HPPPSC

Previous Year Paper
AE EE 2019 23 June

1. What was the per capita income in H.P. in real terms (at 2011-12 prices) during 2016-17 in rupees ?

(A) 77826 (B) 82229

(C) 94731 (D) 103870

2. Hydropower projects of which generation capacity are given preference to the investors belonging to the state in H.P. ?

(A) More than 2 MW but upto 3 MW

(B) More than 2 MW but upto 4 MW

(C) More than 2 MW but upto 5 MW

(D) More than 2 MW but upto 10 MW

3. In which region of Shimla District is Chanshal which is proposed to be developed as tourist destination ?

(A) Chopal (B) Jubbal

(C) Rohru (D) Rampur

4. Which one among the following districts of H.P. is *not* included in the scheme relating to formation/promotion of farmer producer organisations ?

(A) Hamirpur (B) Chamba

(C) Solan (D) Kullu

5. What is the average size of agricultural holdings in H.P. ?

(A) Less than one hectare (B) One hectare

(C) 1.5 hectares (D) Two hectares

6. Which agency is providing financial assistance to the H.P. Government under Mid Himalayan Watershed Development Project ?

(A) World Bank (B) IMF

(C) KFW (D) Asian Development Bank

7. At which place in Kangra district of H.P. a state of Art Industrial Area is being developed ?

(A) Kandrori (B) Nelti

(C) Harchakian (D) Dehra

8. Out of 14 silk yarn reeling units that have been set-up in H.P. in the private sector, how many are there in Kinnaur district ?

(A) Three (B) Two

(C) One (D) Nil

9. According to 2011 census what is the literacy rate in H.P ?

(A) 82.80 (B) 84.20

(C) 86.25 (D) 90.10

10. How many ITIs in H.P. are covered for up-gradation as centres of excellence and general up-gradation under VTIP ?

(A) 10 (B) 14

(C) 16 (D) 20

11. How many seats did the Congress Party win in Chhattisgarh during the 2018 Assembly elections ?

(A) 64 (B) 65

(C) 67 (D) 68

12. In which state of India is Jalli Kattu (bull fight) festival popular ?

(A) Kerala (B) Tamil Nadu

(C) Karnataka (D) Telangana

13. At which place in India is historic monument Bibi Ka Maqbara ?

(A) Ajmer (B) Hyderabad

(C) Aurangabad (D) Agra

14. Who is the Director of Atal Innovation Mission (AIM) ?

(A) M.S. Swaminathan
(B) R. Ramanan
(C) Indranil Manna
(D) Avik Chakraberty

15. What is the name of the communication satellite which India launched on December 05, 2018 ?

(A) GSAT-9
(B) GSAT-10
(C) GSAT-11
(D) GSAT-12

16. In which constitutional monarchy the throne changes hands every five years among royalty of the country ?

(A) Malaysia
(B) Bahrain
(C) Abu Dhabi
(D) Kuwait

17. With whom did Nadia Murad share the 2018 Nobel Prize for peace ?

(A) Paul Romar
(B) Gregory Winter
(C) Frances Arnold
(D) Denis Mukwego

18. When did Lincoln give his famous Getteysberg address at the end of American Civil War ?

(A) November 19, 1861
(B) November 19, 1862
(C) November 19, 1863
(D) November 19, 1864

19. Which one of the following countries is NOT considered as a part of Nordic countries ?

(A) Norway
(B) Sweden
(C) Denmark
(D) Greenland

20. Where is the Headquarters of International Court of Justice ?

(A) Paris
(B) The Hague
(C) New York
(D) Brussels

21. In a network made up of linear resistors and ideal voltage sources, values of all resistors are doubled. Then the voltage across each resistor is :

(A) Doubled
(B) Not changed
(C) Halved
(D) Decreases four times

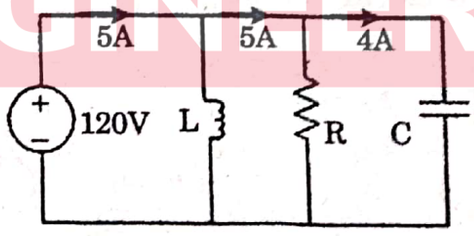
22. The current enters to the positive terminal of a device is $i(t) = 20\ e^{-4t}$ amps, and the voltage across the device is $v(t) = 3\ d(i)/dt$ volt. The amount of the charge delivered (in C) to the device between $t = 0$ and $t = 2$ seconds.

(A) 4.90–5.0
(B) 9.90–10.0
(C) 79–80
(D) 39–40

23. The current enters to the positive terminal of a device is $i(t) = 20\ e^{-4t}$ amps, and the voltage across the device is $v(t) = 3\ d(i)/dt$ volt. The amount of energy absorbed (in Joule) in between $t = 0$ and $t = 2$ seconds is in the range of :

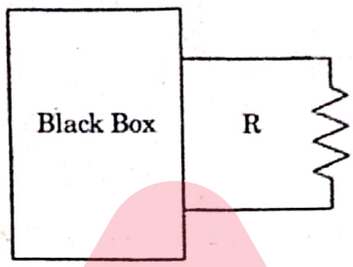
(A) – 589 to – 590
(B) – 599 to – 600
(C) – 4711 to – 4713
(D) – 149 to – 151

24. In the circuit shown in the given figure, the current through the inductor L is :



(A) 0 A
(B) 3 A
(C) 4 A
(D) 8 A

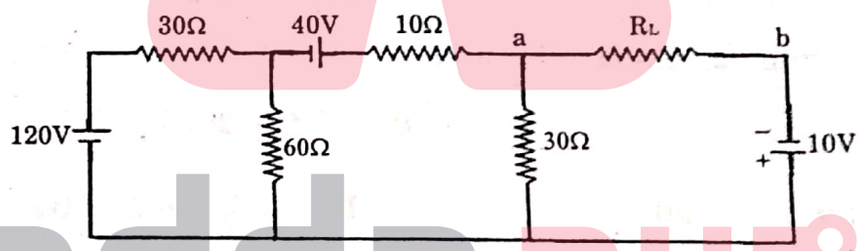
25. For the circuit shown in figure below, the black box contains resistors and independent sources only, the current I is 1.5 and 0.75 A for R = 0 and R = 2Ω respectively. For R = 1, what is the current I (in A) ?



(A) 1 (B) 2

(C) 3 (D) 4

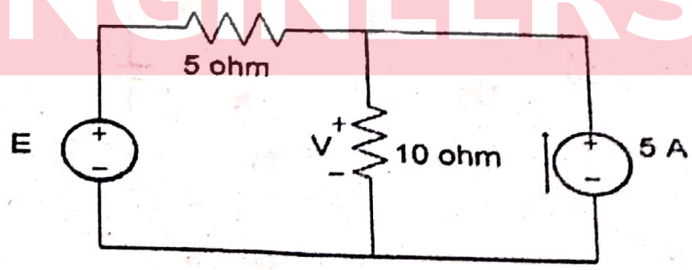
26. Find the value of R_L in circuit given below for which maximum power is to be delivered at load.



(A) 15Ω (B) 20Ω

(C) 25Ω (D) 22Ω

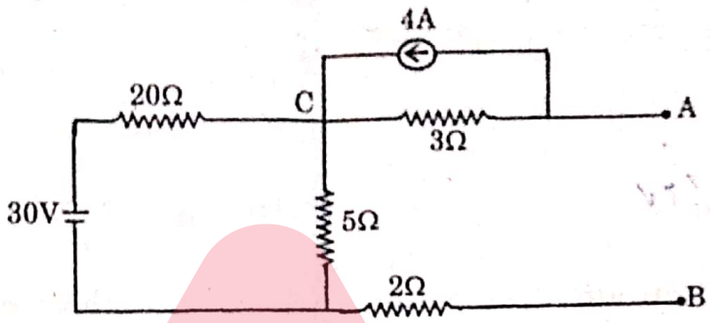
27. If the voltage V across 10Ω resistance is 10 V, what is the voltage E of the voltage source in the circuit shown below ?



(A) –50 V (B) +50 V

(C) +10 V (D) –10 V

28. Find V_{th} in the circuit given below :



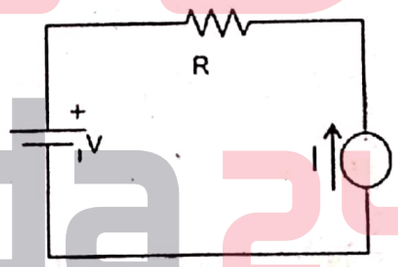
(A) 25 V

(B) 6 V

(C) 10 V

(D) 23 C

29. For the network shown in the figure below, what is the voltage across current source ?



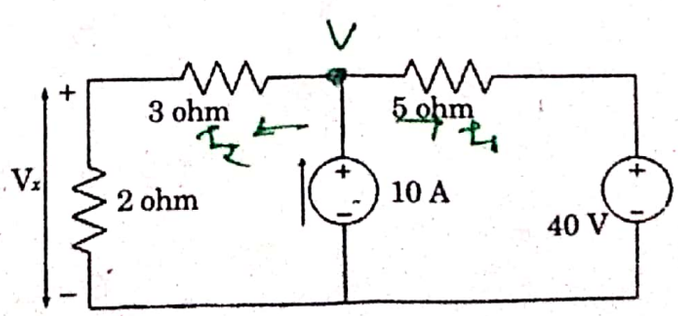
(A) V – RI

(B) Zero

(C) V + RI

(D) RI – V

30. The voltage V_x across the 2Ω resistance in the circuit is :



(A) 16 V

(B) 60 V

(C) 18 V

(D) 10 V

31. The number of independent KVL and KCL equations for a network with n-nodes and l-links are respectively.

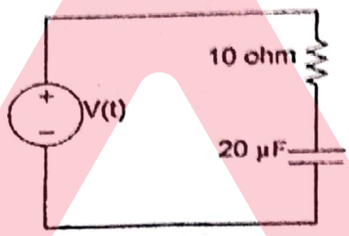
(A) l and n

(B) l and $(n - l)$

(C) $(n - l)$ and l

(D) $(n - l)$ and $(l - l)$

32. In the given RC circuit, the current $i(t) = 2 \cos 5000t$ A. The applied voltage $v(t)$ is :



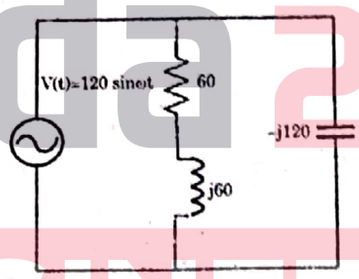
(A) 28.28 cos $(5000t - 45°)$ V

(B) 28.28 cos $(5000t + 45°)$ V

(C) 28.28 sin $(5000t - 45°)$ V

(D) 28.28 sin $(5000t + 45°)$ V

33. For the a.c. circuit given below what is the value of I ?



(A) 1 + j1

(B) 1 + j0

(C) 0 + j0

(D) 0 − j1

34. Power dissipation in ideal inductor is :

(A) Maximum

(B) Minimum

(C) Zero

(D) Finite value

35. RMS value is defined based on which of the following ?

(A) Heating effect
(B) Charge transfer
(C) Current
(D) Voltage

36. Form factor is equal to peak factor in case of :

(A) Square wave
(B) Triangle wave
(C) Sawtooth wave
(D) Sinusoidal wave

37. At what frequency will an inductor of 5 mH have the same reactance as a capacitor of 0.1 μF ?

(A) 7.12 GHz
(B) 7.12 Hz
(C) 7.12 MHz
(D) 7.12 kHz

38. To obtain wide bandwidth, network is designed with which of the following :

(A) High Q factor
(B) Low Q factor
(C) Unity Q factor
(D) Zero Q factor

39. In an RLC circuit susceptance is equal to :

(A) 1/X
(B) 1/R
(C) X/Z^2
(D) R/Z^2

40. The RMS value of the voltage $u(t) = 3 + 4\cos(3t)$ is :

(A) $\sqrt{17}$ V
(B) 5 V
(C) 7 V
(D) $(3 + 2\sqrt{2})$ V

41. Q factor of a series RLC circuit possessing resonant frequency of 10 Hz and bandwidth of 5 Hz is :

(A) 0.5 (B) 2

(C) 2.5 (D) 50

42. Three equal impedance are first connected in delta across a 3-phase balanced supply. If the same impedances are connected in star across the same supply then :

(A) Phase current will be one-third

(B) Line current will be one-third

(C) Power consumed will be one-third

(D) Phase current will remain the same

43. A 3-phase, 4-wire system supplies power to a balanced star-connected load. The current in each phase is 15 A. The current in the neutral wire will be :

(A) 15 A (B) 45 A

(C) 8.66 A (D) 0 A

44. A 3-phase 3-wire supply feeds a star connected load consisting of 3 equal resistors. If one of the resistors is to be removed, then what is the reduction in power as compared to the original power ?

(A) 25% of the original power (B) 33.3% of the original power

(C) 50% of the original power (D) 66.6% of the original power

45. A 3-phase delta-connected symmetrical load consumes P watt of power from a balanced supply. If the same load is connected in star to the same supply, then what is the power consumption ?

(A) P/3 (B) P

(C) $\sqrt{3}$ P (D) 3P

46. A balanced delta connected load has an impedance of $9\angle 30°\ \Omega$ per phase. What is the impedance per phase of its equivalent star ?

(A) $27\angle 30°\ \Omega$ (B) $9\angle 90°\ \Omega$

(C) $3\angle 30°\ \Omega$ (D) $3\angle 20°\ \Omega$

47. Two resistors of equal value are connected in series across the lines B and C of a symmetrical 3-phase 400-V system. What is the magnitude of the voltage between the line A and the junction of the resistors ?

(A) $400\sqrt{3}$ (B) $200\sqrt{3}$

(C) $400/3$ (D) $100\sqrt{3}$

48. Two wattmeters are used to measure the power in a 3-phase balanced system. What is the power factor of the load when one wattmeter reads twice the other ?

(A) 0 (B) 0.5

(C) 0.866 (D) 1

49. The advantage of PMMC instrument is that it :

(A) is free from friction error

(B) has low torque-to-weight ratio

(C) has high torque-to-weight ratio of moving parts

(D) can be used on both AC and DC

50. The following is *not* essential for the working of an indicating instrument :

(A) Deflecting torque (B) Braking torque

(C) Damping torque (D) Controlling torque

51. A current $I = 5 + 14.14 \sin (314t + 45°)$ is passed through a centre-zero PMMC, hot wire and moving iron instrument, the respective readings are :

(A) -5, 15 and $\sqrt{125}$

(B) $-5, \sqrt{125}$ and 19.14

(C) 5, 10, 10

(D) 5, $\sqrt{125}$ and $\sqrt{125}$

52. A spring controlled moving iron voltmeter draws a current of 1 mA for full scale value of 100 V. If it draws a current of 0.5 mA, the meter reading is :

(A) 50 V

(B) 100 V

(C) 25 V

(D) 200 V

53. A moving coil instrument of resistance 5Ω requires a potential difference of 75 mV to give a full scale deflection of 75 mV to give a full scale deflection. The value of shunt resistance needed to give a full scale deflection of 30 A is :

(A) 2.5 mΩ

(B) 9.99 Ω

(C) 5 Ω

(D) 9.95 Ω

54. The pressure coil of an induction type energy meter is :

(A) Highly resistive

(B) Highly inductive

(C) Purely resistive

(D) Purely inductive

55. Creep error may occur in induction type energy meter due to :

(A) Incorrect position of brake magnet

(B) Overvoltage across voltage coil

(C) Increase in temperature

(D) Incorrect adjustment of position of shading band

56. Materials which lack permanent magnetic dipoles are known as :

(A) Paramagnetic

(B) Diamagnetic

(C) Ferromagnetic

(D) Ferrimagnetic

57. Unit of retentivity is :

(A) Ampere turn

(B) Ampere turn/meter

(C) Weber

(D) Wb/m^2

58. Substances having permeability less than the permeability of free space are known as :

(A) Diamagnetic (B) Bipolar

(C) Paramagnetic (D) Ferromagnetic

59. If Cu loss of transformer at 7/8th full load is 4900 W, then its full load Cu loss (in Watt) would be :

(A) 5600 (B) 6400

(C) 375 (D) 429

60. When a 400 Hz transformer is operated at 50 Hz, its kVA rating is :

(A) Reduced to 1/8 times (B) Increased 8 times

(C) Reduced to 8 times (D) Increased by 1/8 times

61. The full load copper-loss and iron-loss of a transformer are 6400 W and 5000 W respectively. The copper-loss and iron-loss at half load will be, respectively :

(A) 3200 W and 2500 W (B) 3200 W and 5200 W

(C) 1600 W and 1250 W (D) 1600 W and 5000 W

62. If the iron core of a transformer is replaced by an air core, then the hysteresis losses in the transformer will :

(A) Increase (B) Decrease

(C) Remain unchanged (D) Become zero

63. A 500 kVA transformer has constant losses of 500 W and copper losses at full load are 2000 W. Then at what load, is the efficiency maximum ?

(A) 250 kVA (B) 500 kVA

(C) 1000 kVA (D) 125 kVA

64. A 200 V/100 V, 50 Hz transformer is to be excited at 40nHz from 100 V side. For the exciting current to be the same, the applied voltage should be :

(A) 150 V (B) 80 V

(C) 100 V (D) 125 V

65. A single-phase two winding transformer is designed to operate at 400/200 V. 50 Hz. If the h.v. side is now energized from a 400 V, 40 Hz source, the no load l.v. side voltage would be :

(A) 300 V
(B) 250 V
(C) 200 V
(D) 150 V

66. A 100 VA, 120/12 V transformer is to be connected so as to form a step-up transformer. A primary voltage of 120 V is applied to the transformer. What is the secondary voltage of the transformer ?

(A) 1.2 V
(B) 12 V
(C) 120 V
(D) 132 V

67. Generally the no-load losses of an electrical machine is represented in its equivalent circuit by a :

(A) Series resistance with low value
(B) Parallel resistance with high value
(C) Parallel resistance with low value
(D) Series resistance with high value

68. The use of higher flux density in the transformer design.

(A) Reduces the weight per kVA
(B) Increases the weight per kVA
(C) Has no relation with the weight of transformer
(D) Increases the weight per kW

69. If P_1 and P_2 be the iron and copper losses of a transformer at full load and the maximum efficiency of the transformer is at 75% of the full load, then what is the ratio of P_1 and P_2 ?

(A) 9/16
(B) 10/16
(C) 3/4
(D) 3/16

70. A 5 kW, 200 V dc shunt motor has armature resistance of 1Ω and shunt field resistance of 100 Ω. At no-load, the motor draws 6A from 200V supply and runs at 1000 rpm. What is the total copper loss of the machine ?

(A) 400 W
(B) 16 W
(C) 36 W
(D) 416 W

71. The induced emf of a dc machine running at 750 rpm is 220 V. The percentage increase in field flux for generating an induced emf of 250 V at 700 rpm would be :

(A) 7%
(B) 11.25%
(C) 21.7%
(D) 42.4%

72. The dc series motor is accidentally connected to single-phase a.c. supply. The torque produced will be :

(A) of zero average value
(B) oscillating
(C) steady and unidirectional
(D) pulsating and unidirectional

73. In case of dc motor, maximum mechanical power is developed when back emf equals :

(A) The applied voltage
(B) Half the applied voltage
(C) One-third of the applied voltage
(D) Double the applied voltage

74. Wave winding is employed in a d.c. machine of :

(A) High current and low voltage rating
(B) Low current and high voltage rating
(C) High current and high voltage rating
(D) Low current and low voltage rating

75. DC generator principle follows :

(A) Fleming right hand Rule (B) Fleming left hand Rule

(C) Lenz law (D) Lorenz force

76. A 3-phase, 440 V, 50 hp. 50 Hz induction motor runs at 1,450 rpm when it delivers rated output power. Determine rotor induced voltage (in V) if stator to rotor turn ratio is 1 : 0.80. Assume the winding factors are the same.

(A) 11.70 – 11.80 (B) 11.30 – 11.40

(C) 12.70 – 12.80 (D) 12.30 – 12.40

77. What is the operating slip of a 400 V, 50 Hz, 6-pole, 3-phase induction motor, while the speed is 936 r.p.m. with a 400 V, 48 Hz, 3-phase supply ?

(A) 0.036 (B) 0.064

(C) 0.025 (D) 0.075

78. An induction motor having 8 poles runs at 727.5 rpm. If the supply frequency is 50 Hz, the emf in the rotor will have a frequency of :

(A) 1.5 Hz (B) 48.5 Hz

(C) 51.5 Hz (D) 75 Hz

79. If the load on an induction motor is increased from no-load to full load, its slip and the power factor will, respectively.

(A) Decrease, decrease (B) Decrease, increase

(C) Increase, decrease (D) Increase, increase

80. A smaller air gap in a polyphase induction motor helps to :

(A) Reduce the chances of crawling

(B) Reduce the magnetising current

(C) Increase the starting torque

(D) Reduce the chances of cogging

81. Slip of an induction motor increases with :

(A) Increase in current and decrease in torque

(B) Decrease in current and torque

(C) Decrease in current and increase in torque

(D) Increase in current and torque

82. A 8 pole single-phase induction motor is running at 690 rpm. What is its slip with respect to forward and backward fields, respectively ?

(A) 0.08, 2.0

(B) 0.08, 1.92

(C) 1.92, 0.08

(D) 2.0, 0.08

83. In a split phase motor, the running winding should have :

(A) high resistance and low inductance

(B) High resistance and high inductance

(C) Low resistance and high inductance

(D) Low resistance and low inductance

84. Which one of the following is the type of single-phase induction motor having the highest power factor at full load ?

(A) Shaded pole type

(B) Split-phase type

(C) Capacitor start type

(D) Capacitor-run type

85. If the field of a synchronous motor is under excited, the power factor will be :

(A) Lagging

(B) Leading

(C) Unity

(D) More than unity

86. In a cylindrical rotor synchronous machine, the phasor addition of stator and rotor mmf is possible because :

(A) Two mmfs are rotating in opposite direction

(B) Two mmfs are rotating in same direction at same speed

(C) Two mmfs are stationary with respect to each other

(D) One mmf is stationary and the other mmf is rotating

87. A 10 pole, 25 Hz alternator is directly coupled to and is driven by 60 Hz synchronous motor. What is the number of poles for the synchronous motor ?

(A) 24 (B) 12

(C) 48 (D) 16

88. Power factor of an alternator driven by constant prime mover input can be changed by changing its :

(A) Speed (B) Field excitation

(C) Load (D) Phase sequence

89. A 440 V, 3-phase, 10 pole and 50 Hz synchronous motor delivering s torque of $50/\pi$ Nm, delivers a power of :

(A) 50 W (B) 500 W

(C) 1000 W (D) 2000 W

90. A 500 MW, 13.8 kV star connected synchronous generator at 0.8 p.f. will deliver a full load current of :

(A) 12.1 kA (B) 21.0 kA

(C) 26.15 kA (D) 46.5 kA

91. In synchronous motor V curves present the variation of :

(A) Armature current with field excitation

(B) Armature current with maximum power developed

(C) Field excitation with stalling torque

(D) Field excitation with maximum power developed

92. The number of electrical degrees passed through in one revolution of a six pole synchronous alternator is :

(A) 720 (B) 1800

(C) 3600 (D) 1080

93. An alternator is generating power at 210 V per phase while running at 1500 rpm. If the speed of an alternator drops to 1000 rpm the generated voltage per phase will be :

(A) 140 V (B) 150 V

(C) 110 V (D) 230 V

94. Negative voltage regulation can be expected in case of :

(A) High speed alternator
(B) Slow speed alternator
(C) Leading power factor load
(D) Lagging power factor load

95. The cable best suited for the transmission of voltages from 33 kV to 66 k is.....

(A) Belted cables
(B) Screened cables
(C) Pressure cables
(D) None of these

96. Transmission efficiency of a transmission line increases with the.....

(A) Decrease in power factor and voltage
(B) Increase in power factor and voltage
(C) Increase in power factor but decrease in voltage
(D) Increase in voltage and decrease in power factor

97. By increasing to transmission voltage to double of its original value the sa power can be dispatched keeping the line loss :

(A) Equal to original value
(B) Half the original value
(C) Double the original value
(D) One-fourth of original value

98. Distributors are designed from the point of view of :

(A) Its current carrying capacity
(B) Operating voltage
(C) Voltage drop in it
(D) Operating frequency

99. Feeder is designed mainly from the point of view of :

(A) Its current carrying capacity
(B) Operating voltage
(C) Voltage drop in it
(D) Operating frequency

100. A 3-phase 4 wire system is commonly used for :

(A) Primary distribution
(B) Secondary distribution
(C) Primary transmission
(D) Secondary transmission