

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

TEST BOOKLET
AP(ELECT.)-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 gives 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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P.T.O.

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1. Which of the following transducer requires a high input impedance preamplifier for proper measurement ?
(A) Thermocouple (B) Thermistor
(C) LVDT (D) Piezoelectric
2. The positive sequence current for a L-L fault of a 2 kV system is 1.4 kA, and corresponding current for a L-L-G fault is 2.2 kA. The zero sequence impedance of the system is :
(A) 62.75 Ω (B) 4.5275 Ω
(C) 5.275 Ω (D) 0.5275 Ω
3. Time graded protection of a radial feeder can be achieved by :
(A) Definite time relays
(B) Inverse time relays
(C) Both definite and inverse time relays
(D) None of the above
4. Zero sequence currents can flow from a line to transformer bank if the windings are in :
(A) Grounded star/delta (B) Delta/star
(C) Star/grounded star (D) Delta/delta

5. Shunt compensation in an EHV line is used to :
- (A) Improve stability
 - (B) Improve the voltage profile
 - (C) Reduce fault level
 - (D) Substitute for synchronous phase modifier
6. Unified Power Flow Controller (UPFC) is a :
- (A) Shunt-series FACTS controller
 - (B) Series-shunt FACTS controller
 - (C) Series-series FACTS controller
 - (D) Shunt-shunt FACTS controller
7. The value of boost factor is equal to unity when TCSC is operated in :
- (A) Capacitive Boost Mode
 - (B) Inductive Boost Mode
 - (C) Bypass Mode
 - (D) Blocking Mode

8. If, for a given alternator in economic operation mode, the incremental cost is given by :

$$IC = 0.012 P + 8 \text{ Rs/MW}, \frac{dP_L}{dP} = 0.2$$

and plant penalty factor (λ) = 25, then the power generation is :

- (A) 1000 MW (B) 1250 MW
(C) 750 MW (D) 1500 MW
9. If inductance and capacitance of a system are 1 H and 0.01 μF respectively and the instantaneous value of current interrupted is 10 A, then voltage across the breaker contacts will be :
- (A) 50 kV (B) 100 kV
(C) 60 kV (D) 75 kV
10. Commutation overlap in the phase controlled ac to dc converters is due to :
- (A) load inductance
(B) harmonic content of load current
(C) switching operation in the converter
(D) source inductance

11. Simplest method of eliminating third harmonic from the output voltage waveform of a single phase bridge inverter is to use :
- (A) Inverters in series (B) Single pulse modulation
(C) Stepped wave inverters (D) Multiple pulse modulation
12. A chopper can be used on :
- (A) Pulse width modulation only
(B) Frequency modulation only
(C) Amplitude modulation only
(D) Both PWM and FM
13. Normally Z_{BUS} matrix is a :
- (A) Null matrix (B) Sparse matrix
(C) Full matrix (D) Unity matrix
14. Compared to Gauss-Seidel method, Newton-Raphson 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 shunt reactor of 100 MVAR is operated at 98% of its rated voltage and at 96% of its rated frequency. The reactive power absorbed by the reactor is :
- (A) 98 MVAR (B) 10.402 MVAR
(C) 96.04 MVAR (D) 100.04 MVAR
16. A travelling wave 400/1/50 means crest value of :
- (A) 400 V with rise time of 1/50 s
(B) 400 kV with rise time 1 s and fall time 50 s
(C) 400 kV with rise time 1 μ s and fall time 50 μ s
(D) 400 MV with rise time 1 μ s and fall time 50 μ s
17. 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

18. The voltage ratio transfer function of an active filter is given by :

$$\frac{V_1(s)}{V_2(s)} = \frac{s^2 + c}{s^2 + as + b}$$

The circuit in a question is a

$$V_1(s)/V_2(s) = [(s^2 + c)/(s^2 + as + b)].$$

(A) Low pass filter

(B) High pass filter

(C) Band pass filter

(D) Band reject filter

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 isthan the carrier life time.

(A) Much higher

(B) Higher

(C) Smaller

(D) Much smaller

21. Which one of the following controls reduces the size of the transformer in a switch mode ac power supply ?
- (A) Resonant control
 - (B) Phase control
 - (C) Bidirectional control
 - (D) PWM control
22. The most suitable device for high frequency inversion in SMPS is :
- (A) BJT
 - (B) MOSFET
 - (C) IGBT
 - (D) GTO
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. Line regulation is determined by :

- (A) Load current
- (B) Load current and zener current
- (C) Changes in load resistance and output voltage
- (D) Changes in output voltage and input voltage

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 rad/sec^2 , the moment of inertia of the systems must be (neglecting viscous and Coulomb friction).

- (A) 0.25 kgm^2
- (B) 0.25 Nm^2
- (C) 4 kgm^2
- (D) 4 Nm^2

26. The phase controlled rectifiers used in speed control of dc motors converts fixed ac supply voltage into output voltage.

- (A) Variable dc
- (B) Variable ac
- (C) Variable frequency ac
- (D) Full rectified ac

27. Electrical circuit breaker is :

- (A) Connected between the current collector and the main wiring
- (B) Provided on the electric locomotive to protect the electrical equipment against excessive overloads automatically
- (C) Provided with a handle to trip it when it is moved to the OFF position by hand
- (D) All of the above

28. The type of braking used in electric traction is :

- (A) Mechanical braking
- (B) Vacuum brake system
- (C) Electro-pneumatic braking
- (D) Both mechanical and electropneumatic braking

29. The preferable method of speed control of linear induction motor is :

- (A) Variable flux control
- (B) PAM control
- (C) Variable frequency and variable voltage control
- (D) Variable frequency and constant voltage control

30. In a multivariable control system there is :
- (A) more than one input variable but one unique output
 - (B) one input variable but variable outputs
 - (C) more than one input variable or more than one output variable
 - (D) more than one input variable and more than one output variable
31. Radio interference from a fluorescent tube can be reduced by :
- (A) Connecting a small capacitor across starter terminals
 - (B) Eliminating choke
 - (C) Putting two tubes in parallel
 - (D) Any of the above
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. Which one of the following gives the transfer function of a phase-lag compensation network ?

(A) $\frac{1 + s\alpha T}{1 + sT}$; $\alpha < 1$

(B) $\frac{1 + s\alpha T}{1 + sT}$; $\alpha > 1$

(C) $\frac{1 + s\alpha T}{1 + sT}$; $\alpha = 1$

(D) $\frac{1 - s\alpha T}{1 + sT}$; $\alpha < 1$

34. The basic electrical requirement in arc welding is that there should be :

(A) Coated electrodes

(B) no arc blow

(C) dc power supply

(D) high open-circuit voltage

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

44. A lightning arrester provides :

- (A) low impedance path
- (B) high impedance path
- (C) low resistance path
- (D) high resistance path between line and earth during operation

45. A line trap in along transmission line is used to :

- (A) improve the power factor
- (B) confine the carrier signals in the line
- (C) dampen the overvoltage oscillations
- (D) protect the line against direct lightning stroke

46. Two input phase comparator in a static relay is made up of a :

- (A) transformer amplifier
- (B) transistor logic circuit
- (C) rectifier bridge
- (D) thyristors bridge

47. The earth fault in stator causes :

- (A) arcing to core
- (B) severe heating in conductors and thereby damaging the insulation
- (C) open circuit in the stator
- (D) both arcing to core and severe heating in conductors and thereby damaging the insulation

48. In HVDC transmission, there are predominant :

- (A) current harmonics on ac side and voltage harmonics on dc side of converters
- (B) voltage harmonics on ac side and current harmonics on dc side of converters
- (C) current harmonics only on the dc side of the converters
- (D) voltage harmonics only on the ac side of the converters

49. In compressed gas insulated cable, SF₆ has the gas pressure in the range of :

- (A) 10-20 mmHg
- (B) 80-100 mmHg
- (C) 3-5 kg/cm²
- (D) 40-50 kg/cm²

50. A mass curve can be plotted from :

- (A) load duration curve
- (B) chronological load curve
- (C) energy load curve
- (D) both load duration curve and chronological load curve

51. Power demand can be estimated approximately by :

- (A) Load survey method
- (B) Mathematical method
- (C) Economic parameters
- (D) Statistical method

52. Salvage value of a plant :

- (A) is always positive
- (B) is always zero
- (C) is always negative
- (D) may be positive, zero or negative

53. For a nuclear plant, the useful life is expected to be :

- (A) 10 years
- (B) 30 years
- (C) 60 years
- (D) 80 years

54. During load shedding :
- (A) System voltage is reduced
 - (B) System frequency is reduced
 - (C) System loads are switched off
 - (D) System power factor is changed
55. 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 decreases of load demand
 - (B) Partly by increased generation and partly by increased excitation
 - (C) Only by increased generation by opening of steam valve
 - (D) Only by decrease of load demand due to drop in system frequency
56. If the generating station is situated very close to the load centre, the penalty factor for this unit is :
- (A) zero
 - (B) almost unity
 - (C) negative
 - (D) very high

57. The resolution of a 12 bit D/A converter using a binary ladder with +10 V as the full scale output will be :
- (A) 2.44 mV (B) 3.50 mV
(C) 4.32 mV (D) 5.12 mV
58. For stable operation of interconnected system, the passive element that can be used as the interconnecting element is :
- (A) reactor (B) resistor
(C) capacitor (D) resistor and capacitor
59. As per recommendation of ISI, the maximum load that can be connected in one sub-circuit is :
- (A) 500 W (B) 800 W
(C) 1000 W (D) 1600 W
60. Non-metallic conduits used in internal wiring are generally made of :
- (A) wood (B) rubber
(C) PVC (D) cork

61. Which one of the following is custom power device ?

(A) UPFC

(B) TCSC

(C) SPS

(D) DVR

62. may be defined as the degree to which both the utilization and delivery of electric power affects the performance of electrical equipment.

(A) Power quality problem

(B) Power quality

(C) FACTS device

(D) Custom power device

63. Power transmission system may also have an impact on the quality of power.

This is because the modern transmission systems have a/an resistance to reactance ratio resulting in low system damping.

(A) zero

(B) low

(C) high

(D) infinite

64. A is any occurrence manifested in voltage, current or frequency deviation that may result in failure or mis-operation of customer equipment.

(A) Power quality problem

(B) Power quality

(C) FACTS device

(D) Custom power device

65. Custom power describes the value-added power that electric utilities will offer their customers in the future, focusing on the and

- (A) quality of power flow, reliability
- (B) power flow control, reliability
- (C) stability enhancement, reliability
- (D) quality of power flow, stability enhancement

66. Under full-load condition, the power factor of the rotor circuit is :

- (A) about 0.2 lagging
- (B) about 0.5 lagging
- (C) about 0.8 lagging
- (D) almost unity

67. For a 20 kW, 3-phase, 400 V induction motor, the no-load current is about :

- (A) 2 A
- (B) 10 A
- (C) 40 A
- (D) 100 A

68. Skewing of slots :

- (A) improves heat transfer
- (B) reduces noise
- (C) suppresses the undesirable harmonics
- (D) none of the above

69. Ward-Leonard control is basically a :

- (A) Voltage control method
- (B) Field diverter method
- (C) Shunt armature control
- (D) Armature resistance control method

70. An alternator with higher value of SCR has :

- (A) Poor voltage regulation and lower stability limit
- (B) Better voltage regulation and higher stability limit
- (C) Poor voltage regulation and higher stability limit
- (D) Better voltage regulation and lower stability limit

79. Reactive power is a function of

(A) voltage phase angle

(B) voltage magnitude

(C) active power

(D) resistance

80. Megger is an instrument for :

(A) measuring current

(B) measuring voltage

(C) testing insulation

(D) measuring power

81. Who published the *Vansavalis* of the Rajas of Kangra, Nurpur, Mandi, Suket, Chamba and Rajauri ?

(A) Vigne

(B) Alexander Cunningham

(C) Captain Harcourt

(D) Thomas Coryat

82. According to Hutchison and Vogel, what was the total number of Thakurains in the Shimla Hills ?

(A) 12

(B) 18

(C) 20

(D) 22

83. Which raja of Kullu subdued the Thakurs of his state, who has been constantly at strife with him, around the middle of sixteenth century ?

(A) Partap Singh

(B) Bahadur Singh

(C) Man Singh

(D) Jai Singh

84. At which place in Kinnaur District is Usha Devi temple ?

(A) Kamru

(B) Taranda

(C) Sangla

(D) Nichar

85. Which mountain pass joins Lahul and Bharmaur ?

(A) Chobia

(B) Hamtah

(C) Kugti

(D) Jalsu

86. Which river's tributary is Khara-ka-khala stream ?

(A) Bata

(B) Andhra

(C) Giri

(D) Markanda

87. In which district of H.P. is Talra Sanctuary ?

(A) Kinnaur

(B) Kullu

(C) Shimla

(D) Bilaspur

88. In which river basin is Thiroth hydro-power project ?

(A) Beas

(B) Satluj

(C) Ravi

(D) None of these

89. To which place did Major Mehar Dass who took active part in the Indian National Army (INA) belong ?

(A) Dharamsala

(B) Naharanpukhar

(C) Neri

(D) Chadiyar

90. As per advance estimates (based on economic performance upto December, 2015), what is expected to be the rate of economic growth in H.P. during 2015-16 ?

(A) 7.0 percent

(B) 7.5 percent

(C) 7.7 percent

(D) 8.1 percent

91. When was *Pradhan Mantri Saansad Adarsh Gram Yojna* launched ?

(A) August, 2014

(B) October, 2014

(C) February, 2015

(D) None of these

92. Who was sworn in as the Chief Minister of Kerala after the 2016 Vidhan Sabha elections ?

(A) Pinyari Vijayan

(B) P. Sathasivam

(C) V.S. Achutanandan

(D) Ooman Chandy

93. In which district of Maharashtra is Shani Shingnapur temple ?

(A) Nanded

(B) Amravati

(C) Ahmednagar

(D) Akola

94. In the Forbes 2016 list of most powerful businesswomen in Asia, who among the following is at the top among eight Indian business women ?

- (A) Arundhati Bhattacharya (B) Nita Ambani
(C) Chanda Kochhar (D) Deepali Goenka

95. When was Reserve Bank of India nationalised ?

- (A) 1947 (B) 1949
(C) 1956 (D) 1963

96. Who is Tsai Ing-Wen ?

- (A) First woman President of Taiwan
(B) President of South Korea
(C) Chief Executive of Hong Kong
(D) President of Vietnam

97. What was the venue of Shanghai Cooperation Organisation Summit which was held in July, 2015 ?

(A) UAE

(B) USA

(C) UFA

(D) UPA

98. Which day is observed as world day to combat desertification and drought ?

(A) March 15

(B) June 17

(C) August 19

(D) November 21

99. Among the following which country has the lowest life expectancy ?

(A) Zimbabwe

(B) Zambia

(C) Lesotho

(D) Sierra Leone

100. Government of which country controls nearly everything about how people live; so much so that there are nearly 28 Government approved haircut styles ?

(A) Cuba

(B) Vietnam

(C) North Korea

(D) Kiribati