

**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO**

**TEST BOOKLET**  
**A.P. (ELECT.) T.E. 2016**

Time Allowed : 2 Hours]

[Maximum Marks : 100

All questions carry equal marks.

**INSTRUCTIONS**

1. Immediately after the commencement of the examination, you should check that test booklet does not have any unprinted or torn or missing pages or items, etc. If so, get it replaced by a complete test booklet.
2. Write your Roll Number only in the box provided alongside.   
Do not write anything else on the Test Booklet.
3. This Test Booklet contains 100 items (questions). Each item comprises four responses (answers). Choose only one response for each item which you consider the best.
4. After the candidate has read each item in the Test Booklet and decided which of the given responses is correct or the best, he has to mark the circle containing the letter of the selected response by blackening it completely with Black or Blue ball pen. In the following example, response "C" is so marked :  

(A)   (B)   ●   (D)
5. Do the encoding carefully as given in the illustrations. While encoding your particulars or marking the answers on answer sheet, you should blacken the circle corresponding to the choice in full and no part of the circle should be left unfilled. After the response has been marked in the ANSWER SHEET, no erasing/fluid is allowed.
6. You have to mark all your responses ONLY on the ANSWER SHEET separately given according to 'INSTRUCTIONS FOR CANDIDATES' already supplied to you. Responses marked on the Test Booklet or in any paper other than the answer sheet shall not be examined.
7. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. There will be no negative marking.
8. Before you proceed to mark responses in the Answer Sheet fill in the particulars in the front portion of the Answer Sheet as per the instructions sent to you.
9. If a candidate give more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.
10. After you have completed the test, hand over the Answer Sheet only, to the Invigilator.

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1. Strain gauge, LVDT and thermocouple may be classified as ..... transducers.  
(A) active (B) analog  
(C) primary (D) none of these
2. Hay's bridge is used to measure inductance of a coil of Q value :  
(A) less than 10 (B) more than 10  
(C) more than 100 (D) less than 1
3. What is the major cause of creeping in an energy meter ?  
(A) Overcompensation of friction  
(B) Mechanical vibrations  
(C) Excessive voltage across the potential coil  
(D) Stray magnetic fields
4. Which of the following devices is used at the first stage of an electronic voltmeter ?  
(A) BJT (B) SCR  
(C) MOSFET (D) UJT
5. Number of fundamental cut-sets of any graph will be :  
(A) Same as the number of links (B) Equal to 1  
(C) Same as the number of nodes (D) Same as the number of twigs

6. Interline Power Flow Controller (IPFC) is a :
- (A) Shunt-series FACTS controller (B) Series-series FACTS controller  
(C) Both (A) and (B) (D) None of these
7. .... is defined as a steady-state deviation from an ideal sine wave of power frequency, principally characterized by the spectral content of the deviation.
- (A) Waveform distortion (B) Flicker  
(C) Voltage sag (D) Voltage imbalance
8. .... is a periodic voltage disturbance caused by the normal operation of power electronic devices when current is commutated from one phase to another.
- (A) Noise (B) Notching  
(C) Inter-harmonics (D) Sub-harmonics
9. .... is also known as the average failure rate.
- (A) System average interruption frequency index  
(B) System average interruption duration index  
(C) Average service availability index  
(D) Customer average interruption frequency index



10. In ..... mode, no voltage is injected ( $V_{DVR} = 0$ ) by DVR. The booster transformer's low voltage winding is shorted through the converter. No switching of semiconductors occurs in this mode of operation. The DVR will be in this mode most of the time.
- (A) Protection (B) Injection  
(C) Stand by (D) Shut down
11. Response time of STATCOM is ..... times faster than that of SVC.
- (A) 2-4 (B) 4-6  
(C) 6-8 (D) 8-10
12. What will be the equipotential surfaces by a pair of equal and opposite line charges ?
- (A) Spheres (B) Concentric cylinders  
(C) Non-concentric cylinders (D) None of these
13. Normally  $Y_{BUS}$  matrix is a :
- (A) Null matrix (B) Sparse matrix  
(C) Full matrix (D) Unity matrix
14. Compared to Newton-Raphson method, Gauss-Seidel method takes :
- (A) Less number of iterations and more time per iteration  
(B) Less number of iterations and less time per iteration  
(C) More number of iterations and more time per iteration  
(D) More number of iterations and less time per iteration

15. A lossless transmission line of characteristic impedance  $Z_0$  and length  $l < \frac{\lambda}{4}$  is terminated at the load end by an open circuit. What is its input impedance  $Z_s$  ?
- (A)  $Z_s = jZ_0 \tan \beta l$  (B)  $Z_s = -jZ_0 \tan \beta l$   
(C)  $Z_s = jZ_0 \cot \beta l$  (D)  $Z_s = -jZ_0 \cot \beta l$
16. What is the internal resistance of an ideal current source ?
- (A) 0 (B) 1  
(C) 100 (D) Infinity
17. To have sparkless commutation in dc generator, the brushes are rocked ahead so as to be :
- (A) Just ahead of magnetic neutral axis  
(B) In magnetic neutral axis  
(C) Just behind the magnetic neutral axis  
(D) In geometrical neutral axis
18. Scott connections are used for :
- (A) Single-phase to three-phase transformation  
(B) Three-phase to single-phase transformation  
(C) Three-phase to two-phase transformation  
(D) Any of the above

19. Opto-coupler is used to :
- (A) Reduce SCR turn-off time
  - (B) Protect IGBTs against  $dv/dt$
  - (C) Reduce gate signal
  - (D) Isolate gating circuitry from power lines
20. A laser diode can readily be pulse-modulated, since the photon life time is ..... than the carrier life time.
- (A) Much higher
  - (B) Higher
  - (C) Smaller
  - (D) Much smaller
21. In operating a 400 Hz transformer at 50 Hz :
- (A) Only voltage is reduced in the same proportion as the frequency
  - (B) Only kVA is reduced in the same proportion as the frequency
  - (C) Both voltage and kVA are reduced in the same proportion as the frequency
  - (D) None of the above
22. A power station has a maximum demand of 15 MW. The annual load factor is 50% and plant capacity factor is 40%. What is the reserve capacity of the plant ?
- (A) 1875 kW
  - (B) 3750 kW
  - (C) 6000 kW
  - (D) 7500 kW

23. The operation of an inverter fed induction motor can be shifted from motoring to regenerative braking by :
- (A) Reversing phase sequence      (B) Reducing inverter voltage  
(C) Decreasing inverter frequency      (D) Increasing inverter frequency
24. A 90 MVA, 11 kV water wheel generator has an inertia constant  $H = 3$ . The stored energy in the rotor at synchronous speed is :
- (A) 40 kJ      (B) 270 kJ  
(C) 270 MJ      (D) 40 MJ
25. An electric motor developing a starting torque of 15 Nm, starts with a load torque of 7 Nm on its shaft. If the acceleration at start is  $2 \text{ rad/sec}^2$ , the moment of inertia of the systems must be (neglecting viscous and Coulomb friction) :
- (A)  $0.25 \text{ kgm}^2$       (B)  $0.25 \text{ Nm}^2$   
(C)  $4 \text{ kgm}^2$       (D)  $4 \text{ Nm}^2$
26. For the same conductor length, same amount of power, same losses and same maximum voltage to earth, which system requires minimum conductor area ?
- (A) Single-phase ac      (B) 3-phase ac  
(C) 2-phase ac      (D) 3 wire dc



27. What is the approximate value of the surge impedance loading of a 400 kV, 3-phase 50 Hz overhead single circuit transmission line ?
- (A) 230 MW (B) 400 MW  
(C) 1000 MW (D) 1600 MW
28. Which one of the following relays has the capability of anticipating the possible major fault in a transformer ?
- (A) Buchholz relay (B) Overcurrent relay  
(C) Differential relay (D) Overfluxing relay
29. An overhead line having a surge impedance of 400 Ohms is connected in series with an underground cable having a surge impedance of 100 Ohms. If a surge of 50 kV travels from the line end towards the line-cable junction, the value of the transmitted voltage wave at the junction is :
- (A) 20 kV (B) 30 kV  
(C) 80 kV (D) - 30 kV
30. A dc motor armature, supplied through phase controlled thyristors, receives a smoother voltage shape at :
- (A) rated motor speeds (B) low motor speeds  
(C) moderate motor speeds (D) higher motor speeds



31. ac to dc circulating current dual converters are operated with the following relationship between their triggering angles ( $\alpha_1$  and  $\alpha_2$ ) :
- (A)  $\alpha_1 - \alpha_2 = 180^\circ$  (B)  $\alpha_1 + \alpha_2 = 90^\circ$   
(C)  $\alpha_1 + \alpha_2 = 360^\circ$  (D)  $\alpha_1 + \alpha_2 = 180^\circ$
32. The lamp that cannot sustain much voltage fluctuations is :
- (A) incandescent lamp (B) sodium vapour lamp  
(C) mercury iodide lamp (D) mercury vapour lamp
33. The transfer function of a system is the Laplace transform of its :
- (A) step response (B) square wave response  
(C) impulse response (D) ramp response
34. The air-blast circuit breakers for 400 kV system are designed to operate in :
- (A) 100  $\mu$ s (B) 50 ms  
(C) 0.1 s (D) 0.5 s
35. During spot welding, the current flows for :
- (A) fraction of a minute  
(B) fraction of a second to several seconds  
(C) few milliseconds  
(D) few microseconds

36. A solar cell is actually a device which utilizes :
- (A) Photoconductive effect                      (B) Photovoltaic effect  
(C) Photoemissive effect                      (D) Photoresistive effect
37. Which semiconductor device, out of the following, is *not* a current triggered device ?
- (A) Thyristor                                      (B) GTO  
(C) TRIAC                                        (D) MOSFET
38. Carrier frequency gate drive is used for turn-on of a thyristor to reduce :
- (A)  $di/dt$                                       (B)  $dv/dt$   
(C) turn-on time                                (D) size of pulse transformer
39. For an UJT employed for triggering an SCR, standoff ratio is 0.64 and dc source voltage  $V_{BB}$  is 20 V. The UJT would trigger when the emitter voltage is :
- (A) 6.4 V                                        (B) 12.8 V  
(C) 6.55 V                                      (D) 13.1 V
40. A four quadrant operation requires :
- (A) two full converters in series  
(B) two full converters connected back to back  
(C) two full converters in parallel  
(D) two semi-converters connected back to back

41. Parallel operation of traction motors is easier with :
- (A) dc shunt motor
  - (B) dc series motor
  - (C) induction motor
  - (D) differential compound dc motor
42. High temperature metals such as columbium can be easily welded by :
- (A) MIG welding
  - (B) TIG welding
  - (C) Electron beam welding
  - (D) Flash butt welding
43. During load shedding :
- (A) System voltage is reduced
  - (B) System loads are switched off
  - (C) Both (A) and (B)
  - (D) None of these
44. In the load-frequency control system with free governor action, the increase in load demand under steady conditions is met :
- (A) Partly by increased generation and partly by decrease of load demand
  - (B) Only by increased generation by opening of steam valve
  - (C) Both (A) and (B)
  - (D) None of the above



45. In HVDC transmission, there are predominant :
- (A) current harmonics on ac side and voltage harmonics on dc side of converters
  - (B) current harmonics only on the dc side of the converters
  - (C) both (A) and (B)
  - (D) none of the above
46. For automatic drives, the preference is for :
- (A) Synchronous motors
  - (B) Ward-Leonard controlled dc shunt motors
  - (C) Plain squirrel cage induction motors
  - (D) Any of the above
47. For the speed control of ac drive, the preferred method using thyristors is :
- (A) phase control
  - (B) integral cycle control
  - (C) chopper control
  - (D) all are equally good
48. In rotating electrical machines, the insulation temperature limit for class B type is :
- (A) 105°C
  - (B) 130°C
  - (C) 150°C
  - (D) 180°C

49. The phase comparators in case of static relays and electromechanical relays normally are :

- (A) cosine and sine comparators respectively
- (B) sine and cosine comparators respectively
- (C) both are sine comparators
- (D) both are cosine comparators

50. The neutral of 10 MVA, 11 kV alternator is earthed through a resistance of 5 Ohms. The earth fault relay is set to operate at 0.75A. The CTs have a ratio of 1000/5. What percentage of the alternator winding is protected ?

- (A) 11.8%
- (B) 15%
- (C) 85%
- (D) 88.2%

51. Zero sequence current is used for relaying purposes only in the case of :

- (A) phase overcurrent relay
- (B) phase impedance relay
- (C) ground impedance relay
- (D) ground overcurrent relay

52. A bus-bar is rated by :
- (A) current only
  - (B) voltage only
  - (C) current, voltage and frequency
  - (D) current, voltage, frequency and short-circuit current
53. How many relays are used to detect interphase fault of a three-line system ?
- (A) One
  - (B) Two
  - (C) Three
  - (D) Six
54. With the rise in temperature, the insulation resistivity :
- (A) Reduces exponentially
  - (B) Reduces linearly
  - (C) Increases linearly
  - (D) Remains same
55. In the HVDC system, the ac harmonics which get(s) effectively eliminated with 12 pulse bridge converters, are :
- (A) Triplen harmonics
  - (B) Triplen and 5th harmonics
  - (C) Triplen, 5th and 7th harmonics
  - (D) 5th and 7th harmonics



56. The main criterion for selection of the size of a distributor for a radial distribution system is :
- (A) Voltage drop (B) Corona loss  
(C) Temperature rise (D) Capital cost
57. For constant voltage transmission, the voltage drop along the line is maintained constant by installing ..... at the receiving end.
- (A) capacitors (B) inductors  
(C) resistors (D) synchronous phase modifiers
58. For a fixed value of complex power flow in a transmission line having a sending voltage  $V$ , the real power loss will be proportional to :
- (A)  $V$  (B)  $V^2$   
(C)  $1/V^2$  (D)  $1/V$
59. Wavy structure of pin insulator increases its :
- (A) mechanical strength (B) puncture strength  
(C) flashover voltage (D) thermal strength
60. Doherty rate tariff is applied to :
- (A) domestic consumers (B) medium industrial consumers  
(C) bulk supplies (D) municipal loads

61. Which one of the following is FACTS device ?
- (A) UPQC (B) TCSC  
(C) SPS (D) SSSC
62. The daily energy produced in thermal power station is 720 MWh at a load factor of 0.6. What is the maximum demand of the station ?
- (A) 50 MW (B) 30 MW  
(C) 72 MW (D) 720 MW
63. The knowledge of diversity factor helps in computing :
- (A) Plant capacity (B) Average load  
(C) kWh generated (D) Peak demand
64. The speed regulation parameter  $R$  of a control area is 0.025 Hz/MW and load frequency constant  $D$  is 2 MW/Hz. The area frequency response characteristic (AFRC) is :
- (A) 2 MW/Hz (B) 20 MW/Hz  
(C) 40 MW/Hz (D) 42 MW/Hz

65. The public sector unit associated with the manufacturing of steam power plant equipment in India is :
- (A) N.T.P.C.
  - (B) Bharat Heavy Electricals Limited
  - (C) Heavy Engineering Corporation
  - (D) Neyveli Lignite Corporation
66. Zener diode is used as the main component in dc power supply for :
- (A) rectification
  - (B) voltage regulation
  - (C) both rectification and voltage regulation
  - (D) filter action
67. Avalanche breakdown is primarily dependent on the phenomenon of :
- (A) collision
  - (B) doping
  - (C) ionization
  - (D) recombination
68. What is maximum output voltage of a 3-phase bridge rectifier supplied with line voltage of 440 V ?
- (A) 528 V
  - (B) 396 V
  - (C) 594 V
  - (D) 616 V



69. The voltage gain of an ideal voltage follower is :
- (A) 1 (B)  $< 1$   
(C) 0 (D) infinity
70. The zero level detector is one application of :
- (A) differentiator (B) integrator  
(C) summing amplifier (D) comparator
71. Which of the following is *not* a component of PLL ?
- (A) VCO (B) Loop filter  
(C) Phase detector (D) Frequency multiplier
72. FSK demodulation is an application of :
- (A) BPF (B) Timer  
(C) PLL (D) None of these
73. In order to get best results per unit cost, the heat sinks on which the thyristors are mounted are made of :
- (A) nickel (B) stainless steel  
(C) aluminium (D) copper

74. In a thyristors dc chopper, which type of commutation results in best performance ?
- (A) Load commutation (B) Current commutation  
(C) Supply commutation (D) Voltage commutation
75. LEDs are fabricated from :
- (A) silicon (B) germanium  
(C) silicon or germanium (D) gallium arsenide
76. in order to build a MOD-12 counter, the minimum number of flip-flops needed is equal to :
- (A) 12 (B) 4  
(C) 3 (D) 1
77. What is the value of LSB of an 8-bit DAC for 0-12.8 V range ?
- (A) 1.6 V (B) 50 mV  
(C) 0.625 V (D) 1.28 V
78. In a digital voltmeter, the oscillator frequency is 400 kHz, the ramp voltage falls from 8 V to 2 V in 2 ms. The number of pulses counted by the counter is :
- (A) 8000 (B) 4000  
(C) 3200 (D) 1600

79. Active power is a function of .....
- (A) voltage phase angle (B) voltage magnitude  
(C) impedance (D) all of these
80. Load flow study yields a ..... solution to have the values of  $P_i$ ,  $Q_i$ ,  $\text{mag}(V)$  and voltage phase angle at each bus.
- (A) transient (B) dynamic  
(C) steadystate (D) any of these
81. Which of the following is a tributary of the Satluj river ?
- (A) Bather (B) Baner  
(C) Spiti (D) Beljedi
82. In which district of H.P. is Chanderkup lake ?
- (A) Shimla (B) Solan  
(C) Chamba (D) Kinnaur
83. According to 2011 census the density of population in H.P. is 123 persons per sq. km. In how many districts of the state it is below the state average ?
- (A) 3 (B) 4  
(C) 5 (D) 6

84. In which month does the annual Manimahesh Pilgrimage (of Chamba) usually begin ?
- (A) June (B) July  
(C) August (D) None of these
85. Where was a battle fought between Raja Bhim Chand of Kehlur and the Mughals during the last quarter of 17th century in which the Mughals were defeated ?
- (A) Mahal Morian (B) Nadaun  
(C) Bachhretu (D) Dhar Kot
86. Which Raja of Chamba founded the Chamba town ?
- (A) Meru Varman (B) Mushan Varman  
(C) Soma Varman (D) Sahil Varman
87. What is the architectural style of Hidimba temple of Manali ?
- (A) Pagoda (B) Pentroof  
(C) Nagara (D) Pala Art
88. Where is Jersey Cattle breeding Farm in Mandi District of H.P. ?
- (A) Bhangrotu (B) Kamand  
(C) Chauntra (D) Gopalpur



89. Who was the last ruling Raja of Sirmaur princely state ?  
(A) Raghubir Parkash (B) Shamsheer Parkash  
(C) Amar Parkash (D) Rajinder Parkash
90. Which of the following hydro-power project is in Private Sector in H.P. ?  
(A) Sumez (B) Gaj  
(C) Sissu (D) Thirot
91. There are two routes to Amarnath Shrine in J and K. One is via Pahalgam. The other is via .....
- (A) Atbattu (B) Qazigund  
(C) Satsar (D) Baltal
92. With which of the following is Pahlaj Nihalani associated ?  
(A) Film and Television Institute  
(B) Censor Board (Central Board of Film Certification)  
(C) CBSE  
(D) Election Commission of India
93. Which day is observed as National Sports Day in India ?  
(A) June 21 (B) July 4  
(C) August 29 (D) October 15
94. Who headed the committee which proposed that the policy of detention should be reinstated beyond class V examination in schools in India ?  
(A) Sudhir Mankad (B) Shailaja Chandra  
(C) T.S.R. Subramanian (D) J.S. Rajpal

95. With which of the following is Tintu Luka associated ?
- (A) Hockey (B) Athletics  
(C) Kabaddi (D) Table Tennis
96. What is the name of Turkey's airport where over 40 persons were killed in twin blasts followed by gun fire in June 2016 ?
- (A) Hasan (B) Hussain  
(C) Ataturk (D) Anatolia
97. In the recent referendum approximately what percentage of voters of Scotland voted in favour of staying in the European Union ?
- (A) 38 percent (B) 48 percent  
(C) 62 percent (D) none of these
98. In which country is the Headquarters of Red Cross ?
- (A) Switzerland (B) England (U.K.)  
(C) Austria (D) France
99. Who helped Baden Powell in setting up Girl Guide Movement ?
- (A) his wife (B) his mother  
(C) his sister (D) his niece
100. Who is President of Indonesia ?
- (A) Joko Widodo (B) Prabowd Subianto  
(C) General Suharto (D) None of these