

## T.S - ECET-EEE-2016

A

1. An electric heater draws 1000 W from a 250 V source. If it is connected across a 125 V source.  
(1) 500W (2) 250W  
(3) 1000W (4) 125W
2. Which of the following is the best conductor  
(1) carbon (2) copper  
(3) tungsten (4) iron
3. The best suitable material for heating element is  
(1) manganin (2) constantan  
(3) nichrome (4) carbon
4. Beyond curie point ferro-magnetic material  
(1) has increased flux densities (2) loses its magnetic properties  
(3) becomes very hot (4) will have a slight bend
5. A star arrangement of resistances has each resistance of  $3\Omega$ . The equivalent delta arrangement will have each resistance value of  
(1)  $1\Omega$  (2)  $9\Omega$   
(3)  $3\Omega$  (4)  $6\Omega$
6. When 'n' similar resistors each of resistance 'R' are connected in parallel the total resistance is 'R'. If these resistances are connected in series, the total resistance is  
(1) nR (2)  $R/n^2$   
(3)  $n^2 R$  (4)  $R/n$
7. Superposition theorem can be applied only to circuits having \_\_\_\_\_ elements  
(1) non linear (2) passive  
(3) linear & bilateral (4) resistance
8. The combined inductance of two coils connected in series is 0.6H or 0.1 H depending on the relative directions of currents in the coils. If one of the coils has a self inductance of 0.2H, the self inductance of other coil is  
(1) 0.5H (2) 0.35H  
(3) 0.15H (4) 0.25H
9. The diameter of a wire is reduced to one half keeping the length constant then the new resistance will be  
(1) half of the original (2) four times the original  
(3) twice the original (4) one-fourth of the original

10. Three resistors, each of  $R\Omega$  are connected to form a triangle. The equivalent resistance between any two terminals will be
- (1)  $\frac{2}{3}R\Omega$  (2)  $\frac{3}{2}R\Omega$   
 (3)  $R\Omega$  (4)  $3R\Omega$
11. Four 100 W bulbs are connected in parallel across 200V supply line. If one bulb gets fused
- (1) no bulb will glow (2) all the four bulbs will glow  
 (3) rest of the three bulbs will glow (4) one bulb will glow
12. Four capacitors having capacitances of  $5\mu F$ ,  $10\mu F$ ,  $15\mu F$  &  $20\mu F$  are connected in parallel across 600 V mains. The capacitor having least charge will be
- (1)  $5\mu F$  (2)  $10\mu F$   
 (3)  $15\mu F$  (4)  $20\mu F$
13. Equalizer rings are required in a lap wound DC machine
- (1) to improve commutation  
 (2) to filter out harmonics  
 (3) to prevent the flow of circulating current through brushes  
 (4) to reduce armature reaction
14. A DC series motor has linear magnetization and negligible armature resistance. If 'T' is torque, the motor speed is
- (1) directly proportional to  $\sqrt{T}$  (2) inversely proportional to  $\sqrt{T}$   
 (3) directly proportional to T (4) inversely proportional to T
15. In a DC generator, emf due to residual flux is fed back to the shunt winding positively. Why does the no load voltage build up to a finite steady value
- (1) because of field winding inductance (2) because of magnetic saturation  
 (3) because of field winding resistance (4) because of eddy current loss in pole shoes
16. Inter-poles help commutation in a DC machine by
- (1) cancelling the armature reaction mmf  
 (2) aiding the main poles  
 (3) by causing statically induced emf in the coils undergoing commutation  
 (4) by causing dynamically induced emf in the coils undergoing commutation
17. A 600 V DC motor drives a 60 kW load at 900 rpm. If the motor efficiency is 85% determine the current drawn from the supply
- (1) 117A (2) 130A  
 (3) 90A (4) 150A

18. A DC machine has maximum efficiency when
- (1) variable losses = mechanical losses                      (2) variable losses = constant losses  
 (3) mechanical losses = copper losses                      (4) windage & friction losses = copper losses
19. In a DC generator the magnetic neutral axis coincides with the geometrical neutral axis when
- (1) there is no load on the generator                      (2) the generator runs of full load  
 (3) the generator runs on overload                      (4) the generator runs on designed speed
20. The most efficient form of damping used in electrical measuring instruments is
- (1) air friction damping                      (2) fluid friction damping  
 (3) eddy current damping                      (4) hysteresis damping
21. Permanent magnet moving coil instruments can measure
- (1) all AC quantities                      (2) DC quantities only  
 (3) both AC and DC quantities                      (4) sinusoidal AC quantity only
22. Energy meter may be classified as
- (1) indicating instrument                      (2) recording instrument  
 (3) integrating instrument                      (4) deflecting instrument
23. The secondary of a current transformer is
- (1) never left short circuited                      (2) never left open circuited  
 (3) always kept open circuited                      (4) always be used as voltage transformer
24. If an ammeter is connected like a voltmeter, across the load circuit
- (1) the meter reading will be too low  
 (2) almost no current will flow through the meter  
 (3) an admissibly high current will flow through the meter and meter may burn out  
 (4) the loading effect will be low
25. The insulation resistance of a cable can be measured by
- (1) ammeter - Voltmeter method                      (2) megger  
 (3) kelvin's double bridge                      (4) wheatstone bridge
26. The meter constant of an energy meter is 1500rev/kWh. The disc makes 3000 revolutions in given time, the energy consumed is
- (1) 4kWh                      (2) 1kWh  
 (3) 3kWh                      (4) 2kWh

27. In a series RLC circuit  $R = 3\Omega$ ,  $X_L = j6\Omega$ ,  $X_C = -j2\Omega$ . What is the voltage applied across the combination if the series current is  $10 \angle 143^\circ$  A?
- (1)  $50 \angle -30^\circ$  V (2)  $50 \angle -90^\circ$  V  
 (3)  $50 \angle -60^\circ$  V (4)  $30 \angle -90^\circ$  V
28. Three circuit elements,  $R = 2\Omega$ ,  $X_L = j5\Omega$ ,  $X_C = -j10\Omega$  are connected in parallel. If the supply frequency is 50 Hz, find the input admittance
- (1)  $(0.5 - j 0.1)$  mho (2)  $(2 - j5)$  mho  
 (3)  $(2 + j5)$  mho (4)  $(5 - j1)$  mho
29. Selectivity of a resonating circuit is defined as
- (1) (band width) / (resonance frequency) (2) (resonance frequency) / (band width)  
 (3) (resonance frequency)<sup>2</sup> × (band width) (4) (resonance frequency) × (band width)<sup>2</sup>
30. The property of resonance of parallel LRC circuit is
- (1) power factor is zero (2) current is maximum  
 (3) net impedance circuit is minimum (4) current is minimum
31. In a balanced delta connection of a three phase system, the line currents are \_\_\_\_\_ behind the respective phase currents
- (1)  $60^\circ$  (2)  $30^\circ$   
 (3)  $120^\circ$  (4)  $90^\circ$
32. A three phase, 400 V, 50 Hz source supplied power to a 3 phase balanced motor load. If the line current is 25 A, power factor being 0.8; obtain the real power consumed.
- (1) 13.856kW (2) 1.3856kW  
 (3) 138.56kW (4) 100kW
33. An induction motor draws a three phase power and two wattmeter measurement is applied to find the total power. If  $W_1$  and  $W_2$  are the watt meter readings, find the total three phase real power (P) and reactive power (Q).
- (1)  $P = (W_1 + W_2)$ ,  $Q = 1.732 \times (W_1 + W_2)$  (2)  $P = (W_1 - W_2)$ ,  $Q = 1.732 \times (W_1 - W_2)$   
 (3)  $P = (W_1 + W_2)$ ,  $Q = 1.732 \times (W_1 - W_2)$  (4)  $P = 1.732 \times (W_1 - W_2)$ ,  $Q = (W_1 - W_2)$
34. If a transformer core has air gaps, then
- (1) reluctance of magnetic path is decreased (2) hysteresis loss is decreased  
 (3) magnetizing current is greatly increased (4) eddy current is increased
35. A 230 V/2300 V single phase transformer takes no load current of 5A at 0.25 power factor lagging. The core loss is
- (1) 300.2W (2) 192.5W  
 (3) 287.5W (4) 212.6 W



36. A transformer has 200 W as iron loss at full load. The iron loss at half load will be  
(1) 50W (2) 100W  
(3) 400W (4) 200W
37. Under no load condition, the power factor of a transformer is  
(1) zero (2) unity  
(3) less than 0.5 lagging (4) less than 0.5 leading
38. A 40 kVA transformer has iron loss of 450 W and full load copper loss of 850 W. If the power factor of the load is 0.8 lagging, the full load efficiency of the transformer is  
(1) 85.2% (2) 96.1%  
(3) 78.5% (4) 91.2%
39. In a  $\Delta - \Delta$  connection, if one transformer becomes disabled, the capacity will reduce to  
(1) 66.67% (2) 57.74%  
(3) 50% (4) 33.33%
40. For successful parallel operation of two single phase transformers, the most essential condition is that their  
(1) percentage impedances are equal (2) polarities are properly connected  
(3) turns ratios are exactly equal (4) kVA ratings are equal
41. In salient pole field structure, the pole shoes cover about \_\_\_\_\_ of pole pitch  
(1) one-third (2) one-half  
(3) two-third (4) whole
42. A 3-phase, 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 30 m Wb sinusoidally distributed and the speed is 375 rpm. The frequency of the generated emf is  
(1) 25Hz (2) 50Hz  
(2) 100H (4) 200Hz
43. An under excited alternator supplies  
(1) lagging VAR (2) leading VAR  
(3) no reactive power (4) no active power
44. Pull-out torque of a practical synchronous motor will occur when the torque angle is about  
(1)  $0^\circ$  (2)  $30^\circ$   
(3)  $45^\circ$  (4)  $75^\circ$
45. A synchronous motor is operating with normal excitation. With the increase in load the armature current drawn from the supply mains increases due to  
(1) increase in back emf  
(2) fall in motor speed  
(3) increase in resultant voltage across the armature  
(4) increase in power factor

46. A synchronous motor is connected to a constant voltage and constant supply frequency. The motor is initially operated at lagging power factor. When the field current is increased
- (1) the load angle increases
  - (2) the power input increases
  - (3) the power factor decreases
  - (4) the armature current decreases upto a certain limit and then increases
47. Double cage induction motor, over an ordinary squirrel cage induction motor has the advantage of
- (1) larger slip
  - (2) higher efficiency
  - (3) higher power factor
  - (4) reduced starting current
48. A 12 pole 3 phase star connected induction motor runs at 600V, 50 Hz. It has a rotor resistance of 0.03 ohm phase and standstill reactance of 0.5 ohm phase. The slip corresponding to maximum torque under running conditions is
- (1) 2%
  - (2) 4%
  - (3) 6%
  - (4) 1%
49. When the supply voltage to an induction motor is reduced by 10% the maximum torque will decrease by approximately
- (1) 5%
  - (2) 10%
  - (3) 20%
  - (4) 40%
50. The capacitor start, capacitor run single phase induction motor has
- (1) no centrifugal switch
  - (2) low power factor
  - (3) noisy operation
  - (4) low efficiency
51. The torque speed characteristic of a repulsion motor resembles torque speed characteristic of \_\_\_\_\_ dc motor.
- (1) separately excited
  - (2) shunt
  - (3) series
  - (4) compound
52. The single phase shaded pole motor has
- (1) squirrel cage rotor
  - (2) wound rotor
  - (3) high power factor
  - (4) high starting torque
53. Unbalanced supply voltage given to a 3 phase delta connected induction motor will cause
- (1) zero sequence currents
  - (2) less heating of the motor
  - (3) negative sequence component current
  - (4) balanced currents

54. Which of the following power plants has the least operating cost
- (1) hydro (2) thermal  
(3) nuclear (4) diesel
55. In a hydro power plant, Water hammer is developed in
- (1) surge tank (2) water turbine  
(3) penstock (4) draft tube
56. A condenser in a steam power plant condenses steam coming out of
- (1) turbine (2) boiler  
(3) economizer (4) super-heater
57. When the rate of electrical energy is charged on the basis of maximum demand of the consumer and the units consumed is called
- (1) simple tariff (2) flat rate tariff  
(3) two part tariff (4) power factor tariff
58. The purpose of the moderator in a nuclear power plant is to control the
- (1) flow of water inlet  
(2) amount of nuclear fuel into the reactor  
(3) nuclear fission rate by slowing down the neutrons  
(4) control the steam flow to the turbine
59. The ratio of average load to the maximum demand during a given period is known as
- (1) load factor (2) demand factor  
(3) diversity factor (4) plant capacity factor
60. The device that detects the fault in a power system is
- (1) circuit breaker (2) isolator  
(3) relay (4) earthing switch
61. The buchholz relay is normally used for the protection of the following equipment
- (1) transformer (2) alternator  
(3) bus-bar (4) transmission line
62. An over-current relay having current setting of 125% is connected to a supply circuit through a current transformer of 400/5A. The pickup current is
- (1) 6.25A (2) 12.5A  
(3) 3.125A (4) 25A

63. A 110V/220 V single phase transformer is to be protected a differential protection. If the CT ratio on primary side (L.V side) is 50/5A, the suitable CT ratio on the HV side is
- (1) 100/5A (2) 200/5A  
(3) 25/5A (4) 12.5/5A
64. The distance relay normally used for the protection medium lines is
- (1) impedance relay (2) reactance relay  
(3) Mho relay (4) IDMT relay
65. For the same power rating, which of the following circuit breaker is least in size
- (1) oil circuit breaker (2) air-blast circuit breaker  
(3) vacuum circuit breaker (4)  $SF_6$  circuit breaker
66. ACSR (aluminum conductor steel reinforced) are employed as overhead conductors because of
- a. lightness b. electrical conductivity c. reustlessness
- (1) a and b only (2) b and c only  
(3) c and a (4) a, b and c
67. The advantage of bundled conductors is
- (1) high voltage gradient (2) high corona loss  
(3) high surge impedance (4) increase in transmission capacity
68. The concept of Self GMD is applicable for
- (1) capacitance only (2) inductance only  
(3) both capacitance and inductance (4) both capacitance and resistance
69. If  $\frac{Y}{2}, Z, \frac{Y}{2}$  are the parameters of a nominal T-type medium transmission line, then A, B, C, D constants of the above model are given by: (where  $Z = (R + jX)$ )

$$(1) A = \left(1 + \frac{YZ}{2}\right), B = Z \left(1 + \frac{YZ}{4}\right), C = Y, D = \left(1 + \frac{YZ}{2}\right)$$

$$(2) A = \left(1 + \frac{YZ}{2}\right), B = Z \left(1 + \frac{YZ}{4}\right), C = Y \left(1 + \frac{YZ}{4}\right), D = \left(1 + \frac{YZ}{2}\right)$$

$$(3) A = Z \left(1 + \frac{YZ}{2}\right), B = Z \left(1 + \frac{YZ}{4}\right), C = Y, D = Y \left(1 + \frac{YZ}{2}\right)$$

$$(4) A = \left(1 + \frac{YZ}{2}\right), B = Z \left(1 - \frac{YZ}{4}\right), C = Y \left(1 - \frac{YZ}{2}\right), D = \left(1 - \frac{YZ}{2}\right)$$



70. For a loss less ( $r = 0, g = 0$ ) long transmission line, the surge impedance ( $Z_c$ ) is given by

(1)  $\sqrt{\frac{C}{L}}$

(2)  $\frac{L}{C}$

(3)  $\sqrt{\frac{L}{C}}$

(4)  $\sqrt{\frac{1}{LC}}$

71. Corona loss can be reduced by using

(1) small diameter conductors only

(2) less height of the conductors from the ground

(3) bundled conductors only

(4) both small diameter &amp; bundled conductors

72. The sag of a conductor between two supports of equal length takes the form of

(1) semi circle

(2) catenary

(3) hyperbola

(4) parabola

73. The main requirement of the insulating material used for cable is

(1) low insulation resistance

(2) It should be non-hygroscopic

(3) low dielectric strength

(4) It should be hygroscopic

74. Maximum voltage appears across the disc \_\_\_\_\_ the line conductors

(1) nearest to

(2) middle of

(3) away from

(4) between middle &amp; away from the conductors

75. A single core cable has a conductor diameter of  $d_1$  cm, and insulation thickness of  $r_2$  cm. If the specific resistance of the insulation is  $\rho \Omega - cm$ . The formula used to calculate the insulation resistance R for a 'l' km length of the cable is

(1)  $(\rho \times 10^{-2}) (2\pi l \times 10^3) \log_e \left( \frac{r_1 + r_2}{r_1} \right) \Omega$

(2)  $\frac{2\pi l \times 10^3}{\rho \times 10^{-2}} \log_e \left( \frac{r_1 + r_2}{r_1} \right) \Omega$

(3)  $(\rho \times 10^{-2}) (2\pi l \times 10^3) \log_e \left( \frac{r_1 + r_2}{2} \right) \Omega$

(4)  $\frac{\rho \times 10^{-2}}{2\pi l \times 10^3} \log_e \left( \frac{r_1 + r_2}{r_1} \right) \Omega$

76. The main drawback of the radial distribution system are

1) the consumers are not dependent of single feeder

2) the end of the distributor nearest to feeding point will not be heavily loaded

3) the consumer at the distant end of distributors will be subjected to serious voltage fluctuations when load on the distributor changes

(1) 1 and 2

(2) 2 and 3

(3) 3 only

(4) 1 only

77. In a traction system, the distance between two stations is 1 km and the schedule speed is 30 kmph. Station stop time is 20 sec. Calculate the average speed. (Assume speed time curve is approximated by a trapezoidal curve)
- (1) 36kmph (2) 30kmph  
(3) 10kmph (4) 3kmph
78. The factor(s) \_\_\_\_\_ which affects the specific energy consumption in a traction system, for a given scheduled speed
- (1) distance between stops (2) the acceleration and retardation  
(3) gradient (4) all of the above
79. Quadrilateral speed time curve is used for
- (1) suburban service only (2) urban service only  
(3) main line service only (4) both suburban and urban services
80. Because of \_\_\_\_\_, steam engine drive in a traction system is being gradually replaced by either diesel electric or straight electric system
- (1) low thermal efficiency (2) low coefficient of adhesion  
(3) unbalanced reciprocation parts (4) all of the above
81. Which of the following is important for driving equipment used for traction purpose
- 1) high coefficient adhesion  
2) low coefficient adhesion  
3) wear caused on the brake shoes and wheel tyres should be minimum  
4) pollution free
- (1) 1 and 3 only (2) 2 and 4 only  
(3) 2, 3 and 4 only (4) 1, 3 and 4 only
82. The main requirements of traction motor is
- (1) low starting torque (2) heavy in weight  
(3) easy speed control (4) regenerative braking is not desirable
83. The symbol  $\bar{X}$  represents
- (1) group of lamps (2) wall mounted lamp  
(3) ceiling mounted lamp (4) fluorescent lamp
84. Which Indian electricity rule pertains to clearance above ground of the lowest conductor of power lines
- (1) 57 (2) 79  
(3) 77 (4) 87

85. Normal area of  $\frac{7}{20}$  SWG copper conductor is
- (1) 4.5sq.mm (2) 2.5sq.mm  
(3) 3.0sq.mm (4) 7.0sq.mm
86. HRC stands for
- (1) high rupturing capacity (2) high rupturing current  
(3) heat resistance capacity (4) heat rupturing capacity
87. In a NPN transistor
- (1) emitter and base are 'N' (2) collector and emitter are 'N'  
(3) emitter is 'P' and base is 'N' (4) collector is 'P' and base is 'N'
88. If the time period of input voltage of a full-wave rectifier is 40 ms, then the time period of output voltage is
- (1) 20ms (2) 40ms  
(3) 10ms (4) 80ms
89. In which of the following devices reverse biasing is useful
- (1) light emitting diode (2) zener diode  
(3) silicon controlled rectifier (4) LCD
90. Identify the universal gates from the following
- (1) NOT and EX-OR (2) AND and NOT  
(3) NOT and NOR (4) NOR and NAND
91. Current gain is more than unity and voltage gain is almost equal to unity in
- (1) CE and CB amplifiers (2) CB amplifier only  
(3) CC amplifier only (4) CE and CC amplifiers
92. The binary value of decimal value 142 is
- (1) 10001110 (2) 11001110  
(3) 10011100 (4) 10001010
93. The two transistor model of a thyristor consists of following two transistors
- (1) one n-p-n and other p-n-p (2) both p-n-p  
(3) both n-p-n (4) one n-p-n and other UJT

94. LASCR has
- (1) 4 semiconductor layers and 3 junctions
  - (2) 3 semiconductor layers and 2 junctions
  - (3) 2 semiconductor layer and 2 junctions
  - (4) 3 semiconductors layers and 3 junctions
95. In a single phase full converter fed by a source having inductance, the number of thyristors conducting during overlap is
- (1) one
  - (2) two
  - (3) three
  - (4) four
96. A single phase half bridge inverter required to feed RL loads, needs
- (1) two thyristors
  - (2) four thyristors
  - (3) two thyristors and two diodes
  - (4) four thyristors and four diodes
97. A step down dc chopper has an input voltage  $V$ . If duty cycle is ' $\alpha$ ' and the load is resistive, the rms value of out-put voltage is
- (1)  $\alpha V$
  - (2)  $\sqrt{\alpha} V$
  - (3)  $\alpha^2 V$
  - (4)  $(1-\alpha)V$
98. A bridge type single phase cyclo-converter changes the frequency  $f$  to  $\frac{f}{3}$ . Then one half wave of output contains
- (1) three full waves of input
  - (2) three half waves of input
  - (3) six full waves of input
  - (4) six half waves of input
99. Internal RAM size of 8051 microcontroller is \_\_\_\_\_ bytes
- (1) 128K
  - (2) 4K
  - (3) 128
  - (4) 64K
100. A separately excited dc motor is fed from a 500V dc through a one quadrant chopper. resistance of the armature is 0.1 ohm and armature current is 200A. The voltage constant is 1.4V/A-rad/sec. If the field current is 2A and the duty cycle of the chopper is 0.5, find the speed in rad/sec
- (1) 82.14
  - (2) 90.14
  - (3) 72.14
  - (4) 100.14

**KEY**

1) 2	2) 2	3) 3	4) 2	5) 2	6) 3	7) 3	8) 3	9) 2	10) 1
11) 3	12) 1	13) 3	14) 2	15) 2	16) 4	17) 1	18) 2	19) 1	20) 3
21) 2	22) 3	23) 2	24) 3	25) 2	26) 4	27) 2	28) 1	29) 2	30) 4
31) 2	32) 1	33) 3	34) 3	35) 3	36) 4	37) 3	38) 2	39) 2	40) 2
41) 3	42) 2	43) 2	44) 4	45) 3	46) 4	47) 4	48) 3	49) 3	50) 1
51) 3	52) 1	53) 3	54) 1	55) 3	56) 1	57) 3	58) 3	59) 1	60) 3
61) 1	62) 1	63) 3	64) 1	65) 4	66) 4	67) 4	68) 2	69) 1	70) 3
71) 3	72) 2	73) 2	74) 1	75) 4	76) 3	77) 1	78) 4	79) 4	80) 4
81) 4	82) 3	83) 3	84) 3	85) 1	86) 1	87) 2	88) 1	89) 2	90) 4
91) 3	92) 1	93) 1	94) 1	95) 4	96) 3	97) 2	98) 2	99) 3	100) 1