



# **SSC JE 2019 Tier-1**

## **ELECTRICAL ENGINEERING**

**28th Oct.**

**Shift-1**

**Memory Based**  
**Questions with Solutions**



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## SSC JE 2019 Electrical Subject Weightage Analysis

Shift-1 (Memory Based)		
Subject	Difficulty Level	No. of Questions
Circuit Theory	Easy	15-20
Measurements	Easy	5-8
Electrical Machines	Moderate	40-50
Generation, Transmission & Distribution	Easy	12-15
Estimation & Costing	Easy	3-4
Utilization of Electrical Energy	Easy	6-8
Basic Electronics	Easy	8-10
Reasoning	Tough	50
General Awareness	Moderate	50
<b>OVERALL</b>	<b>Easy</b>	<b>200 Qs</b>

## ELECTRICAL ENGINEERING

### Questions Shift-I (Memory Based)

1. When rain falls on Rainbow it will be reflected or dispersion?

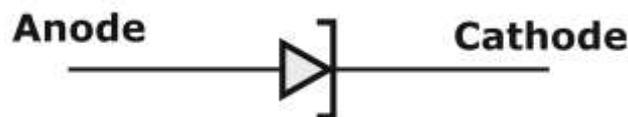
Sol. When sunlight falls on drop of rain, it undergoes refraction and internal reflection and splits into different colours (dispersion).

2. By which material thermocouple is made of?

Sol. A combination of Copper - Constantan; Iron - Constantan; Platinum Rhodium - Platinum; Rhodium Iridium - Iridium

3. What is the symbol of tunnel diode?

Sol. Symbol of tunnel diode is:



4. Which element doped with silicon to give p type semiconductor?

Sol. In p-type semiconductor, number of holes are greater than number of electrons. Boron is the element which is used as doping material with silicon.

5. In RLC series circuit, selectivity is defined as...

Sol. Ratio of Resonant frequency and bandwidth

6. What is the maximum speed of an alternator when supplied by 60Hz frequency?

Sol. Synchronous Speed  $N=120f/p$   
 $= (120 \times 60)/2$   
 $=3600 \text{ rpm}$

Note: For Maximum speed, Pole must be minimum.

7. Which method is the General method among EMF, ZPFC, MMF and potier for voltage regulation?

Sol. Potier Triangle Method also known as Zero Power Factor Characteristic (ZPFC) Method or general method.

8. Mechanical force developed by a magnetic Field is?

Sol. Magnetic force developed by a magnetic field can be expressed as:

$$F = BIL \sin \theta$$

Where,

B is magnetic flux density

I is the current in conductor

L is the length if conductor

Theta is the angle between conductor and magnetic field.

9. How much voltage can be withstand by a pin type insulator?

Sol. Pin insulator can withstand the voltage upto 33 kV

10. Instrument used to measure temperature?

Sol. Thermocouple is the instrument used to measure temperature.

11. In nominal T representation the shunt capacitance may be ?

Sol. Concentrated in the centre of the transmission line.

12. Reluctivity is analogous to?

Sol. Reluctivity is analogous to resistivity or specific resistance

13. Condition of ideal transformer?

Sol. Zero winding resistance, Zero leakage reactance, infinite permeability, Zero magnetizing current, zero loss, efficiency 100%

14. What is the principle of the Repulsive motor?

Sol. Repulsion Motors are based on the Principle of repulsion between two magnetic fields.

15. Hysteresis loss depends on?

Sol.  $P_h = B_m n f V = v n f n - 1 V$

$B_m$  = Maximum Flux Density

$f$  = Supply Frequency

$V$  = Volume of the core material

$v$  = Supply Voltage

16. How many loops are there if Branches are 12 and nodes are 5 ?

Sol. Number of loops =  $b - (N - 1)$

Where,  $b$  is number of branches

$N$  is number of node

Number of loops =  $12 - (5 - 1)$

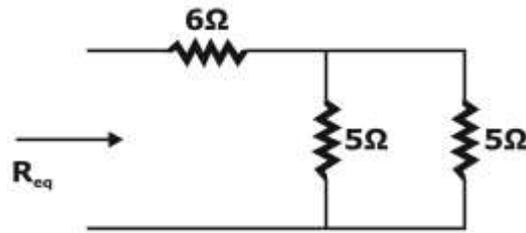
Number of loops = 8

17. Which of the following is not true about hysteresis motor?

Sol. Smooth running (**Need options**)

18. What is the Equivalent resistance of 6 and 5 parallel to 5ohm?

Sol.



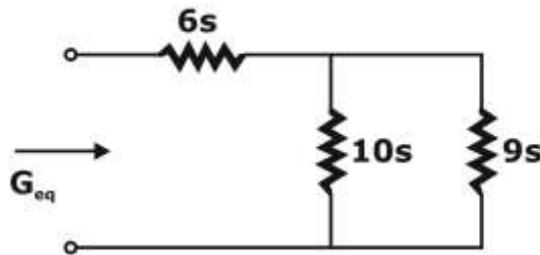
$$R_{eq} = 6 + 5 \parallel 5$$

$$= 6 + \frac{5 \times 5}{5 + 5} = 6 + \frac{25}{10} = 6 + 2.5 = 8.5\Omega$$

19. What is the Equivalent conductance of 6s and 10s parallel to 9s ?

Sol.  $G_{eq}$  = Series combination of 6s and parallel combination of 10s and 9s.

$$G_{eq} = \frac{6 \times (10 + 9)}{6 + (10 + 9)} = \frac{144}{25} = 5.76s$$



20. What is the Ferranti effect in transmission line?

Sol. In a long transmission line, at the time of no load or light load conditions voltage at the receiving end becomes greater than sending end voltage.

This effect is called Ferranti effect.

21. In a steam power plant, the efficiency of the turbine?

Sol. Efficiency of turbines in steam power plant is around 80% to 90%.

22. Magnetic flux density is also known as ....

- A. Magnetic induction
- B. permeance
- C. reluctance
- D. permittivity

Sol. Magnetic flux density is also known as magnetic induction.

23. Why Transposition is done on the transmission lines ?

Sol. Transposition is done in the transmission line to reduce the radio interference in the line and increasing the transmission efficiency.

24. If  $I = 3t^2 - t$ , then the value of charge for  $t = 1$  to  $2$  sec will be?

Sol.  $i(t) = 3t^2 - t$

$$Q = \int_{t_0}^t i(t) dt = \int_{1 \text{ sec}}^{2 \text{ sec}} (3t^2 - t) dt = \left[ t^3 \right]_1^2 - \left[ \frac{t^2}{2} \right]_1^2$$

$$= [2^3 - 1^3] - \left[ \frac{2^2 - 1^2}{2} \right] = (8 - 1) - \left[ \frac{4 - 1}{2} \right]$$

$$= 7 - \frac{3}{2} = 5.5 \text{ C}$$

25. What is the Definition of Error ?

Sol. Error is the difference between measured value of quantity and its true value.

26. What will be the Input current when the motor of 2hp,  $\text{pf} = 0.8$ ,  $V = 240\text{V}$  and efficiency 70% is used ?

Sol. Efficiency,  $\eta = \frac{P_{\text{out}}}{P_{\text{in}}} \Rightarrow P_{\text{in}} = \frac{P_{\text{out}}}{\eta}$

where,  $P_{\text{out}} = 2 \times 746 \text{ W} = 1492 \text{ W}$

[ $\because 1 \text{ HP} = 746 \text{ W}$ ]

$\eta = 70\% = 0.70 \text{ pu.}$

$$\therefore P_{\text{in}} = \frac{P_{\text{out}}}{\eta} = \frac{1492}{0.70} = 2131.43 \text{ Watt}$$

$$I = \frac{P_{\text{in}}}{V \cos \phi} = \frac{2131.43}{240 \times 0.8} = 11.10 \text{ A}$$

27. If current gain of the CE transistor is 50, the current gain for the CB transistor will be?

Sol. Relation between current gain of CB transistor,  $\alpha$  and current gain of CE transistor,  $\beta$  can be expressed as:

$$\alpha = \frac{\beta}{\beta + 1}$$

$$\alpha = \frac{50}{50 + 1}$$

$$\alpha = 0.98$$

28. What will be the rotor frequency if supply frequency is 50Hz and slip is 5% ?

Sol. As we known,

rotor frequency = slip  $\times$  supply frequency

rotor frequency =  $0.05 \times 50$

rotor frequency = 2.5 Hz

29. HVDC transmission is not preferred over AC transmission because of... ?

- A. Corona loss
- B. Skin effect
- C. Radio interference
- D. Expensive convertors

Sol. In HVDC transmission, Converters are required to convert AC to DC at transmitting end and from DC to AC at receiving end.

Hence, the cost of a converter is high in HVDC transmission.

Option D is correct

30. Which motor cannot have addition of external resistance?

- A. Wound Rotor Induction Motor
- B. slip ring Induction Motor
- C. squirrel cage Induction Motor

Sol. External resistance cannot be added in a squirrel cage induction motor because rotor winding in this type of motor is in the form of bars which are closed at both ends.

31. If the Efficiency of turbine, Boiler and generator are 40%, 85% and 95% respectively. The overall efficiency of the system is ?

Sol. Overall efficiency of the system,

$$\begin{aligned}\eta_{\text{overall}} &= \eta_{\text{turbine}} \times \eta_{\text{Boiler}} \times \eta_{\text{Generator}} \\ &= 0.40 \times 0.85 \times 0.95 \\ &= 0.323 = 32.3\%\end{aligned}$$

32. For Maximum torque, the Maximum slip is equals to?

Sol. Slip at maximum torque can be expressed as:

$$S_{T_{\text{Max}}} = \frac{R_2}{X_2}$$

33. For 400kV Substation the requirement of Land is ?

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

Sol. \*\*\*

34. If  $L_1 = 15\text{mH}$ , The additive and subtractive equivalent inductance are  $70\text{mH}$  and  $30\text{mH}$  respectively for the series connection. The value of  $L_2$  will be ?

Sol. In additive equivalent inductance:

$$L_{eq} = L_1 + L_2 + 2M$$

$$70 = 15 + L_2 + 2M$$

In subtractive equivalent inductance:

$$L_{eq} = L_1 + L_2 - 2M$$

$$30 = 15 + L_2 - 2M$$

By solving both equations:

Value of inductance of second inductor = **35 mH**

35. If two inductors are the same, i.e  $L$ , with  $k = 0.4$  and  $M = 10\text{mH}$ , The value of  $L$  will be ?

Sol. Expression of mutual inductance can be expressed as:

$$M = k\sqrt{L_1L_2}$$

As,  $L_1 = L_2 = L$

$$M = kL$$

$$L = \frac{10}{0.4}$$

$$L = 25 \text{ mH}$$

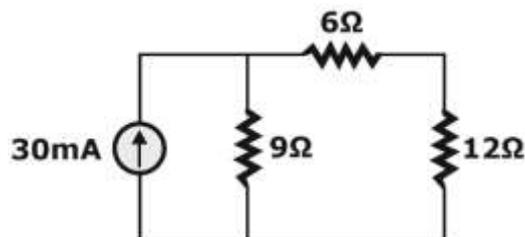
36. For Angular frequency equals to  $628 \text{ rad/sec}$ , The frequency in Hertz will be ?

Sol. Frequency in Hz,  $f = \frac{\omega}{2\pi}$

$$f = \frac{628}{2(3.14)}$$

$$f = 100 \text{ Hz}$$

37. Power Delivered by source ?



Sol. Current in  $9\Omega$  resistor can be calculated as:

$$I = \frac{18}{18+9} \times 30$$

$$I = 20 \text{ mA}$$

Voltage across resistor:

$$V = 20 \times 9$$

$$V = 180 \text{ mV}$$

$$V = 0.18 \text{ V}$$

Power delivered by source:

$$P = VI_s$$

$$P = 0.18 \times 30$$

$$P = 5.4 \text{ mW}$$

38. In CRO, Which control is used for controlling intensity of screen ?

Sol. Intensity control

### NON-TECH

1. **Vyommitra** is related to?

Sol. Vyom Mitra is a female-looking spacefaring humanoid robot being developed by the Indian Space Research Organisation to function on-board the Gaganyaan, a crewed orbital spacecraft. **Vyommitra** was first unveiled on 22 January 2020 at the Human Spaceflight and Exploration symposium in Bengaluru.

2. ISRO is related to ?

Sol. The Indian Space Research Organisation is the national space agency of the Republic of India, headquartered in Bengaluru. It operates under the Department of Space which is directly overseen by the prime minister of India while chairman of ISRO acts as executive of DoS as well.

3. Current CEO of Niti Aayog ?

Sol. Amitabh Kant

4. Army chief of India right now ?

Sol. Manoj Mukund Narvane

5. Chandipur beach in which state ?

Sol. Chandipur, is a beach in Baleswar District, Odisha, India. The beach is located on the shore of Bay of Bengal and is approximately 16 kilometers from the Baleswar Railway Station.

6. FIFA team of the year 2019 is ?

Sol. **Manchester United** keeper, David De Gea completes the 2019 FIFA Team of the Year.

7. In which index does India ranked 102 out of 117 participating countries in 2019 ?

Sol. Global Hunger Index Rank

8. Who invented dynamite ?

Sol. Alfred Nobel

9. Who was the first traveller who arrived in india... ?

A. Megasthenes

B. fahein

C. huyanTsang

Sol. **Megasthenes**

10. The GOOD GOVERNANCE DAY is which of the following persons birth anniversary?

Sol. The birth anniversary of former-Prime Minister Atal Bihari Vajpayee.

11. Which ministry of India was set up in 2019 ?

A. Jal shakti

B. Janshrvashakti

C. Nari shakti

Sol. Jal Shakti was formed in 2019.

12. Article 112(1) is Related to ?

Sol. According to Article 112(1): The President shall in respect of every financial year cause to be laid before both the Houses of Parliament a statement of the estimated receipts and expenditure of the Government of India for that year, in this Part referred to as the annual financial statement

13. Dilli chalo is a slogan given by whom?

Sol. Shubhash Chandra Bose

14. What is the Tiger count in India in 2018 Tiger Index Count ?

Sol. 2,967 tigers

15. Who was given the term 'mahamana' among leaders?

Sol. Madan Mohan Malviya

16. Inverted image is formed at which part of the eye?

Sol. Retina

17. Where Is Ganga tributary ?

- A. Son
- B. gandak
- C. khamerema
- D. mahi

Sol. Son is the tributary of Ganga river

18. In order to decrease the incidence of light in the eye which part of the eye is responsible... ?

- A. Retina
- B. pupil
- C. cornea
- D. iris

Sol. Retina

19. Which schedule among 1,2,3 and 4 provides the allocation of seats in the council of states?

Sol. Fourth Schedule contains provisions as to the allocation of seats in the Council of States.

20. In which web browser, polygraph is used?

Sol. \*\*\*

21. Who was the first Chinese traveller to India?

Sol. Xuanzang was a Chinese Buddhist monk, scholar, traveler, and translator who traveled to India in the seventh century and described the interaction between Chinese Buddhism and Indian Buddhism during the early Tang dynasty.

22. In 2019 Nov, Who is elected as Sri Lanka president?

Sol. This was the first Presidential election in Sri Lanka where no sitting president, prime minister or opposition leader was contesting for president. Gotabaya Rajapaksha won this election. The results were released on 17 November 2019 and Gotabaya managed to cross the majority mark to win the election.

23. In early history NBPW refers to ?

Sol. It stands for Northern Black Polished Ware.

24. In India innovation, Which state has first rank ?

Sol. Karnataka has the first rank among all states of India.

25. Which of the following industries involves minimum initial cost?

- A. Hydel
- B. Thermal
- C. Textile
- D. Nuclear

Sol. Among the following options, textile mills have minimum initial cost.

26. Which of the following is not a Web browser ?

- A. Ubuntu
- B. explorer
- C. chrome

Sol. Ubuntu is a Linux distribution based on Debian mostly composed of free and open-source software.

27. In human beings, carbohydrates are stored in the form of?

- A. Glycogen
- B. cellulose
- C. glucose
- D. lactose

Sol. Glucose energy is **stored** as glycogen, with the majority of it in the muscle and liver.

28. Palk strait is the border between India and which country ?

Sol. The Palk Strait is a strait between the Tamil Nadu state of India and the Jaffna District of the Northern Province of the island nation of Sri Lanka. It connects the Bay of Bengal in the northeast with Palk Bay in the southwest.

29. In IT the databases, software, and information are stored in ?

Sol. Cloud computing

30. Which state has declared that more than two children will not be allowed for government jobs from January 2021 ?

Sol. The Assam government announced this week that people who have more than two children will not be eligible for government jobs, with effect from 1 January 2021.

31. Belgaum airport is situated in which state of india?

Sol. Belgaum Airport is an airport serving Belgaum, a city in the Indian state of Karnataka.

32. Study of lungs problems is termed as ?

Sol. It is called as a pulmonology. **Pulmonology** is an area of medicine that focuses on the health of the respiratory system.

33. Cytology study of cells is for ?

- A. Brain
- B. Cell
- C. blood
- D. hair

Sol. **Cytology** is the exam of a single cell type, as often found in fluid specimens. It's mainly used to diagnose or screen for cancer. It's also used to screen for fetal abnormalities, for pap smears, to diagnose infectious organisms, and in other screening and diagnostic areas.

34. Which of the following plants has the least running cost?

- A. Flour mill
- B. Textile mill
- C. Pumping station
- D. Hydropower plant

Sol. \*\*\*

\*\*\*\*

## SSC JE 2019 Electrical Expected Cutoff

Expected Cutoff (Shift-1)					
Years	General	EWS	OBC	SC	ST
2018	152.16	147.47	149.30	133.39	125.49
2019	150-155	145-150	145-150	135-140	125-130

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