current in coil 2 is 24 , calculate the value of $x$ if the mutual inductance is 750 H .
A. 300
B. 400
C. 500
D. 750

Ans. C
Sol. As the mutual inductance is the product of the number of turns in one will and the flux linkages of that coil, divided by the current in other coil.
$N=750 \times \frac{2}{3}=500$ turns
40. The equivalent inductance of two coils with series flux having inductances H and 2 H with a mutual inductance of 1 H .
A. 10
B. 7
C. 11
D. 13

Ans. B
Sol. The equivalent inductance of two coils in series with opposing flux is $L=L_{1}+L_{2}-2 M$ where $L_{1}$ and $L_{2}$ are the self inductances and $M$ is mutual inductance. Thus $L=7+2-2(1)=7 H$
41. What is the current in the given circuit?

A. 0 A
B. 15 A
C. 5 A
D. 10 A

Ans. A

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Sol. Total voltage by moving in clock-wise direction
$-10-20+30=0 \mathrm{~V}$
As $\mathrm{I}=\frac{\mathrm{V}}{\mathrm{R}}=0$
So, current is 0 A
42. What will be the value of current be once source transformation is applied to the circuit?

A. 10 A
B. 20 A
C. 30 A
D. 40 A

Ans. A
Sol. Using ohm's law V = IR
$\mathrm{I}=\frac{\mathrm{V}}{\mathrm{R}}=\frac{220}{22}=10 \mathrm{~A}$
43. In the given circuit, switch $S$ is closed at time $t=0$. The steady state current equals:

A. $\frac{V}{\sqrt{R^{2}+\omega^{2} L^{2}}} \sin \left(\omega t+\theta-\tan ^{-1} \frac{\omega L}{R}\right)$
B. $V \sin \left(\omega t+\theta-\tan ^{-1} \frac{\omega L}{R}\right)$
C. $\frac{V}{\sqrt{R^{2}+\omega^{2} L^{2}}} \sin \left(\omega t+\theta+\tan ^{-1} \frac{\omega L}{R}\right)$
D. $\mathrm{V} \sin \left(\omega \mathrm{t}+\theta+\tan ^{-1} \frac{\omega \mathrm{~L}}{\mathrm{R}}\right)$

Ans. A
Sol. At steady state conductor, inductor becomes short circuited so $\mathrm{i}(\mathrm{t})$

$$
\frac{V}{\sqrt{R^{2}+\omega^{2} L^{2}}} \sin \left(\omega t+\theta-\tan ^{-1} \frac{\omega L}{R}\right)
$$

44. The 'Q' Quality factor of a series R-L-C circuit is equal to the
A. impedance
B. Resonant frequency
C. Voltage gain
D. Current Gain

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Ans. C
Sol. For series RLC circuit
$\mathrm{Q}=\frac{\mathrm{WL}}{\mathrm{R}}=\frac{\mathrm{W}}{\Delta \mathrm{W}}$ have $\Delta \mathrm{w} \rightarrow$ band width
So, it is equivalent to voltage gain.
45. A balanced RYB sequence, $Y$-connected source with $V_{R N}=100 \mathrm{~V}$ is connected to a $\Delta$ connected balanced load of $(8+j 6)$ ohm per phase. The phase current and line current values respectively are:
A. $10 \mathrm{~A}, 30 \mathrm{~A}$
B. $10 \sqrt{3} \mathrm{~A}, 30 \mathrm{~A}$
C. $10 \mathrm{~A}, 10 \mathrm{~A}$
D. $10 \sqrt{3} A, 10 \sqrt{3} A$

Ans. B
Sol. Phase current $=\frac{V_{p} h}{Z_{p} h}=\frac{100 \sqrt{3}}{\sqrt{8^{2}+6^{2}}}=\frac{100 \sqrt{3}}{10}=10 \sqrt{3}$
Line current $=$ phase current $\times \sqrt{3}$
$=10 \sqrt{3} \times \sqrt{3}=30 \mathrm{~A}$
46. For the circuit shown below, what are the value of the Norton's equivalent current and conductance between $A B$ terminals:

A. $-\alpha \frac{V_{1}}{R_{1}}$ and $C_{1}=\frac{1}{R_{2}}$
B. $\alpha \frac{V_{1}}{R_{2}}$ and $C_{1}=\frac{1}{R_{1}}$
C. $\alpha \frac{V_{1}}{R_{1}}$ and $C_{1}=\frac{1}{R_{1}}$
D. $-\alpha \frac{V_{1}}{R_{1}}$ and $C_{1}=\frac{1}{R_{1}}$

Ans. A
Sol. $\quad I_{e q}=-\alpha i=-\alpha\left(\frac{V_{1}}{R_{1}}\right) \Rightarrow \alpha \frac{V_{1}}{R_{1}}$
And $\mathrm{C}_{1}=\frac{1}{\mathrm{R}_{2}} \rightarrow$ Conductance
So, correct answer is
$-\alpha \frac{V_{1}}{R_{1}}$ and $C_{1}=\frac{1}{R_{2}}$

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47. The total capacitance of two capacitors $C_{1}$ and $C_{2}$ connected in series will be
A. less than smallest capacitor
B. more than highest capacitor
C. equal to highest capacitor
D. equal to $\mathrm{C}_{1}+\mathrm{C}_{2}$

Ans. A
Sol. When connected in series then
$\mathrm{C}_{\mathrm{eq}}=\frac{\mathrm{C}_{1} \cdot \mathrm{C}_{2}}{\mathrm{C}_{1}+\mathrm{C}_{2}}$
So, $C_{\text {eq }}$ is smaller in values of $C_{1} \& C_{2}$.
48. Two bulbs $100 \mathrm{w}, 250 \mathrm{~V}$ and $200 \mathrm{w}, 250 \mathrm{v}$ are connected is series across a 500 V line then,
A. 100W bulb will be fused
B. 200W bulb will be fused
C. Both bulbs will be fused
D. No bulb will be fused

Ans. C
Sol. Both bulbs will get fused as connected across HV line.
49. Which of the following is an ohmic conductor?
A. Copper
B. Silver
C. Gold
D. All of these

Ans. D
Sol. All the given conductor is ohmic in nature.
50. In the case of an inductor:
A. Voltage lags the current by $\frac{\pi}{2}$
B. voltage leads the current by $\frac{\pi}{2}$
C. voltage leads the current by $\frac{\pi}{3}$
D. Voltage leads the current by $\frac{\pi}{4}$

Ans. B
Sol. Inductor current lags the voltage so option $B$ is correct.

## Upcoming Mini Mock Challenge in July Month

## SSC JE

## Electrical Engineering

| Exam | Live Date | Syllabus | No. of Questions | Time |
| :---: | :---: | :---: | :---: | :---: |
| SSC JE Mini Mock Test-1 | 08 July 2020 | Full Syllabus (Tech. (30 Q's) \& Non-Tech. (20 Q's)) | 50 | 30 |
| SSC JE Mini Mock Test-2 | 15 July 2020 | Full Syllabus (Tech. (30 Q's) \& Non-Tech. (20 Q's)) | 50 | 30 |
| SSC JE Mini Mock Test-3 | 22 July 2020 | Full Syllabus (Tech. (30 Q's) \& Non-Tech. (20 Q's)) | 50 | 30 |
| SSC JE Mini Mock Test-4 | 29 July 2020 | Full Syllabus (Tech. (30 Q's) \& Non-Tech. (20 Q's)) | 50 | 30 |

## gradeup

