



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY

THIRUVANANTHAPURAM—695 011, INDIA.

(An Institute of National Importance under Govt. of India)

Phone—(91)0471—2443152 Fax—(91)0471—2446433, 2550728

Email-sct@sctimst.ac.in Web site—www.sctimst.ac.in

ROLL NUMBER

**WRITTEN TEST FOR THE POST OF JR. TECHNICAL ASSISTANT (ELECTRICAL) -A**

DATE: 11/06/2025

TIME: 10 To 11.30 am

DURATION: 90 MINUTES

Total Marks: 100

**INSTRUCTIONS TO THE CANDIDATES**

1. Write your Roll Number on the top of the Question Booklet and in the **OMR** sheet.
2. Each question carries **one (1)** mark.
3. There will be no Negative Marking.
4. Each question carries 4 options i.e., **A, B, C & D**. Darken completely, the bubble corresponding to the most appropriate answer using **blue or black ball point pen**.
5. Marking more than one option will invalidate the answer.
6. Candidate should sign in the **question paper** and **OMR** sheet.
7. No clarifications will be given.
8. Candidate should hand over the **OMR** sheet to the invigilator before leaving the examination hall.

Signature of the Candidate

1. Which effect causes the resistance of a conductor to increase under AC compared to DC source?
  - A. Skin effect
  - B. Photoelectric effect
  - C. Hall effect
  - D. Ferranti effect
2. Capacitance of underground cable
  - A. Decreases with increasing length
  - B. Increases with increasing length
  - C. Remains same with increasing length
  - D. None of the above
3. In respect of the resistance which of the following is correct?
  - A. Aluminum > silver > copper
  - B. Silver > aluminum > copper
  - C. Aluminum > copper > silver
  - D. Copper > silver > aluminum
4. Which of the following exhibit superconductivity?
  - A. Copper
  - B. Aluminium
  - C. Silicon
  - D. Mercury
5. Which of the following materials is used in electrical iron?
  - A. Nichrome
  - B. Iron
  - C. Tungsten
  - D. Molybdenum
6. Units of transformer oil dielectric strength?
  - A. kA / mm
  - B. kV / Mtr
  - C. kA / Mtr
  - D. kV / mm
7. What is the units of electrical conductance?
  - A. Henry
  - B. Siemens
  - C. Ohms
  - D. Farads
8. Ratio of maximum energy stored to energy dissipated is called?
  - A. Form factor
  - B. Quality factor
  - C. Power factor
  - D. Peak factor
9. What is the form factor of a pure sinusoidal AC waveform?
  - A. 1.11
  - B. 1.21
  - C. 1.41
  - D. 2.0
10. Power consumption of a pure inductive load of 0.1 Henry connected to a 100 V, 50 Hz supply?
  - A. 50 W
  - B. 23 W
  - C. 0 W
  - D. Cannot be determined

11. Energy consumption of 80 kW connected load with unity power factor and a diversity factor of 0.6, running for 8 hours daily over 5 days?
- A. 1920 KWH
  - B. 1920 KVARH
  - C. 3200 KVAH
  - D. 3200 KWH
12. If the supplied voltage is reduced by half, the amount of heat produced by heater is
- A. Decreases by half
  - B. Decreases by eight times
  - C. Decreases by two times
  - D. Decreases by four times
13. Resistors connected between capacitor bank terminals to
- A. Maintain proper voltage
  - B. Maintain full load current
  - C. Discharge the capacitors
  - D. Protect from voltage surge
14. Power consumption of 1200 mm, 230V, 50 Hz rated BLDC ceiling fan is around
- A. 100W
  - B. 35W
  - C. 10W
  - D. 85W
15. Which of the following battery has high energy density?
- A. Lithium ion
  - B. Nickel-Metal Hydride
  - C. Nickel cadmium
  - D. Lead acid
16. Specific gravity reading of a fully charged Lead Acid battery electrolyte?
- A. Around 2.52
  - B. Around 0.63
  - C. Around 5.04
  - D. Around 1.26
17. Terminal voltage of a battery bank made up of 40 alkaline batteries, arranged in 4 parallel rows, with 10 batteries connected in series in each row?
- A. 15V
  - B. 120V
  - C. 50V
  - D. 10V
18. If 1 kW load runs for 2 hours using a 48V battery system with 85% efficiency, what should be the minimum battery capacity?
- A. 41 Ah
  - B. 49 Ah
  - C. 55 Ah
  - D. 60 Ah
19. According to KVL, the algebraic sum of all IR drops and e.m.f.s in any closed loop of a network is always
- A. Negative
  - B. Positive
  - C. Zero
  - D. Determined by battery e.m.fs.



20. For a given line voltage, four heating coils will produce maximum heat when connected
- A. One pair in parallel with the other two in series
  - B. All in series
  - C. Two parallel pairs in series
  - D. All in parallel
21. A 100 W light bulb burns on an average of 10 hours a day for one week. The weekly consumption of energy will be \_\_\_\_ unit
- A. 0.07
  - B. 70
  - C. 7
  - D. 0.7
22. Condition for maximum power transfer from a source to load?
- A. Load resistance is zero
  - B. Load resistance is infinite
  - C. Load resistance equals source resistance
  - D. Load voltage equals source voltage
23. A series RLC circuit has  $R = 10\Omega$ ,  $L = 0.1H$ , and  $C = 100\mu F$ . Find the resonant frequency?
- A. 160 Hz
  - B. 60 Hz
  - C. 100 Hz
  - D. 50 Hz
24. Which of following will draw the more current?
- A. 60 Watt incandescent lamp
  - B. 60 Watt induction motor
  - C. 60 Watt LED bulb
  - D. All of the above
25. Three resistors of  $3\Omega$  each are connected in a delta ( $\Delta$ ) configuration. What is the value of each equivalent star ( $Y$ ) resistance?
- A.  $3\Omega$
  - B.  $1\Omega$
  - C.  $9\Omega$
  - D.  $0.5\Omega$
26. A piezoelectric transducer is commonly used to measure:
- A. Pressure
  - B. Temperature
  - C. Voltage
  - D. Current
27. The Hall effect principle is used to measure:
- A. Temperature difference
  - B. Frequency of a signal
  - C. Electric power
  - D. Magnetic field strength
28. Which type of conductor surface results in higher corona losses in high voltage transmission lines?
- A. Rough surface conductor
  - B. Smooth surface conductor
  - C. Polished conductor
  - D. Bundled conductor

29. To convert a galvanometer into an ammeter
- High-value series resistor
  - Low-value shunt resistor
  - Low-value series resistor
  - High-value shunt resistor
30. In the two-wattmeter method, if one of the wattmeter shows a negative reading, it indicates:
- Power factor is leading or lagging and less than 0.5
  - Power factor is lagging and greater than 0.5
  - The load is purely resistive
  - There is a fault in the connection
31. Tan Delta Test is used to measure the:
- Power factor of generators
  - Inductance of transmission line
  - Insulation quality of HT transformer bushings.
  - Resistance of earthing system
32. In in two wattmeter method to measure the power, the wattmeter reading are 8.5 kw and -0.5 kw. the total power and power factors are
- |               |                |
|---------------|----------------|
| A. 8 kW, 0.46 | C. 8 kW, 0.8   |
| B. 9 kW, 0.46 | D. 9 kW, 0.707 |
33. Desired characteristic for electrical insulators
- Puncture voltage is less than flashover voltage
  - Puncture voltage is greater than flashover voltage
  - Puncture voltage is equal to flashover voltage
  - No relation between puncture and flashover voltage
34. A  $10\ \Omega$  resistor, 10 H inductor, and a  $100\ \mu\text{F}$  capacitor, all are connected in parallel across a 10 V DC source. What is the equivalent impedance of the circuit?
- |                |                  |
|----------------|------------------|
| A. Infinity    | C. $9.5\ \Omega$ |
| B. $0\ \Omega$ | D. $8.5\ \Omega$ |
35. Impedance offered by capacitor if frequency increases by 10 times?
- Impedance decrease by 10 times
  - Current increases by 10 times
  - Impedance increase by 10 times
  - Impedance remains same
36. In an RLC series circuit, at resonance, the impedance is:
- Maximum and purely resistive
  - Minimum and purely resistive
  - Minimum and purely inductive
  - Maximum and purely capacitive

37. In AC circuit analysis, multiplication by "j" corresponds to:
- A.  $180^\circ$  phase shift
  - B.  $90^\circ$  phase lead
  - C. No phase change
  - D.  $90^\circ$  phase lag
38. Which transformer connection is commonly used to step up voltage at a power generation station for transmission?
- A. Delta-Delta
  - B. Star-Delta
  - C. Delta-Star
  - D. Star-Star
39. In DYn11 transformer
- A. Primary voltage lags secondary voltage by  $30^\circ$
  - B. Primary voltage leads secondary voltage by  $30^\circ$
  - C. Primary voltage lags secondary voltage by  $60^\circ$
  - D. Primary voltage leads secondary voltage by  $60^\circ$
40. Which of the following is not an essential condition for parallel operation of transformers?
- A. Same voltage ratio and turns ratio
  - B. Same percentage impedance
  - C. Same polarity
  - D. Same kVA rating
41. Which sides are preferred to perform the open-circuit and short-circuit tests on transformer?
- A. Open-circuit on high-voltage side, short-circuit on low-voltage side
  - B. Open-circuit on low-voltage side, short-circuit on high-voltage side
  - C. Both tests on high-voltage side
  - D. Both tests on low-voltage side
42. On-load tap changer (OLTC) in a power transformer is generally provided on the:
- A. Low-voltage (LV) side
  - B. Secondary side
  - C. Primary side
  - D. High-voltage (HV) side
43. A transformer operates at maximum efficiency when:
- A. Copper loss = Iron loss
  - B. Copper loss > Iron loss
  - C. Copper loss < Iron loss
  - D. At no load
44. Transformer cores are laminated to reduce:
- A. Copper losses
  - B. Eddy current losses
  - C. Hysteresis losses
  - D. Stray losses



45. A transformer designed to operate at 400 Hz is operated at 50 Hz. Its kVA rating will be:
- A. Same as rated kVA
  - B. Increased by 8 times
  - C. Increased by 16 times
  - D. Reduced by 8 times
46. What is the primary purpose of oil in a transformer?
- A. To provide electrical insulation and cooling
  - B. To increase voltage rating
  - C. To reduce copper losses
  - D. To improve power factor
47. The secondary winding of the current transformer shall never be
- A. Short circuited
  - B. Connected to load
  - C. Open circuited
  - D. Connected to measuring instrument
48. Purpose of skewing the rotor bars in a squirrel cage induction motor?
- A. To increase starting torque
  - B. To reduce speed
  - C. To prevent cogging
  - D. To reduce copper losses
49. If the synchronous speed  $N_s = 1500$  rpm and rotor speed  $N_r = 1400$  rpm, what are the forward slip  $S_f$  and backward slip  $S_b$ ?
- A.  $S_f = 0.933$ ,  $S_b = 1.93$
  - B.  $S_f = 0.067$ ,  $S_b = 1.93$
  - C.  $S_f = 0.067$ ,  $S_b = 0.067$
  - D.  $S_f = 0.933$ ,  $S_b = 0.067$
50. Which starter is commonly used to reduce the starting current of a squirrel cage induction motor?
- A. Direct On-Line (DOL) starter
  - B. Star-Delta starter
  - C. Auto-transformer starter
  - D. Both B and C
51. In a 3-phase induction motor, the magnitude of the resultant rotating magnetic field flux is approximately:
- A. Equal to the maximum value of flux due to any phase
  - B.  $\sqrt{3}$  times the maximum value of flux due to any phase
  - C. 1.5 times the maximum value of flux due to any phase
  - D. 2.5 times the maximum value of flux due to any phase
52. For constant torque output in an induction motor, which of the following is true?
- A.  $V^2/f^2$  shall be maintained constant
  - B.  $V/f$  shall be maintained constant
  - C.  $V^3/f^2$  shall be maintained constant
  - D.  $V^2/f^3$  shall be maintained constant

53. Which of the following statements is true regarding the speed of an induction motor?
- A. Rotor speed is always greater than synchronous speed
  - B. Rotor speed is equal to synchronous speed
  - C. Rotor speed is less than synchronous speed
  - D. Rotor speed is independent of synchronous speed
54. Which of the following is considered a constant loss in an induction motor?
- A. Stator copper loss
  - B. Rotor copper loss
  - C. Mechanical losses
  - D. Core loss
55. Efficiency of full-wave rectifier?
- A. 40.6%
  - B. 81.2%
  - C. 50%
  - D. 90%
56. Which of the following statements about power generator rotor types and their typical applications is TRUE?
- A. Salient pole rotors are used in steam turbines running at high speeds
  - B. Cylindrical rotors are commonly used in hydro turbines operating at low speeds
  - C. Salient pole generators are used in hydro turbines running at low speeds
  - D. Cylindrical rotors have projecting poles and are used in low-speed applications
57. How to control synchronous generator reactive and active power output?
- A. Reactive power by adjusting prime mover input; Active power by changing field excitation current
  - B. Reactive power by varying load resistance; Active power by altering frequency
  - C. Reactive power by changing field excitation current; Active power by adjusting prime mover input
  - D. Reactive power and active power both controlled by changing system voltage
58. Lap winding is suitable for \_\_\_\_\_ current, \_\_\_\_\_ Voltage dc generators.
- A. Low, High
  - B. High, Low
  - C. Low, Low
  - D. High, High
59. For DC shunt generator to build up voltage, the field circuit resistance must be:
- A. Equal to critical resistance
  - B. Independent of critical resistance
  - C. More than critical resistance
  - D. Less than critical resistance
60. In a DC generator, the polarity of the inter-poles is:
- A. Same as the main pole ahead in the direction of rotation
  - B. Same as the main pole behind in the direction of rotation
  - C. Always north
  - D. Always south



61. At unity power factor, the armature reaction in an alternator is:
- A. Demagnetizing
  - B. Magnetizing
  - C. Distorting and demagnetizing
  - D. Cross-magnetizing
62. The main disadvantage of using short pitch winding in alternator is that it
- A. Reduces harmonics in generated voltage
  - B. Reduces the total voltage around the armature coil
  - C. Produces asymmetry in the three phase winding
  - D. Increases copper of end connections
63. Which device is commonly used for power factor improvement in industrial loads?
- A. Transformer
  - B. Induction motor
  - C. Capacitor banks
  - D. Resistor bank
64. The phenomenon of transposition in overhead transmission lines is done primarily to:
- A. Balance the inductance and capacitance
  - B. Reduce the total resistance of the line
  - C. Increase the surge impedance of the line
  - D. Improve the mechanical strength
65. A major disadvantage of low power factor is:
- A. Reduced copper losses
  - B. Increased current for the same power output
  - C. Decreased voltage drop in the system
  - D. Improved system efficiency
66. Recommended power factor value
- A. In between 0.9 lagging & unity
  - B. In between 0.7 lagging to 0.8 lagging
  - C. In between 0.7 leading to 0.8 leading
  - D. None of the above
67. Application of isolators in substation to:
- A. interrupt short-circuit currents during faults
  - B. switching high loads under normal conditions
  - C. disconnect a section of the substation for maintenance
  - D. All of the above
68. What kind of faults does transformer differential protection primarily detect?
- A. External faults only
  - B. internal faults
  - C. Overvoltage faults
  - D. Frequency fluctuations

69. A current relay has a plug setting of **5 A**, and the fault current is **20 A**. What is the Plug Setting Multiplier (PSM)?
- A. 2  
B. 200  
C. 400  
D. 4
70. Which of the following is required characteristic of lightning arrester?
- A. Low resistance during lightning surge  
B. High resistance under all conditions  
C. Low resistance under normal operation  
D. High resistance during lightning surge
71. Making current of circuit breakers is \_\_\_\_\_ times symmetrical breaking current
- A. 1.55  
B. 3.55  
C. 2.55  
D. 0.55
72. The maximum allowed frequency variation in distribution system is
- A.  $\pm 1.5\%$   
B.  $\pm 3\%$   
C.  $\pm 6\%$   
D.  $\pm 10\%$
73. What is the recommended wire size for 1.5 TR air conditioner operating on a single-phase 230V supply?
- A.  $1.0 \text{ mm}^2$   
B.  $2.5 \text{ mm}^2$   
C.  $6.0 \text{ mm}^2$   
D.  $10 \text{ mm}^2$
74. Which MCB trip curve type is preferred for protecting moderate inductive loads?
- A. B-curve  
B. C-curve  
C. D-curve  
D. K-curve
75. In a standard electrical socket outlet, on which side is the **line (live)** and **neutral** terminal typically placed (when viewed from the front)?
- A. Line on right, Neutral on left  
B. Line on left, Neutral on right  
C. Both line and neutral on left  
D. Both line and neutral on right
76. IS Code for earthing of electrical installations?
- A. IS 1239  
B. IS 456  
C. IS 732  
D. IS 3043
77. What is the standard size of the copper plate used for plate earthing as per IS standards?
- A.  $500 \text{ mm} \times 500 \text{ mm} \times 5 \text{ mm}$   
B.  $600 \text{ mm} \times 600 \text{ mm} \times 6 \text{ mm}$   
C.  $300 \text{ mm} \times 300 \text{ mm} \times 3 \text{ mm}$   
D.  $400 \text{ mm} \times 400 \text{ mm} \times 4 \text{ mm}$

78. What is the recommended maximum earth resistance value for domestic earthing system?
- A. 20  $\Omega$  C. 10  $\Omega$   
B. 15  $\Omega$  D. 5  $\Omega$
79. Which type of circuit breaker is preferred for extra high-voltage outdoor Substation?
- A. SF<sub>6</sub> circuit breaker C. Oil circuit breaker  
B. Air circuit breaker D. Vacuum circuit breaker
80. Which material is commonly used as the arc quenching medium in an HRC fuse?
- A. Asbestos C. Quartz sand  
B. Mica D. Oil
81. Which distribution system provides better voltage regulation and reliability?
- A. Ring main C. Isolated  
B. Radial D. Tree-type
82. The Mho relay is primarily used for the protection of:
- A. Transformers C. Short transmission lines  
B. Busbars D. Long transmission lines
83. Which of the following lighting types has the highest efficiency?
- A. LED C. Fluorescent lamp  
B. incandescent lamp D. Halogen lamp
84. In 1- $\phi$  diode bridge rectifier, the load resistance is 50 ohms, source voltage is  $100\sin\omega t$  V, where  $\omega = 100\pi$  rads/s. the power dissipated in the load resistor is
- A.  $800/\pi$  W C. 800 W  
B.  $100/\pi$  W D. 100 W
85. Recommended motor for traction application
- A. DC shunt motor C. Stepped motor  
B. Universal motor D. DC series motor
86. Luminous efficiency of general purpose LED lamps is around
- A. 10 Lumens / Watt C. 500 Lumens / Watt  
B. 100 Lumens / Watt D. 1000 lumens / Watt
87. Cool day light colour temperature range
- A. 5500-6500 Kelvin C. 1500-2500 Kelvin  
B. 2500-3500 Kelvin D. 500-1500 Kelvin
88. What is the terminal used to trigger an SCR called?
- A. Base C. Collector  
B. Emitter D. Gate



89. A MOSFET is a \_\_\_\_\_ device.
- |                       |                           |
|-----------------------|---------------------------|
| A. Voltage controlled | C. Temperature controlled |
| B. Current controlled | D. Power controlled       |
90. A line-commutated converter operates as an inverter when:
- The firing angle  $\alpha < 90$  and the DC source feeds the load
  - The firing angle  $\alpha = 0$  and AC source feeds the load
  - The firing angle  $\alpha > 90$  and the DC source acts as the load
  - The firing angle  $\alpha < 90$  and DC source acts as the load
91. How does increasing temperature generally affect the efficiency of a silicon-based photovoltaic cell?
- Decreases efficiency
  - Increases efficiency
  - No effect on efficiency
  - Efficiency first increases then decreases
92. Which of the following correctly represents the relative widths of the emitter, base, and collector in a BJT?
- |                               |                               |
|-------------------------------|-------------------------------|
| A. Emitter > Base > Collector | C. Collector > Base > Emitter |
| B. Base > Emitter > Collector | D. Collector > Emitter > Base |
93. Which device is preferred for high power but moderate frequency applications?
- |         |           |
|---------|-----------|
| A. BJT  | C. MOSFET |
| B. IGBT | D. UJT    |
94. What is the correct procedure for performing CPR (Cardiopulmonary Resuscitation) on an adult?
- 30 chest compressions followed by 1 rescue breath
  - 15 chest compressions followed by 2 rescue breaths
  - 30 chest compressions followed by 2 rescue breaths
  - 20 chest compressions followed by 2 rescue breaths
95. What is the correct sequence of first aid steps to follow after safely removing a person from an electric shock?
- Check responsiveness and breathing
  - Cover the person with a blanket
  - Call emergency services
  - Start CPR if the person is not breathing
- |                  |                  |
|------------------|------------------|
| A. 3 → 1 → 4 → 2 | C. 1 → 3 → 4 → 2 |
| B. 1 → 4 → 3 → 2 | D. 3 → 4 → 1 → 2 |

96. Which of the following fire extinguishers can be used for fires involving electrical equipment?
- A. Carbon dioxide (CO<sub>2</sub>) extinguisher (Class C)
  - B. Foam extinguisher (Class B)
  - C. Water extinguisher (Class A)
  - D. Wet chemical extinguisher (Class F)
97. The insulation resistance of healthy electrical installations should be in the range of:
- A. Micro ohms
  - B. Milli ohms
  - C. Kilo ohms
  - D. Mega ohms
98. Why substations are provided with a layer of stones or gravel on the ground surface?
- A. To keep the earth resistance low
  - B. To maintain the substation voltage
  - C. To reduce the foot potential
  - D. None of the above
99. Which type of electrical wire is designed to emit low smoke and low toxic gases during a fire?
- A. PVC
  - B. FRLSH
  - C. FR
  - D. XLPE
100. For a three-phase balanced load, the preferred connection of capacitor banks:
- A. Delta ( $\Delta$ ) connection
  - B. Star ( $Y$ ) connection
  - C. Series connection
  - D. Parallel connection

**Answer Key**  
**JTA (Electrical)**

Q.No	Answer	Q.No	Answer	Q.No	Answer	Q.No	Answer
1	A	26	A	51	C	76	D
2	B	27	D	52	B	77	B
3	C	28	A	53	C	78	D
4	D	29	B	54	D	79	A
5	A	30	A	55	B	80	C
6	D	31	C	56	C	81	A
7	B	32	A	57	C	82	D
8	B	33	B	58	B	83	A
9	A	34	B	59	D	84	D
10	C	35	A	60	A	85	D
11	A	36	B	61	D	86	B
12	D	37	D	62	B	87	A
13	C	38	C	63	C	88	D
14	B	39	A	64	A	89	A
15	A	40	D	65	B	90	C
16	D	41	B	66	A	91	A
17	A	42	D	67	C	92	D
18	B	43	A	68	B	93	B
19	C	44	B	69	D	94	C
20	D	45	D	70	A	95	C
21	C	46	A	71	C	96	A
22	C	47	C	72	B	97	D
23	D	48	C	73	B	98	C
24	B	49	B	74	B	99	B
25	B	50	D	75	A	100	A

*Key*