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STAFF SELECTION COMMISSION

SSC JE 2019-20

Electrical Engineering

Mini Mock Challenge
(June 06- June 07 2020)

Questions & Solutions

1. **In the following question, select the related letters from the given alternatives.**

   EKMR : VPNI : : SJWG : ?

   A. HQTD   B. HMQT

   C. HDTQ   D. HQDT

Ans. D

Sol. If we arrange alphabets in two rows as shown below, the letters are related as follows,

So SJWG will be related to,

Thus SJWG is related to HQDT.

Hence, option D is the correct answer.

2. **In the following question, select the related number from the given alternatives.**

   11 : 121 : : 111 : ?

   A. 1234   B. 2314

   C. 12321   D. 12421

Ans. C

Sol. As,

   $11^2 = 121$

   Similarly,

   $111^2 = 12321$

   Thus 111 is related to 12321.

   Hence, option C is the correct answer.

3. **In the following question, select the odd number from the given alternatives.**

   A. 497   B. 809

   C. 648   D. 164

Ans. B

Sol. Square of the digit at the extreme right end is equal to the rest of the digits of the number

   7x7=49

   8x8=64

   4x4=16

   9x9=81 and not 80

   Hence, option B is the correct answer.

4. **In the following question, select the odd word from the given alternatives.**

    A. Lavani   B. Bihu

    C. Jhumar   D. Ballet

Ans. D

Sol. All except ballet are folk dances.

    Hence, option D is the correct answer.

5. **Arrange the following words in a logical sequence.**

    1) Result   2) Exam

    3) School   4) Study

    5) Admission

    A. 5, 3, 1, 4, 2   B. 3, 5, 2, 4, 1

    C. 3, 5, 4, 2, 1   D. 3, 4, 5, 2, 1

Ans. C

Sol. Generally,

    First we find the school(1),

    Then we take admission(2),

    Then we study(3)

    Then we take exam(4)

    And finally we get the result(5).

    Correct sequence = 3, 5, 4, 2, 1

    Hence, option C is the correct answer.

6. Pointing to a boy Ranjan said, "He is the son of my father's brother". How is Ranjan related
    to that boy?

    A. Uncle   B. Sibling

    C. Cousin   D. Son

Ans. C

Sol. From the text given in the questions, we can draw following family tree-
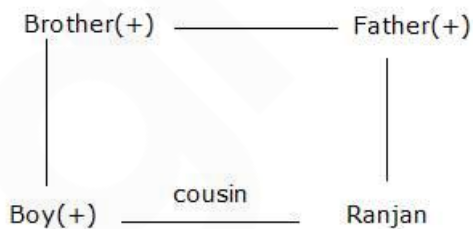
    Hence, option C is the correct answer.

7. In a certain code language, "**SALMON**" is written as "**VDOPRQ**". How is "**FISH**" written in
    that code language?

    A. ILVK   B. KILL

    C. VILK   D. EILK

Ans. A

Sol. As, SALMON is coded as VDOPRQ

S+3=V

A+3=D

L+3=O

M+3=P

O+3=R

N+3=Q

Similarly,

F+3=I

I+3=L

S+3=V

H+3=K

So, FISH is coded as ILVK.

Hence, option A is the correct answer.

8. **In the following question, select the missing number from the given alternatives.**

5	2	8	10	20
7	5	6	3	27
2	8	41	5	42
35	7	3	8	49
12	4	8	11	?

A. 52   B. 71

C. 81   D. 60

Ans. A

Sol. Horizontally,

(5*8)-(2*10)=40-20=20

(7*6)-(5*3)=42-15=27

(2*41)-(8*5)=82-40=42

(35*3)-(7*8)=105-56=49

(12*8)-(4*11)=96-44=52

So, Missing Number=52

Hence, option A is the correct answer.

9. Two statements are given, followed by two conclusion I and II. Assuming these statements to be true, even if they seem to be at variance with commonly known facts, decide which of the given conclusion logically follow (s) from the statements.
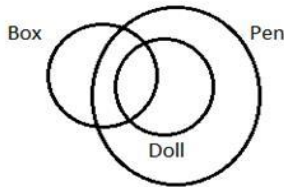
Statements:

Some boxes are dolls.

All dolls are pen.

Conclusion:

I. Some boxes are pens.

II. Some pens are boxes.

III. Some pens are dolls.

IV. All pen are dolls.

A. Only conclusion II, III and IV follow.   B. Only conclusion I, II and III follow.

C. Only conclusion I, II and IV follow.   D. All the conclusion follow.

Ans. B

Sol.   Minimum possible diagram is-

Conclusion:

I. Some boxes are pens.(It follows as its obvious from the above diagram.)

II. Some pens are boxes.(It also follows as its obvious from the above diagram.)

III. Some pens are dolls. .(It also follows as its obvious from the above diagram.)

IV. All pen are dolls. .(It does not follow as its just a possibility, not surety.)

So, Only conclusion I, II and III follow.
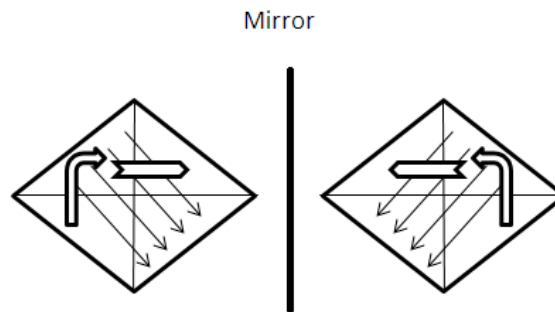
Hence, option B is the correct answer.

10. **Select the correct mirror of the given figure when the mirror is placed on the right of the figure.**
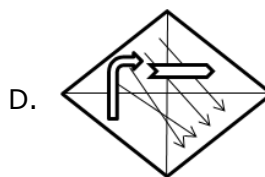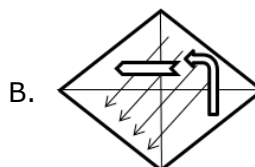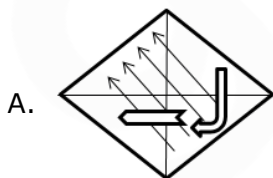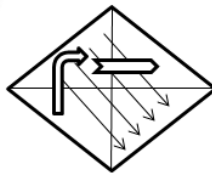
A.   B.

C.   D.

Ans. B

Sol. In a plane mirror, a mirror image is a reflected duplication of an object that appears almost identical, but it is reversed in the direction perpendicular to the mirror surface. As an optical effect it results from reflection of substances such as a mirror or water.

Hence, option B is the correct answer.

11. 104th amendment of the constitution is related to which article?

    A. Article 15   B. Article 16
    C. Article 334   D. Article 335

Ans. C

Sol. ● 104th amendment of the constitution is related to Article 334. This amendment was done on 25 Jan 2020.

    ● This amendment was done to extend the reservation of seats for SCs and STs in the Lok Sabha and states assemblies from seventy years to eighty years.

12. The doctrine of basic structure of constitution was given in which case?

    A. Golak Nath case   B. Keshwanand bharti case
    C. Minerva mills case   D. Indira Sahani case

Ans. B

Sol. The doctrine of basic structure of constitution was given in **Keshwanand bharti case**, 1973.

    * In this case, The Supreme Court held that the Parliament has power to amend any provision of the constitution, but doing so, the basic structure of the constitution is to be maintained.

    * The basic features of the Constitution include:

    Supremacy of the constitution, Republican and democratic form of government, Secular character of the constitution, Federal character of the constitution, Separation of power etc.

13. Who is referred to as 'Frontier Gandhi'?

    A. Sheikh Abdullah   B. Manilal Gandhi
    C. Khan Abdul Gaffar Khan   D. Gopal Krishna Gokhale

Ans. C

Sol. Abdul Ghaffār Khān', nicknamed Bāchā Khān or Pāchā Khān, was a Pashtun independence activist against the rule of the British Raj. He was a political and spiritual leader known for his nonviolent opposition, and a lifelong pacifist and devout Muslim

14. The Battle of Plassey was fought in year

   A. 1775   B. 1761

   C. 1576   D. 1757

Ans. D

Sol. The Battle of Plassey was fought between British East India company and Nawabs of Bengal in 1757. The English East India company's forces under Robert Clive defeated Siraj-ud-daulah the Nawab of Bengal.

15. International Women's Day is observed on _____ .

   A. January 1   B. February 28

   C. March 8   D. April 30

   E. March 1

Ans. C

Sol.

• International Women's Day (March 8) is a global day celebrating the social, economic, cultural and political achievements of women.

• The day also marks a call to action for accelerating gender parity.

16. Which type of soil is most abundant in deccan plateau?

   A. Alluvial Soil   B. Red Soil

   C. Black Soil   D. Laterite Soil

Ans. C

Sol. • **Black Soil is most abundant is Deccan plateau region.**

   • It is also known as Regur Soil & it has black colour due to abundance of Iron, magnesium and aluminium.

   • It is most suitable for Cotton cultivation.

   • These soils are mainly found in Maharashtra, Madhya Pradesh, parts of Karnataka, Andhra Pradesh, Gujarat and Tamil Nadu.

17. Which are the Youngest Fold Mountains of the world?

   A. Andes   B. Atlas

   C. Ural   D. Himalayas

Ans. D

Sol. The Himalayas is the Youngest Fold Mountains of the world.

   • Himalayas are lifted by the subduction of the Indian tectonic plate under the Eurasian Plate.

   • Himalayan rocks consist mostly of uplifted sedimentary and metamorphic rocks.

• Himalayan Glaciers are the world's largest ice cap regions outside Polar Regions.

• Himalayan mountains have come out of a great geosyncline called the Tethys Sea and that the uplift has taken place in different phases.

18. Which artery gives blood supply to the brain?

A. Coronary artery
B. Common carotid artery
C. Subclavian artery
D. Brachiocephalic artery

Ans. B

Sol. • **The carotid arteries** are major blood vessels in the neck that supply blood to the brain, neck and face. There are two carotid arteries, one on the right and one on the left.

• In the neck, each carotid artery branches into two divisions: the internal carotid artery supplies blood to the brain and the external carotid artery supplies blood to face and neck.

19. Which of the following phenomenon is observed in prisms & rainbows?

A. Interference
B. Refraction
C. Dispersion
D. Scattering

Ans. C

Sol. * **Dispersion phenomenon is observed in prisms and rainbows.**

* The separation of visible light into its different colours is known as dispersion. When light passes through prism it splits into its seven colour and bend according to their frequencies.

20. Recently which country launched its first military satellite 'Noor'?

A. Pakistan
B. Iran
C. Iraq
D. Afghanistan

Ans. B

Sol. * Recently **Iran** launched its first military satellite '**Noor'**.

* The satellite is launched by **Ghased Launcher**.

* The Satellite was launched by **Iran's Islamic Revolutionary Guard Corps** (IRGC).

* IRGC is operates its own military infrastructure in parallel to armed forces and answerable only to Leader **Ayatollah Ali Khamenei**.

* The US administration has warned that the technology used to launch satellites could help Iran develop Inter Continental Ballistic Missiles

21. If the network elements can be separated physically from each other, then they are called as-

A. Distributed network
B. Lumped network
C. Bilateral network
D. Unilateral network

Ans. B

Sol. If the network elements can be separated physically from each other. They are called as lumped network.

22. Two identical coils A and B of 1000 turns each lie in a plane such that 70% of flux produced by one coil links with the other. If the current 10A flowing in coil A produces a flux of 5mWb in it. Find out the mutual inductance between A and B.

   A. 35mH   B. 350mH

   C. 3.5mH   D. 0.35mH

Ans. B

Sol. Mutual inductance

   $$(M) = \frac{N_B \phi_{AB}}{i_A}$$

   Given,

   $N_A = N_B = 1000$

   $i_A = 10A$, $\phi_A = 5mWb$

   $\phi_{AB} = 0.7 \times 5mWb$

   $= 3.5mWb$

   $$M = \frac{1000 \times 3.5 \times 10^{-3}}{10} = 350 \text{ mH}$$

23. Which of the following is NOT correct about permanent magnet?

   A. Broad hysteresis loop   B. Large residual field exist

   C. Negative susceptibility   D. Strong attraction to magnetic field.

Ans. C

Sol. Permanent magnets used in instruments are hard core material which exhibits the properties:

   1) Broad hysteresis loop

   2) High energy density

   3) Presence of large residual field and coercive field.

   4) Strong attraction to magnetic fields

   5) They shows positive susceptibility.

24. Hydroelectric generators are:

   A. Cylindrical roto type   B. Salient pole type

   C. Slip ring type   D. Double cage rotor type

Ans. B

Sol. Hydroelectric generators are run at low speed. So, the number of poles are more and salient pole construction is best suited for this type of operation.
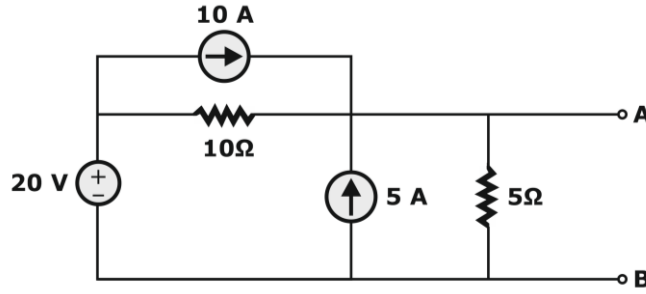
25. The phase difference between the input and output voltages in common base configuration is:

A. 180°   B. 90°

C. 360°   D. 0°

Ans. D

Sol. The phase difference between the input and output voltages in common base configuration is 0°.

26. The unit of retentivity is-

A. Weber   B. Weber/sq. m

C. Weber/m   D. AT/m

Ans. B

Sol. Retentivity of a material is its capacity to remain magnetized even after the external magnetization has been removed.

Unit of Retentivity is weber/sq. meter.

27. Which of the following is NOT feature of an open circuit?

A. It has infinite resistance.   B. Current through it is zero

C. There is zero voltage across it.   D. There is finite voltage across it.

Ans. C

Sol. For open circuited,

- No current

- Finite voltage

- Infinite Resistance

28. Symmetrical braking current is:

A. Peak value of ac component   B. Average value of ac component

C. Rms value of ac component   D. Rms value of ac and dc component

Ans. C

Sol. Symmetrical breaking current represents only RMS value of AC component of fault current.

29. Which type of wiring having very long life?

A. Conduit wiring   B. Casing and capping wiring.

C. Batten wiring   D. Cleat wiring.

Ans. A

Sol. Conduit wiring having very long life because in conduit wiring PVC cables are taken through steel conduit pipes. This may be surface conduit or concealed conduit wiring.

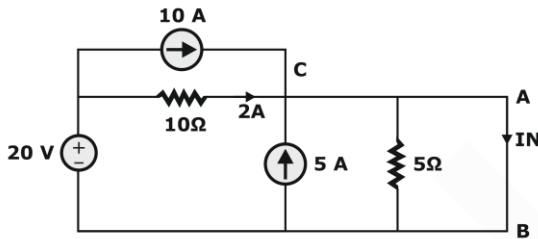30. Find out the Norton current for the circuit shown below across AB.

A. 15 A   B. 17 A

C. 25 A   D. 13 A

Ans. B

Sol. Short the terminal AB.

Apply KCL at Node C.

$$I_N = \frac{20}{10} + 5 + 10 = 17A$$

31. The selectivity in series circuit varies with frequency as-

A. f^0 B. f

C. f^{-1} D. $\sqrt{f}$

Ans. B

Sol. Selectivity = $\dfrac{\omega L}{R} \Rightarrow Q - factor$

$\boxed{S \propto f}$

So, selectivity is proportional to frequency.

32. Which of the following statement is correct?

A. Synchronous machine with longer air-gap is stiffer than with smaller air-gap.

B. Synchronous machine with smaller air-gap is stiffer than with larger air-gap.

C. Stiffness of machine does not depend on air-gap.

D. None of the above.

Ans. A

Sol. Stiffness factor = $\dfrac{dP}{d\delta}$

$$P_{sy} = \dfrac{dP}{d\delta} = \dfrac{EX}{X_s}\cos\delta \text{ and } \boxed{P_{sy} \propto \text{Stability}}$$

So, $\uparrow P_{sy} \propto \dfrac{1}{\downarrow X_s} \propto (\text{Air gap}) \uparrow$

So, Synchronous machine with larger air-gap is more stable them with smaller air-gap.

33. The 8's complement of the octal number $(235)_8$ is:

A. $(542)_8$ 　　　　　　　　　　B. $(543)_8$

C. $(541)_8$ 　　　　　　　　　　D. $(540)_8$

Ans. B

Sol. So, the 7's complement of the octal number is-

$(777)_8 - (235)_8 = (542)_8$

Now 8's complement = (Now 7's complement + 1)

$= (542)_8 + 1$

$= (543)_8$

34. What is the maximum load that is permitted in a power circuit?

A. 5000 Watts 　　　　　　　　　B. 10000 Watts

C. 3000 Watts 　　　　　　　　　D. 8000 Watts

Ans. C

Sol. In a power circuit the maximum load that can be permitted is around 3000 Watts.

35. Which of the following is NOT plastic welding?

A. Thermit welding 　　　　　　　B. Forge welding

C. Resistance welding 　　　　　　D. Arc welding

Ans. D

Sol. Plastic or Non-fusion welding is the process in which the pieces of metal to be joined are heated to a plastic state then forced together by external pressure. This type of welding includes-

Thermit welding, Resistance welding and Forge welding.

36. The Pitch factor for a full pitched winding of a synchronous machine is-

A. 0.9 　　　　　　　　　　　　B. 0.5

C. 0 　　　　　　　　　　　　　D. 1

Ans. D

Sol. $k_p = \cos\left(\dfrac{\varepsilon}{2}\right)$, where ϵ is the chording angle.

In case of full pitched coil, chording angle will be zero.

So, $k_p = \cos 0 = 1$

Hence, The Pitch factor for a full pitched winding of a synchronous machine is 1.

37. Which of the following statement is correct about the design of split phase single phase induction motor winding?

    A. Starting windings has low resistance and high reactance.

    B. Main winding has high resistance and low reactance

    C. Starting winding has high resistance and low reactance.

    D. Main winding has low resistance and low reactance.

Ans. C

Sol.
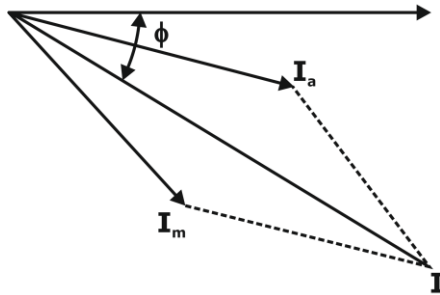
In order to give a phase shift between starting and main winding, The windings are so designed as starting winding has high resistance and low reactance while the main winding has low resistance and high reactance.

38. In which manner the lightning arresters are connected with the equipment to be protected in the power system network?

    A. In parallel   B. In series

    C. Either parallel or series   D. None of the above.

Ans. A

Sol. Lightning arresters are connected between the line and earth i.e., in parallel with the equipment to be protected at the substation.

39. In a tank circuit, the capacitor is charged up to 10V and the capacitance and inductance are 20mF and 5mH respectively. The peak value of the circulating current is-

    A. 10A   B. 5A

    C. 20A   D. 1A

Ans. C

Sol. Tank circuit
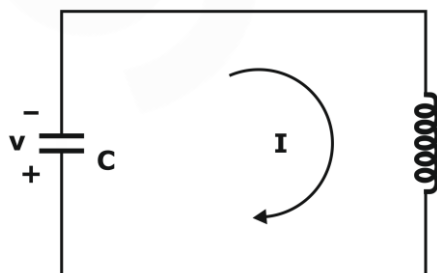
$I = I_P \sin \omega_0 t$

$I_p = V\sqrt{\dfrac{C}{L}}$

$\omega_0 = \dfrac{1}{\sqrt{LC}}$

Peak value of current $(I_p) = V\sqrt{\dfrac{C}{L}}$

$I_p = 10\sqrt{\dfrac{20}{5}} = 10 \times 2 = 20A$

40. Hysteresis loss and eddy current loss are used in-

 A. Dielectric heating   B. Resistance heating

 C. Induction heating   D. Any of the above.

Ans. C

Sol. hysteresis loss and eddy current loss are used in induction heating.

 These losses together is also known as Iron loss.

41. Under commutation in a DC machine gives rise to-

 A. Sparking at the leading edge of the Brush

 B. Sparking at the trailing edge of the Brush

 C. Sparking at the middle of the Brush.

 D. No sparking at all

Ans. B

Sol. Under commutation delays the current to reverse while commutation. It results in sparking at the trailing edge of the Brush.

42. The hysteresis loop of a magnetic material has an area $10cm^2$ with the scale given as 1cm = 2AT and 1cm = 25mWb. At 100 Hz, the total hysteresis loss is:

 A. 50W   B. 100W

 C. 10W   D. 0.1W

Ans. B

Sol. Area under hysteresis loop represents hysteresis loss.

 Area = $10cm^2 = 10 \times 4 \times 25 \times 10^{-3}$

 = 1 J

 ∴ Power loss = Energy × frequency

 = 1 J × 100 = 100W

 $\boxed{P_2 = 100W}$

43. Two transformers of the same type are designed to work at the flux and current densities, but the linear dimensions of one times those of the other in all respect. The ratio of their core loss will be:

A. 9

B. $3\sqrt{3}$

C. $9\sqrt{3}$

D. $27\sqrt{3}$

Ans. C

Sol. The core loss ∝ volume ∝ (dimension)³

Pc ∝ (dimensions)³∝ x³

$$\frac{P_{c1}}{P_{c2}} = \left(\frac{x}{\sqrt{3x}}\right)^3$$

$$P_{c2} = 9\sqrt{3}P_{c1}$$

Ratio is, $\dfrac{P_{c2}}{P_{c1}} = 9\sqrt{3}$

44. For a 4-pole DC machine with wave wound armature, the number of brushes required is:

A. 4

B. 2

C. 8

D. 6

Ans. B

Sol. The no of brushes depends on the winding used. For wave wound machine, the no. of brushes are 2 as two parallel paths In case of LAP wound machine, the no. of Brushes are equal to the parallel paths (A = P).

45. In case of circuit breakers if the area of arc decreases, its resistance:

A. Increases

B. Decreases

C. Remain same

D. None of the above

Ans. A

Sol. The resistance of arc increases with reducing the cross-section area of the arc. This method is used to interrupt the arc during faulty condition.

46. Rayleigh's current balance is a-

A. Secondary instrument

B. Absolute instrument

C. Integrating instrument

D. Recording instrument

Ans. B

Sol. Rayleigh's current balance is an example of absolute instrument. These instruments give the magnitude of the quantity under measurement in terms of physical constants and no need to calibrate these instruments with other instruments.

47. Instruments transformers are used in which type of circuits?

A. AC only

B. DC only

C. Both AC and DC circuits

D. None of the above.

Ans. A

Sol. Instruments transformers are used in AC system for measurement of electrical quantity.

48. Cathode of CRO is coated with-

   A. Thorium oxide   B. Zinc oxide

   C. Barium oxide   D. Strontium oxide

Ans. D

Sol. The cathode in CRO that provides a large number of electrons is coated with strontium oxide or Barium oxide.

49. The number of suspension discs required in order to design a line of 220 kV rating will be.

   A. 10   B. 20

   C. 30   D. 15

Ans. B

Sol. Each suspension disc is designed for normally voltage rating = 11 kV

   So, No. of discs to designed 220 kV line

   $= \dfrac{220kV}{11kV} = 20$

50. In a 3-φ power measurement for a balanced load using the two wattmeter method. The reactive power is given by

   A. $\sqrt{2}$ times the sum of two wattmeter readings.

   B. $\sqrt{3}$ times the sum of two wattmeter readings.

   C. $\sqrt{2}$ times the difference of two wattmeter readings.

   D. $\sqrt{3}$ times the difference of two wattmeter readings.

Ans. D

Sol. We know this for two wattmeter method,

   $W_1 = V_L I_L \cos(30 - φ)$

   $W_2 = V_L I_L \cos(30 + φ)$

   $(W_1 - W_2) = V_L I_L [\cos(30 - φ) - \cos(30 + φ)]$

   $(W_1 - W_2) = V_L I_L (2 \times \sin 30 \sin φ)$

   $(W_1 - W_2) = V_L I_L \sin φ$

   Reactive power = $\sqrt{3}(w_1 - w_2) = \sqrt{3} V_L I_L \sin φ$

   Reactive power = $\sqrt{3}$ lines the difference between readings of two watt meters.

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Upcoming Mini Mock Challenge in **June** Month

SSC JE

Electrical Engineering

Exam	Live Date	Syllabus	No. of Questions	Time
SSC JE Mini Mock Test-1	06 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30
SSC JE Mini Mock Test-2	13 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30
SSC JE Mini Mock Test-3	20 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30
SSC JE Mini Mock Test-4	27 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30

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