



SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY

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ROLL NUMBER

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

DATE: 25/10/2023

TIME: 11 To 12.30 pm

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** and **question paper** to the invigilator before leaving the examination hall.

Signature of the Candidate

Deepa Sreedhar
25/10/2023

Junior Technical Assistant (Electrical)-A 25/10/2023

Q1. A transformer:

- A. Changes ac to dc
- B. Changes ac to dc
- C. Changes dc to ac
- D. Steps up or down AC voltages

Q2. For a power plant, the ratio of the maximum generator demand to the generator capacity is called _____.

- A. load factor
- B. demand factor
- C. diversity factor
- D. utilization factor

Q3. An alternating current is given by the expression $i(t) = 60 \sin 314t$. Calculate the frequency.

- A. 25 Hz
- B. 50 Hz
- C. 100 Hz
- D. 500 Hz

Q4. A 100Ω resistor and a 25Ω resistor are connected in parallel. What will be the effective resistance of the parallel connection?

- A. 12.5Ω
- B. 125Ω
- C. 25Ω
- D. 20Ω

Rupa Sreedhar
25/10/2023

Q5. Which of the following is NOT a valid advantage of moving iron instruments?

- A. Uniform scale
- B. Can be used for AC as well as DC measurements
- C. Low cost
- D. High operating torque

Q6. A cathode ray oscilloscope CANNOT be used for the measurement of:

- A. phase
- B. amplitude
- C. frequency
- D. energy

Q7. In a Δ - Δ system, a phase voltage of 100 V produces a line voltage of:

- A. 100 V
- B. 71 V
- C. 141 V
- D. 173 V

Q8. How much resistance is offered by a circuit, which has a total potential difference of 4 volts and a total current of 0.15 amperes?

- A. 22.66 ohms
- B. 0.6 ohms
- C. 0.0375 ohms
- D. 6.66 ohms

Rupa Sreenan
25/09/2023

Q9. Which type of component increases when trivalent material is mixed with pure semiconductor material?

- A. Holes
- B. Electrons
- C. Insulation property
- D. Heating property

Q10. What will be the equivalent resistance if a uniform wire of resistance 50 is cut into five equal parts and these parts are connected in parallel?

- A. 10Ω
- B. 5Ω
- C. 2Ω
- D. 15Ω

Q11. If the maximum power is being transferred to a load, then what is the power transfer efficiency?

- A. 75%
- B. 25%
- C. 50%
- D. 100%

Q12. Magnetic leakage factor is the ratio of

- A. Useful flux to total flux.
- B. Flux in the air gap to flux in the iron path
- C. Flux in the air gap to useful flux.
- D. Total flux to useful flux.

Peepa Sreedhar
25/10/2023

Q.13 In a hydroelectric power station, which type of alternator is used?

- A. Steam turbine alternator
- B. Salient pole alternator
- C. Non-salient pole alternator
- D. Turbo generator

Q.14 Which of the following is the unit of energy meter constant?

- A. It is a unit-less quantity.
- B. Number of revolutions/KWh.
- C. kWh/Number of revolutions.
- D. kWh.

Q 15. Which of the following location is suitable to use shackle insulator?

- A. Sharp Turn in transmission line
- B. Dead end of low voltage distribution line
- C. For bearing High Voltage transmission line conductor
- D. Dead end of EHV transmission line

Q 16. An induction motor can be said analogous to _____

- A. transformer
- B. synchronous motor
- C. universal motor
- D. stepper motor

Reya Sreedhar
25/10/2023

Q.17 To compensate the Ferranti effect in transmission lines, _____ are switched on at the receiving-end bus of the transmission system in each phase.

- A. Series capacitors
- B. Series inductors
- C. Shunt inductors
- D. Shunt capacitors

Q.18. An electric motor in which both rotor and stator fields rotate with the same speed is called:

- A. Universal motor
- B. Charge motor
- C. Synchronous motor
- D. DC motor

Q.19 The maximum torque which the motor can develop without pulling out of step or synchronism is called:

- A. Pull in torque
- B. Starting torque
- C. Running torque
- D. Pull out torque

Q.20 Illumination of surface is inversely proportional to the square of distance between surface and a point source. This is a statement associated with:

- A. Inverse square law
- B. Coulomb's law
- C. Lenz's law

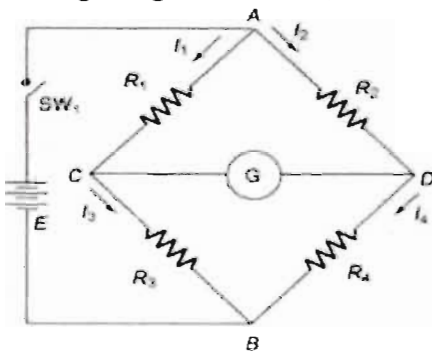
Reepa Sreedhar
25/10/2023

D. Lambert's cosine law

Q.21 Which of the following is NOT an example of a ferromagnetic material?

- A. Lithium
- B. Iron
- C. Nickel
- D. Cobalt

Q.22 In the figure given below, $R_1 = 10\text{ K}\Omega$, $R_2 = 15\text{ K}\Omega$ and $R_3 = 30\text{ K}\Omega$. Find R_4



- A. $25\text{ K}\Omega$
- B. $30\text{ K}\Omega$
- C. $45\text{ K}\Omega$
- D. $15\text{ K}\Omega$

Q.23 How much energy does a 100 W bulb consume in one day?

- A. 1200 Wh
- B. 100 Wh
- C. 600 Wh
- D. 2400 Wh

Rupa Sreedhar
 25/10/2023

Q.24 Which of the following is a gas-operated relay?

- A. Thermal relay
- B. Electromagnetic relay
- C. Solid state relay
- D. Buchholz relay

Q.25 Which of the following is NOT a routine test on transformers?

- A. Impedance voltage test
- B. Polarity test
- C. Radio interference test
- D. Core insulation voltage test

Q.26. The variable resistor shunting the field of a DC series motor is called:

- A. Armature diverter
- B. Potential divider
- C. Field diverter
- D. Voltage regulator

Q.27 An ideal transformer is one which has?

- A. Primary windings less than that of secondary
- B. A common core for its primary and secondary windings
- C. No losses and magnetic leakage
- D. Interleaved primary and secondary windings

Reena Sreedhar

25/10/2023

Q.28 Which of the following have negative temperature coefficient of resistance

1. Copper
2. Carbon
3. Aluminium

- A. Only 2 and 3
- B. Only 1 and 3
- C. Only 1
- D. Only 2

Q.29 An electric kettle consumes 10kw of electric power when operated at 200 V.

A fuse wire of what rating must be used for it?

- A. 10A
- B. 30A
- C. 50A
- D. 40A

Q.30 Which of the following information is NOT present on the nameplate of a transformer?

- A. Insulation class
- B. KVA or MVA rating
- C. Rated frequency
- D. Frame size

Reena Bredhar
25/10/2023

Q.31 In case of electrical energy, the joule is also expressed as the _____

- A. watt-second
- B. meter-second
- C. joule-second
- D. newton-second

Q.32 Which of the following measurement instruments consumes the least amount of energy?

- A. Induction type
- B. Moving iron type
- C. Dynamometer type
- D. Permanent Magnetic Moving Coil type

Q.33 What is the role of swamping resistance in Ammeter?

- A. To reduce the error in measurement due to variations in temperature
- B. To reduce the error in measurement due to variations in voltage
- C. To reduce the error in measurement due to variations in gravity
- D. To reduce the error in measurement due to variations in frequency

Q.34. During resonance, becomes maximum for a series R-L-C circuits

- A. Current
- B. Impedance
- C. Voltage
- D. Reactance

Q.35. The half-wave rectifier can be designed by using minimum.....

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- A. One p-n diode
- B. Two p-n diode
- C. three diode
- D. Four diode

Q.36. For a half-wave rectified alternating current, "Form factor" is equal to.....

- A. 1.57
- B. 2.57
- C. 3.57
- D. 4.57

Q.37. Which Welding process involves the melting of the parent metal?

- A. Fusion welding
- B. Resistance welding
- C. Friction welding
- D. Non-fusion welding

Q.38 RTD stands for:

- A. Resistance Temperature Deflector
- B. Resistance Transfer Deflector
- C. Resistance Temperature Detector
- D. Resistance Transfer Detector

Q.39 A series R-L-C circuit has $R= 1000 \Omega$, $L=100 \text{ mH}$, $C=10 \text{ pF}$. The supply voltage is 100 V. Calculate the bandwidth.

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- A. 10 k rad/s
- B. 1 rad/s
- C. 100 rad/s
- D. 50 rad/s

Q.40 Determine the amount of charge stored on either plate of the capacitor of $2\mu\text{F}$ when connected to a 9 V battery?

- A. $18\mu\text{C}$
- B. $4.5\mu\text{C}$
- C. $2\mu\text{C}$
- D. $36\mu\text{C}$

Q.41 Which of the following is not true with respect to dielectric strength?

- A. It decreases with increase in frequency
- B. It increases with increase in frequency
- C. It decreases with increase in operating temperature
- D. It decreases with increase in humidity

Q.42 In AC series motor, power factor is low because of _____

- A. high capacitance of the field and armature circuit
- B. high inductance of the field and armature circuit
- C. high resistance of the field and armature circuit
- D. low inductance of the field and armature circuit

Q.43 In common-collector configuration of bipolar junction transistor (BJT), the output voltage is:

- A. in phase with the input voltage
- B. shifted by 90° from the input voltage
- C. shifted by 270° from the input voltage
- D. out of phase with the input voltage

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Q.44is a measuring instrument and graphical display of electrical signals that vary over time. This tool makes it possible to visualize transient phenomena and facilitates the diagnosis and analysis of an electrical circuit's operation, as well as its possible failures.

- A. Voltmeter
- B. Ohmmeter
- C. Multimeter
- D. Oscilloscope

Q.45 In a balanced 3phase system, the zero phase sequence currents are:

- A. zero
- B. varying
- C. maximum
- D. minimum

Q.46 What is the composition of the alloy Kanthal' (used as a heating element in electrical heating systems)?

- A. Chromium, aluminium, nickel
- B. Chromium, aluminium, iron
- C. Chromium, copper, cobalt
- D. Chromium, aluminium, cobalt

Q.47 A 10V power supply would use filter capacitor of following type:

- A. Electrolytic capacitor
- B. Air capacitor
- C. Paper capacitor
- D. Mica capacitor

Q.48 Which of the following materials can be used as an arc quenching medium in High Rupturing Capacity (HRC) fuse?

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- A. Argon gas
- B. Mica
- C. Plaster of Paris
- D. Aluminium

Q.49 Which of the following is NOT a static compensation equipment for transmission lines?

- A. Synchronous motor
- B. Shunt capacitors
- C. Series capacitors
- D. Shunt reactors

Q.50 Which of the following statements is NOT correct about the significance of stationary armature alternator?

- A. The output current can be easily taken from rotor winding
- B. The armature windings of the rotating field alternator are not subjected to centrifugal forces.
- C. The rotating field type alternator has a smaller size than the rotating armature type.
- D. The armature windings can be braced better mechanically against the high electromagnetic force.

Q.51 Select the motor with the least starting torque:

- A. Capacitor-start, capacitor-run motor
- B. Capacitor-start, induction-run motor
- C. R-split phase induction motor
- D. Shaded-pole induction motor

Q.52 Which of the following motors can be used as a part of a control circuit in robotic applications?

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- A. AC series motor
- B. Servo motor
- C. Universal motor
- D. Schrage motor

Q.53 Which of the following is an active component?

- A. Transistor
- B. Resistor
- C. Inductor
- D. Capacitor

Q.54 In a parallel operation of single phase transformers, a dead short circuit can happen if:

- A. paralleling is done with incorrect polarities
- B. their percentage impedances are not equal
- C. the power factors of transformer don't match with that of the load
- D. there is a difference in the transformation ratios of the transformers

Q.55 Calculate the apparent power of a circuit if the circuit has a power factor of 0.8 and the active power of the circuit is 40 W.

- A. 75 VA
- B. 100 VA
- C. 50 VA
- D. 40 VA

Q.56 In 3 phase power measurement for a balanced load using the two-wattmeter method, the reactive power is given by:

- A. $\sqrt{3}$ times the difference of the readings of the two wattmeters
- B. $\sqrt{3}$ times the sum of the readings of the two wattmeters

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- C. 3 times the difference of the readings of the two wattmeters
- D. the sum of both the wattmeter readings

Q.57 In case of a DC machine, the efficiency is maximum when:

- A. Copper loss in the armature circuit = constant loss
- B. Winding resistance = winding reactance
- C. Copper loss in the field circuit = constant loss
- D. Frictional loss = copper loss

Q.58 In nodal analysis, for a network of N nodes, the number of simultaneous equations to be solved to get the unknowns is:

- A. $N(N-1)$
- B. $N(N+1)$
- C. N
- D. N-1

Q.59 Solid state power supplies are protected from high voltage surges due to lightning using:

- A. Zinc-oxide-based varistors
- B. Silicon-carbide varistors
- C. Metal glaze resistors
- D. Metal film resistors

Q.60 Which of following devices exhibits negative resistance region?

- A. Zener diode
- B. P-N junction diode
- C. Tunnel diode

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D. BJT

Q.61 The time instant between which the gate current reaches 90% of its final value and anode current reaches 10% of its final value is referred to as:

- A. Rise time
- B. Turn-on time
- C. Spread time
- D. Delay time

Q.62 The number of layers present in SCR are:

- A. 2
- B. 3
- C. 4
- D. 5

Q.63 In case of magnetic circuits, the force that tends to create magnetic flux is called

- A. absolute permeability
- B. reluctance
- C. relative permeability
- D. MMF

Q.64 Which of the following is NOT a method of earth resistance measurement?

- A. Fall of potential method
- B. Potier method
- C. Three-point method
- D. Two-point method

Q.65 In electrical applications, electric geyser coils are made up of a _____

- A. high-inductance metal
- B. high-resistance metal
- C. low-resistance metal

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D. low-inductance metal

Q.66 In the process of Nickel plating of iron articles, iron will first be applied with a film of _____ to ensure good quality.

- A. copper
- B. aluminium
- C. chromium
- D. silver

Q.67 Which of the following is a commonly used circuit breaker in India, for rural outdoor applications ranging from 22 KV to 66 KV?

- A. Air blast circuit breaker
- B. SF6 circuit breaker
- C. Plain break oil circuit breaker
- D. Vacuum circuit breaker

Q.68 Transformer works on principle of:

- A. Self-inductance
- B. Mutual inductance
- C. Ohm's law
- D. Faraday's law

Q.69 Which of the following effects is observed when the conductor carries more current on the surface than at the core?

- A. Corona
- B. Permeability
- C. Ferranti effect

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D. Skin effect

Q.70 In a 4-pole induction motor, if the rotor speed is 1,400 rpm, what will be the air gap field speed?

- A. 1,400 rpm
- B. 1,500 rpm
- C. 1,600 rpm
- D. 1,700 rpm

Q.71 The deflecting torque in a PMMC instrument is proportional to

- A. the square of the current flowing through the coil
- B. the resistance of the coil
- C. the current flowing through the coil
- D. the area of the coil

Q.72 Distance protection scheme is preferred over graded time lag over current protection in HV (high voltage) and EHV (extra high voltage) lines because:

- A. it is simple to install
- B. it is cheaper in operation
- C. it is faster in operation
- D. it has simple configuration

Q.73 The Superposition Theorem is NOT applicable for:

- A. non-linear circuits
- B. linear circuits
- C. a circuit containing a dependent voltage source
- D. a circuit containing a dependent current source

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- Q.74 What is the main reason of placing field winding on the stationary rotor?
- A. Insulation of high voltage is made easy on stator than on rotor.
 - B. Field circuit possesses less power.
 - C. Stator is associated with more power.
 - D. Stator is associated with more current.
- Q.75 A power supply has a full load voltage of 24 V. Its no load voltage for 5% regulation is:
- A. 29 V
 - B. 25.2 V
 - C. 22.8 V
 - D. 19 V
- Q.76 Which of the following is the fastest A-D convertor?
- A. Successive approximation type
 - B. Flash type
 - C. Integration type
 - D. Ramp type
- Q.77 The one-wattmeter method of 3-phase power measurement can only be used for:
- A. Unbalanced load
 - B. Balanced delta connected load
 - C. Balanced star connected load
 - D. Balanced load
- Q.78 If the area of a capacitor plate increases, then:
- A. the capacitance increases
 - B. the capacitance remains unaffected
 - C. the voltage it can withstand increases

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D. the capacitance decreases

Q.79 Calculate the sensitivity of 200 μA meter movement that is to be used as a DC voltmeter.

- A. 5 Ω/V
- B. 5 $\text{K}\Omega/\text{V}$
- C. 5 $\text{K}\Omega$
- D. 5 Ω

Q.80 Which of the following is not a characteristic of open loop system?

- A. It is inaccurate
- B. It is economical
- C. It has small bandwidth
- D. It has feedback elements

Q.81 Which of the following machines is NOT used as a no-load condition?

- A. DC series motor
- B. DC differential compound motor
- C. DC cumulative compound motor
- D. DC shunt motor

Q.82 The function of brushes in a DC generator is to:

- A. Convert AC to DC
- B. Provide low reluctance path for the magnetic flux
- C. Collect current from the commutator
- D. Hold the armature windings

Q.83 What is the decimal equivalent number of binary number 101101?

- A. 45
- B. 90

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C. 40

D. 48

Q.84 Which of the following is NOT a desirable property for the insulating materials used in an underground cable?

- A. High dielectric strength
- B. High insulation resistance
- C. Non-inflammable
- D. Hygroscopic

Q.85 What is the value of 1s compliment of 010010?

- A. 101101
- B. 100110
- C. 011001
- D. 011101

Q.86 In steam power stations, the condenser creates a at the exhaust of the turbine.

- A. Very high pressure
- B. Very high temperature
- C. Very low temperature
- D. Very low pressure

Q.87 During working of a permanent magnet synchronous motor, _____

- A. stator and rotor both produce constant magnetic field
- B. stator and rotor both produce rotating magnetic field
- C. rotor produces constant magnetic field and stator produces rotating magnetic field
- D. rotor produces rotating magnetic field and stator produces constant magnetic field

Reya Sreedhar
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Q.88 The BCD equivalent of decimal number 7 is:

- A. 0111
- B. 1110
- C. 0011
- D. 1100

Q.89 The term 'permeance' in a magnetic circuit is analogous to _____ in an electric circuit..

- A. Conductance
- B. Impedance
- C. Susceptance
- D. Reluctance

Q.90 For zero power factor leading loads, the effect of an armature reaction in an alternator is:

- A. Magnetising
- B. De-magnetising
- C. Distortional
- D. Cross-magnetising

Q.91 In case of an electromechanical generator, the frequency is:

- A. Directly proportional to speed
- B. Indirectly proportional to speed
- C. Indirectly proportional to power
- D. Directly proportional to voltage

Q.92 Which of the following is not an advantage of PMMC?

- A. It displays no hysteresis
- B. There is friction due to jewel-pivot suspension
- C. Its operating fields not significantly affected by stray magnetic fields

Rupa *Rupa Sreedhan*

D. It can be used for wide range of current and voltage

Q.93 In the method of speed control of induction motor by inducing emf in the rotor circuit, if the injected voltage is in phase opposition to the induced rotor emf, then:

- A. the rotor resistance increases
- B. the rotor reactance increases
- C. the rotor reactance decreases
- D. the rotor resistance decreases

Q.94 If the frequency of supply in a three core underground cable is doubled, the charging current will be

- A. four times
- B. half
- C. double
- D. three times

Q.95 Which of the following is not a sequential circuit?

- A. Flip flop
- B. Counter
- C. Shift register
- D. Multiplexer

Q.96 Which of the following can be used as a dopant to make N-type semiconductor?

- A. Boron
- B. Indium
- C. Arsenic
- D. Aluminium

Q.97 According to Tellegen's Theorem, the sum of instantaneous powers for the n branches in a network is always:

Repa Sureshan

25/07/2023

- A. A constant
- B. Alternating
- C. Equal to zero
- D. In-phase with current

Q.98 The deflection sensitivity in a cathode ray oscilloscope (CRO) is _____ the mass of electron.

- A. directly proportional to the square root of
- B. inversely proportional to the square root of
- C. directly proportional to
- D. inversely proportional to

Q.99 Power stations and sub-stations are protected against direct strokes of lightning using:

- A. Horn Gap arrester
- B. Overhead ground wires
- C. Earthing screen
- D. Rod Gap arrester

Q.100 For unity power factor loads, the effect of an armature reaction in an alternator is:

- A. cross-magnetising
- B. de-magnetising
- C. magnetising
- D. distortional

Reena Sreedhar
25/10/2023

JUNIOR TECHNICAL ASSISTANT
(ELECTRICAL) A

25/10/2023

1

Question No	Answer
1	D
2	D
3	B
4	D
5	A
6	D
7	A
8	A
9	A
10	C
11	C
12	D
13	B
14	B
15	B
16	A
17	C
18	C
19	D
20	A
21	A
22	C
23	D
24	D
25	C
26	C
27	C
28	D
29	C
30	D
31	A
32	D
33	A
34	A
35	A
36	A

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37	A
38	C
39	A
40	A
41	B
42	B
43	A
44	D
45	A
46	B
47	A
48	C
49	A
50	A
51	D
52	B
53	A
54	A
55	C
56	A
57	A
58	D
59	B
60	C
61	D
62	C
63	D
64	B
65	B
66	A
67	D
68	B
69	D
70	B
71	C
72	C
73	A
74	A
75	B
76	B

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77	D
78	A
79	B
80	D
81	A
82	C
83	A
84	D
85	A
86	D
87	C
88	A
89	A
90	A
91	A
92	B
93	A
94	C
95	D
96	C
97	C
98	B
99	C
100	A

Junior Technical Assistant (Electrical) - A 25/10/2023

Rupa Sreedhar
25/10/2023.