Voice Principal/Superintendent ITI-Comp. Exam 2024 (Skill & Enterpreneur Dept.)

416225

SPV-25

पुस्तिका में पृष्ठों की संख्या	: 24
Number of Pages in Booklet	: 24
पुस्तिका में प्रश्नों की संख्या	: 150
No. of Questions in Booklet	: 150

प्रश्न–पुस्तिका संख्या व बारकोड /
Question Booklet No. & Barcode

इस प्रश्न-पुस्तिका को तब तक न खोलें जब तक कहा न जाए। Do not open this Question Booklet until you are asked to do so.

Paper Code : 04 **Sub : Electrical Engineering**

समय : 02:30 घण्टे + 10 मिनट अतिरिक्त* Exam Date - 30/7/2025 **अधिकतम अंक : 150**

Time : 02:30 Hours + 10 Minutes Extra* **Maximum Marks : 150**

प्रश्न–पुस्तिका के पेपर की सील/पॉलिथीन बैग को खोलने पर प्रश्न–पत्र हल करने से पूर्व परीक्षार्थी यह सुनिश्चित कर लें कि :

- प्रश्न–पुस्तिका संख्या तथा ओ.एम.आर. उत्तर–पत्रक पर अंकित बारकोड संख्या समान हैं।
- प्रश्न–पुस्तिका एवं ओ.एम.आर. उत्तर–पत्रक के सभी पृष्ठ व सभी प्रश्न सही मुद्रित हैं। समस्त प्रश्न, जैसा कि ऊपर वर्णित है, उपलब्ध हैं तथा कोई भी पृष्ठ कम नहीं है/ मुद्रण त्रुटि नहीं है।

किसी भी प्रकार की विसंगति या दोषपूर्ण होने पर परीक्षार्थी वीक्षक से दूसरा प्रश्न–पत्र प्राप्त कर लें। यह सुनिश्चित करने की जिम्मेदारी अभ्यर्थी की होगी। परीक्षा प्रारम्भ होने के 5 मिनट पश्चात् ऐसे किसी दावे/आपत्ति पर कोई विचार नहीं किया जायेगा।

On opening the paper seal/polythene bag of the Question Booklet before attempting the question paper, the candidate should ensure that :

- **Question Booklet Number and Barcode Number of OMR Answer Sheet are same.**
- **All pages & Questions of Question Booklet and OMR Answer Sheet are properly printed. All questions as mentioned above are available and no page is missing/misprinted.**

If there is any discrepancy/defect, candidate must obtain another Question Booklet from Invigilator. Candidate himself shall be responsible for ensuring this. No claim/objection in this regard will be entertained after five minutes of start of examination.

परीक्षार्थियों के लिए निर्देश

1. **प्रत्येक प्रश्न के लिये एक विकल्प भरना अनिवार्य है।**
2. **सभी** प्रश्नों के अंक समान हैं।
3. प्रत्येक प्रश्न का मात्र **एक** ही उत्तर दीजिए। एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
4. **OMR** उत्तर-पत्रक इस प्रश्न-पुस्तिका के अन्दर रखा है। जब आपको प्रश्न-पुस्तिका खोलने को कहा जाए, तो उत्तर-पत्रक निकाल कर ध्यान से केवल **नीले बॉल पॉइंट पेन** से विवरण भरें।
5. कृपया अपना रोल नम्बर ओ.एम.आर. उत्तर-पत्रक पर सावधानीपूर्वक सही भरें। गलत रोल नम्बर भरने पर परीक्षार्थी स्वयं उत्तरदायी होगा।
6. **ओ.एम.आर. उत्तर-पत्रक में करेक्शन पेन/व्हाईटनर/सफेदा का उपयोग निषिद्ध है।**
7. **प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा।** गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है।
8. **प्रत्येक प्रश्न के पाँच विकल्प दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4, 5 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले (बबल) को उत्तर-पत्रक पर नीले बॉल पॉइंट पेन से गहरा करना है।**
9. **यदि आप प्रश्न का उत्तर नहीं देना चाहते हैं तो उत्तर-पत्रक में पाँचवें (5) विकल्प को गहरा करें। यदि पाँच में से कोई भी गोला गहरा नहीं किया जाता है, तो ऐसे प्रश्न के लिये प्रश्न अंक का 1/3 भाग काटा जायेगा।**
10. *** प्रश्न-पत्र हल करने के उपरांत अभ्यर्थी अनिवार्य रूप से ओ.एम.आर. उत्तर-पत्रक जाँच लें कि समस्त प्रश्नों के लिये एक विकल्प (गोला) भर दिया गया है। इसके लिये ही निर्धारित समय से 10 मिनट का अतिरिक्त समय दिया गया है।**
11. **यदि अभ्यर्थी 10% से अधिक प्रश्नों में पाँच विकल्पों में से कोई भी विकल्प अंकित नहीं करता है तो उसको अयोग्य माना जायेगा।**
12. **मोबाइल फोन अथवा अन्य किसी इलेक्ट्रोनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।**

चेतावनी : अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराते हुए **राजस्थान सार्वजनिक परीक्षा (भर्ती में अनुचित साधनों की रोकथाम अध्युपाय) अधिनियम, 2022 तथा अन्य प्रभावी कानून एवं आयोग के नियमों-प्रावधानों** के तहत कार्यवाही की जाएगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

INSTRUCTIONS FOR CANDIDATES

1. **It is mandatory to fill one option for each question.**
2. **All** questions carry equal marks.
3. Only **one** answer is to be given for each question. If more than **one** answers are marked, it would be treated as wrong answer.
4. The **OMR** Answer Sheet is inside this Question Booklet. When you are directed to open the Question Booklet, take out the Answer Sheet and fill in the particulars carefully with **Blue Ball Point Pen** only.
5. Please correctly fill your Roll Number in **OMR** Answer Sheet. Candidates will themselves be responsible for filling wrong Roll No.
6. **Use of Correction Pen/Whitener in the OMR Answer Sheet is strictly forbidden.**
7. **1/3 part of the mark(s) of each question will be deducted for each wrong answer.** A wrong answer means an incorrect answer or more than one answers for any question.
8. **Each question has five options marked as 1, 2, 3, 4, 5. You have to darken only one circle (bubble) indicating the correct answer on the Answer Sheet using BLUE BALL POINT PEN.**
9. **If you are not attempting a question then you have to darken the circle '5'. If none of the five circles is darkened, one third (1/3) part of the marks of question shall be deducted.**
10. *** After solving question paper, candidate must ascertain that he/she has darkened one of the circles (bubbles) for each of the questions. Extra time of 10 minutes beyond scheduled time, is provided for this.**
11. **A candidate who has not darkened any of the five circles in more than 10% questions shall be disqualified.**
12. **Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt with as per rules.**

Warning : If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would be liable to be prosecuted under **Rajasthan Public Examination (Measures for Prevention of Unfair means in Recruitment) Act, 2022 & any other laws applicable and Commission's Rules-Regulations.** Commission may also debar him/her permanently from all future examinations.

उत्तर–पत्रक में दो प्रतियाँ हैं – मूल प्रति और कार्बन प्रति। परीक्षा समाप्ति पर परीक्षा कक्ष छोड़ने से पूर्व परीक्षार्थी उत्तर–पत्रक की दोनों प्रतियाँ वीक्षक को सौंपेंगे, परीक्षार्थी स्वयं कार्बन प्रति अलग नहीं करें। वीक्षक उत्तर–पत्रक की मूल प्रति को अपने पास जमा कर, कार्बन प्रति को मूल प्रति से कट लाइन से मोड़ कर सावधानीपूर्वक अलग कर परीक्षार्थी को सौंपेंगे, जिसे परीक्षार्थी अपने साथ ले जायेंगे। परीक्षार्थी को उत्तर–पत्रक की कार्बन प्रति चयन प्रक्रिया पूर्ण होने तक सुरक्षित रखनी होगी एवं आयोग द्वारा माँगे जाने पर प्रस्तुत करनी होगी।

1. In an RL circuit R = 20 Ω while L = 60 mH. The input current lag the supply voltage by 60 degree. Obtain value of applied frequency.

(1) 91.93 Hz

(2) 108.41 Hz

(3) 93.91 Hz

(4) 41.10 Hz

(5) Question not attempted

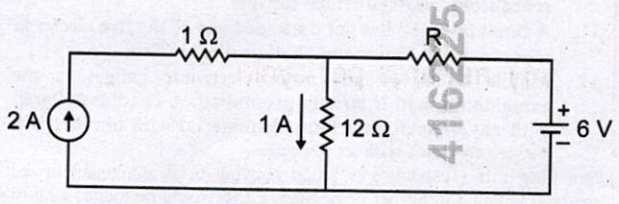
2. A conductor 1.5 m long carries a current of 50 A at right angle to magnetic field of density 1.2 T. Calculate the force on the conductor.

(1) 30 N (2) 40 N

(3) 90 N (4) 60 N

(5) Question not attempted

3. If the 12 Ω resistor draws a current of 1 A as shown in the figure, the value of resistance R is

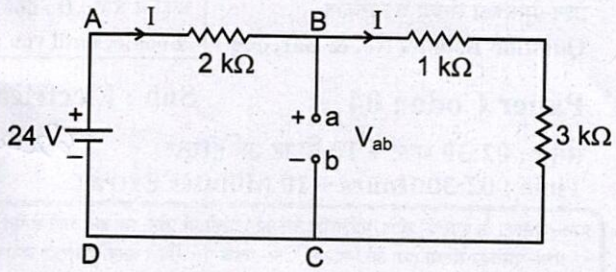


(1) 4 Ω (2) 6 Ω

(3) 8 Ω (4) 18 Ω

(5) Question not attempted

4. Use Kirchhoff's voltage law to find the voltage "V_{ab}" in figure



(1) 16 V (2) 24 V

(3) 8 V (4) 10 V

(5) Question not attempted

5. According to Thevenin's Theorem, any Linear Circuit can be replaced by an equivalent circuit consisting of :

(1) A current source in parallel with a resistance.

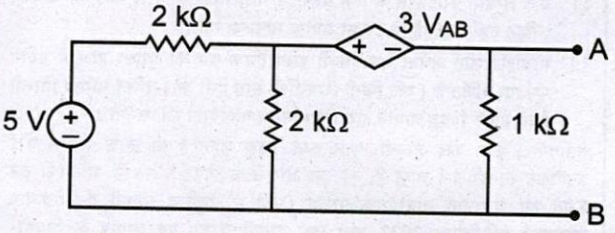
(2) A voltage source in series with a resistance.

(3) A voltage source in parallel with a resistance.

(4) A current source in series with a resistance.

(5) Question not attempted

6. For the circuit given below, the Thevenin's voltage across the terminals A and B is



(1) 1.25 V (2) 0.25 V

(3) 1 V (4) 0.5 V

(5) Question not attempted

7. If the capacitor in a series RLC circuit is increased, the Q factor will

(1) Increase

(2) Decrease

(3) Remain unchanged

(4) Depend on frequency

(5) Question not attempted

8. Given two coupled inductors L_1 and L_2, their mutual inductance M satisfies

(1) $M = \sqrt{L_1^2 + L_2^2}$ (2) $M > \frac{(L_1 + L_2)}{2}$

(3) $M > \sqrt{L_1 L_2}$ (4) $M \leq \sqrt{L_1 L_2}$

(5) Question not attempted

9. A driving point function has

(1) One port

(2) Two ports

(3) Multiple sources

(4) Transformers

(5) Question not attempted

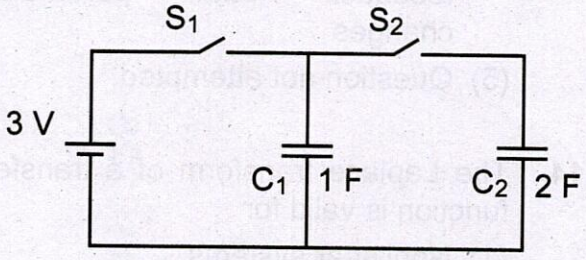
10. The transfer function of a system is $\frac{V_{(s)}}{I_{(s)}} = \frac{s}{s+3}$. The system is at rest for $t < 0$. What will be the value of $v(t)$ for $t \geq 0$ for current input i(t) of unit step ?

(1) e^{-t} (2) e^{-3t}

(3) $2e^{-3t}$ (4) $3e^{-3t}$

(5) Question not attempted

11. In the figure shown, all elements used are ideal. For time $t < 0$, S_1 remained closed and S_2 open. At $t = 0$, S_1 is opened and S_2 is closed. If the voltage V_{C_2} across the capacitor C_2 at $t = 0$ is zero, the voltage across the capacitor combination at $t = 0^+$ will be



(1) 1 V (2) 2 V

(3) 1.5 V (4) 3 V

(5) Question not attempted

12. In a Fourier series expansion of a periodic functions, the coefficient c/o represents its

(1) net area per cycle

(2) d.c. value

(3) average value over half cycle

(4) average a.c. value per cycle

(5) Question not attempted

13. Feedback control systems are

(1) Insensitive to both forward & feedback path parameter changes

(2) Less sensitive to feedback path parameter changes than to forward path parameter changes

(3) Less sensitive to forward path parameter changes than to feedback path parameter changes

(4) Equally sensitive to forward and feedback path parameter changes

(5) Question not attempted

14. The Laplace transform of a transfer function is valid for :

(1) Nonlinear systems

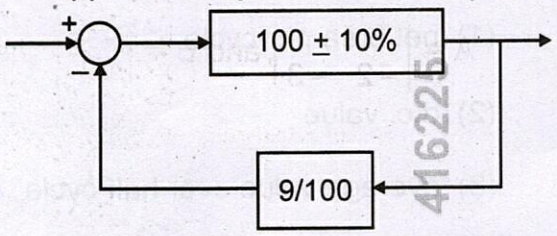
(2) Time-varying systems

(3) Linear time-invariant systems

(4) All systems

(5) Question not attempted

15. As shown in figure, a negative feedback system has an amplifier of gain 100 with ±10% tolerance in the forward path, and an alternator of value 9/100 in the feedback path. The overall system gain is approximately :



(1) 10 ± 1% (2) 10 ± 2%

(3) 10 ± 5% (4) 10 ± 10%

(5) Question not attempted

16. The input-output relationship of a system is given by

$$2\frac{d\,r(t)}{dt} = \frac{d^2c(t)}{dt^2} + 5\frac{d\,c(t)}{dt} + c(t)$$

where r(t) and c(t) are input and output respectively. The transfer function of the system is equal to

(1) $\frac{2s}{s^2+5s+1}$ (2) $\frac{1}{s^2+5s+1}$

(3) $\frac{2s}{s^2+3s+1}$ (4) $\frac{2}{s^2+5s+1}$

(5) Question not attempted

17. The peak overshoot occurs in :

(1) Under-damped systems

(2) Critically damped systems

(3) Over-damped systems

(4) First-order systems

(5) Question not attempted

18. The steady state error of a stable type 2 unity feedback system for a unit ramp function is

(1) 0 (2) $\frac{1}{(1+kr)}$

(3) ∞ (4) $\frac{1}{k_r}$

(5) Question not attempted

19. What will be the steady state value of function f(t) whose Laplace function is $f(s) = \frac{1}{s(s+1)}$?

(1) ∞ (2) 0

(3) 1 (4) 0.5

(5) Question not attempted

20. The characteristic equation of a closed loop system is $s(s + 1)(s + 3) + K(s + 2) = 0$; $K > 0$. Which of the following statement is true ?

(1) Its roots are always real.

(2) It cannot have a breakaway point in the range $-1 < Re[s] < 0$

(3) Two of its roots tend to infinity along the asymptotes $Re[s] = -1$

(4) It may have complex roots in the right half plane.

(5) Question not attempted

21. For the characteristic equation : $s^4 + 3s^3 + 3s^2 + 2s + K = 0$, find the value of K for which the system is marginally stable.

(1) 14/3 (2) 2

(3) 14/9 (4) 14/8

(5) Question not attempted

22. A lead compensator improves :

(1) Stability and transient response

(2) Steady-state error

(3) Settling time only

(4) Bandwidth

(5) Question not attempted

23. A lead compensator used for a closed loop controller has the following transfer function $\frac{K\left(1+\frac{s}{a}\right)}{\left(1+\frac{s}{b}\right)}$.

For such a lead compensator

(1) $a < b$ (2) $b < a$

(3) $a > Kb$ (4) $a < Kb$

(5) Question not attempted

24. A system is controllable if :

(1) All states can be driven to any value using inputs

(2) Output is always constant

(3) No input is required

(4) Poles lie in LHP

(5) Question not attempted

25. For the state-space system :

$A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$, and $B = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$. What is the rank of the controllability matrix ?

(1) 0 (2) 1

(3) 2 (4) 3

(5) Question not attempted

26. State transition matrix of a system is $\phi(t) = e^{At}$. Which of the following is not properties of state transition matrix ?

(1) $[\phi(t)]^k = \phi(kt)$

(2) $\frac{d}{dt}(\phi(t)) = A\,\phi(t)$

(3) $\phi(t_2 - t_1)\,\phi(t_1 - t_0) = \phi(t_2 - t_0)$

(4) $\phi(t_2 - t_1)\,\phi(t_1 - t_0) = \phi(t_2 - 2t_1 + t_0)$

(5) Question not attempted

27. A system is described by the state equation $\dot{X} = AX + BU$. The output is given by $Y = CX$.

Where $A = \begin{bmatrix} -4 & -1 \\ 3 & -1 \end{bmatrix}; B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}; C = [1\ 0]$.

Transfer function G(s) of the system is

(1) $\frac{s}{s^2+5s+7}$ (2) $\frac{1}{s^2+5s+7}$

(3) $\frac{s}{s^2+3s+2}$ (4) $\frac{1}{s^2+3s+2}$

(5) Question not attempted

28. The main advantage of ring-main AC distribution over radial is :

(1) Cheaper installation

(2) Lower fault current

(3) Improved reliability

(4) No neutral required

(5) Question not attempted

29. The basic function of a galvanometer is to :

(1) Measure energy

(2) Detect small currents

(3) Measure voltage

(4) Act as a fuse

(5) Question not attempted

30. A digital voltmeter has a read-out range from 0 to 9.999 count. Determine the resolution of the instrument in volt when the full scale reading is 9.999 V.

(1) 1 V (2) 1 mV

(3) 1 MV (4) 10 mV

(5) Question not attempted

31. A meter reads 127.50 V and the true value of the voltage is 127.43 V. The static correction will be :

(1) 0.07 V (2) – 0.07 V

(3) 0.04 V (4) 0.02 V

(5) Question not attempted

32. The scale of galvanometer is placed at a distance of 0.4 m from the mirror. A deflection of 44 mm is observed. The angle through which the coil has turned is :

(1) 55×10^{-3} rad (2) 35×10^{-3} rad

(3) $55 \times 10^{+3}$ rad (4) $35 \times 10^{+3}$ rad

(5) Question not attempted

33. Which instrument is best suited for measuring DC current ?

(1) Moving Coil

(2) Moving Iron

(3) Induction type

(4) Dynamometer

(5) Question not attempted

34. A Permanent Magnet Moving Coil (PMMC) instrument can be used to measure :

(1) only AC

(2) only DC

(3) Both AC and DC

(4) High frequency signals only

(5) Question not attempted

35. The accuracy of an instrument refers to :

(1) Its ability to reproduce the same thing

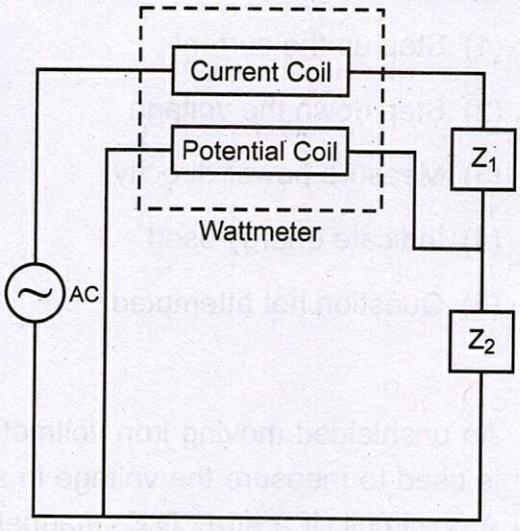
(2) The closeness with which an instrument reading approaches true value

(3) Its least-count

(4) Its resolution

(5) Question not attempted

36. A wattmeter is connected as shown in the figure. The wattmeter reads



(1) Zero always

(2) Total power consumed by Z_1 and Z_2

(3) Power consumed by Z_1

(4) Power consumed by Z_2

(5) Question not attempted

37. An energy meter shows 5 revolutions for 1 unit of energy (kWh). If the disc makes 150 revolutions in 30 minutes, what is the power consumption?

(1) 60 kW (2) 15 kW

(3) 75 kW (4) 30 kW

(5) Question not attempted

38. Which of the following instruments is used for energy measurement ?

(1) Induction wattmeter

(2) Moving coil voltmeter

(3) Dynamometer wattmeter

(4) Induction type energy meter

(5) Question not attempted

39. The function of a potential transformer is to :

(1) Step up the current

(2) Step down the voltage

(3) Measure power directly

(4) Indicate energy used

(5) Question not attempted

40. An unshielded moving iron voltmeter is used to measure the voltage in an A.C. circuit. If a stray D.C. magnetic field having a component along the axis of the meter coil appears, the meter reading would be

(1) Unaffected

(2) Decreased

(3) Increased

(4) Either decreased or increased depending on the direction of the D.C. field

(5) Question not attempted

41. Which device is used for measurement of inductance ?

(1) Maxwell's bridge

(2) Wheatstone bridge

(3) Schering bridge

(4) Kelvin's bridge

(5) Question not attempted

42. The Schering Bridge is used to measure :

(1) Inductance

(2) Capacitance

(3) Resistance

(4) Frequency

(5) Question not attempted

43. The relatively few holes in the n-type material produced by intrinsic action are called :

(1) Majority carrier

(2) Minority carrier

(3) Depletion layer

(4) Doping

(5) Question not attempted

44. Which of the following best describes the behaviour of an ideal diode in forward bias?

(1) It allows current in both directions.

(2) It blocks current completely.

(3) It behaves as a short circuit.

(4) It has a constant resistance.

(5) Question not attempted

45. Intrinsic semiconductor materials have :

(1) no dopping atoms added.

(2) Pentavalent atoms added

(3) conduction by means of doping

(4) a resistance which increases with increase of temperature

(5) Question not attempted

46. In an n-p-n transistor, the base-collector junction is reverse biased for :

(1) Minority carrier

(2) Majority carrier

(3) both minority and majority carrier

(4) only for impurity added

(5) Question not attempted

47. In normal operation, the junctions of p-n-p transistor are :

(1) both forward biased

(2) base-emitter forward biased and base-collector reverse biased

(3) both reverse biased

(4) base-collector forward biased and base-emitter reverse biased.

(5) Question not attempted

48. A transistor in common-emitter mode has I_E = 2 mA and I_B = 20 μA. Calculate β.

(1) 90 (2) 95

(3) 99 (4) 85

(5) Question not attempted

49. The input impedance of a MOSFET is :

(1) Low (2) Moderate

(3) High (4) Zero

(5) Question not attempted

50. An SCR circuit has a latching current I_L = 20 mA and a holding current I_H = 15 mA. If the gate pulse initiates conduction at 30 mA, what happens when the current drops to 12 mA ?

(1) SCR remains ON

(2) SCR turns OFF

(3) Gate will re-trigger SCR

(4) SCR operates in linear mode

(5) Question not attempted

51. For proper clamping, the RC time constant of a clamper circuit should be :

(1) Very large compared to the input signal period

(2) Equal to the input signal period

(3) Much smaller than the input signal period

(4) Zero

(5) Question not attempted

52. A series positive clipper with diode and resistor does what ?

(1) Clips only negative swings

(2) Clips only positive swings

(3) Clamps DC level

(4) Acts as rectifier

(5) Question not attempted

53. Which of the following is a voltage-series feedback configuration ?

(1) Output current sampled, current fed back in parallel

(2) Output voltage sampled, voltage fed back in series

(3) Output current sampled, voltage fed back in series

(4) Output voltage sampled, current fed back in parallel

(5) Question not attempted

54. What will be the binary number of decimal number 41 ?

(1) 00101001 (2) 00011111

(3) 01000001 (4) 00101111

(5) Question not attempted

55. The output of an AND gate is 1 only when :

(1) All inputs are 0

(2) All inputs are 1

(3) Any one input is 1

(4) Any one input is 0

(5) Question not attempted

56. A JK flip-flop toggles when J = K = 1. If clocked Q was 0, what will be next Q ?

(1) 0 (2) 1

(3) Hold (4) Undefined

(5) Question not attempted

57. A register that responds to the pulse duration is commonly called :

(1) a gated latch (2) Counters

(3) ROM (4) RAM

(5) Question not attempted

58. Diversity factor in power system is always

(1) Less than 1

(2) Equal to 1

(3) Greater than 1

(4) Negative

(5) Question not attempted

59. Running cost of which of the following power plant is very high ?

(1) Hydro electric (2) Thermal

(3) Nuclear (4) Diesel

(5) Question not attempted

60. Which factor is crucial in selecting the site for a hydroelectric plant ?

(1) High wind speed

(2) High solar radiation

(3) Availability & storage of water

(4) Availability of coal

(5) Question not attempted

61. A plant produces annual output of 7.35×10^6 kWh and remains in operation for 735 hours in a year. If the plant have installed capacity of 20 MW, then the plant use factor will be :

(1) 10% (2) 50%

(3) 20% (4) 30%

(5) Question not attempted

62. A generating station has a maximum demand of 25 MW, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%. Find the plant capacity.

(1) 10 MW (2) 20 MW

(3) 30 MW (4) 40 MW

(5) Question not attempted

63. Which of the following is NOT a prime property of smart grid ?

(1) Isolation (2) Self heal

(3) Controllable (4) Observable

(5) Question not attempted

64. A yearly load duration curve of a power plant is a straight line. The maximum load is 750 MW and the minimum load is 600 MW. The capacity factor and utilization factor are respectively :

(1) 0.56; 0.80 (2) 0.75; 0.83

(3) 0.78; 0.9 (4) 0.83; 0.75

(5) Question not attempted

65. In a Daily Load curve, the area under the curve gives :

(1) Number of units generated in the day

(2) Sum of consumer max. demand

(3) Max. load

(4) Load factor

(5) Question not attempted

66. When a given block of energy is charged at specified rate and the succeeding block of energy are charged at progressively reduced rates, it is called

(1) Flat rate tariff

(2) Block rate tariff

(3) Simple tariff

(4) Uniform rate tariff

(5) Question not attempted

67. A consumer has a maximum load demand of 200 kW at 40% load factor. If 8760 hours are considered in a year, then the units consumed per year will be :

(1) 6,00,800 kWh

(2) 7,00,800 kWh

(3) 8,00,800 kWh

(4) 9,00,800 kWh

(5) Question not attempted

68. Incremental cost (λ) method is used for :

(1) Frequency regulation

(2) Economic dispatch

(3) Voltage control

(4) Stability analysis

(5) Question not attempted

69. For a given power system, if the power factor is to be raised to unity, then how many more kilowatts can an alternator supply for the same kVA loading ? Presently, the alternator is supplying a load of 300 kW at a p.f. of 0.6 lagging.

(1) 150 kW (2) 200 kW

(3) 300 kW (4) 400 kW

(5) Question not attempted

70. In a given power station of a power system, the maximum demand is 100 MW. If the annual load factor is 40%, then the total energy generated in year will be :

(1) 3504×10^5 kWh

(2) 2504×10^5 kWh

(3) 3504×10^3 kWh

(4) 2504×10^3 kWh

(5) Question not attempted

71. In a AC supply system, the red colour wire is used for

(1) Phase

(2) Neutral

(3) Protective Earth

(4) Inverter

(5) Question not attempted

72. Formula for calculating the illumination is :

(1) Flux – area

(2) $\frac{\text{Flux}}{\text{area}}$

(3) Flux * area

(4) $\frac{\text{Area}}{\text{Flux}}$ * Solid angle

(5) Question not attempted

73. In power system stability, which one is true ?

(1) The critical clearing angle should be less than actual clearing angle for stable operation.

(2) The critical clearing angle should be larger than actual clearing angle for stable operation.

(3) The minimum time to clear a fault without losing is known as critical clearing time.

(4) The duration of fault should be high for better power system stability.

(5) Question not attempted

74. When synchronous machines are operated with fast acting voltage regulators, then _____ stability take place.

(1) Dynamic

(2) Steady state

(3) Load flow

(4) Generator flow

(5) Question not attempted

75. Which is the possible cause of rotor acceleration ?

(1) Electromagnetic Torque (T_e)

(2) Mechanical Torque (T_i)

(3) $T_i - T_e$

(4) $T_i + T_e$

(5) Question not attempted

76. Why does a human body experience shock ?

(1) Both flow of current through the body and due to the voltage level

(2) Due to the voltage level but not due to flow of current through the body

(3) Not due to flow of current through the body and not due to the voltage level

(4) Flow of current through the body but not due to the voltage level

(5) Question not attempted

77. Which one is not an advantage of neutral grounding ?

(1) Voltages of phases are limited to phase to ground voltages.

(2) Sensitive protective relays against line to ground faults can be used.

(3) The high voltages due to arcing grounds are not eliminated.

(4) The over voltage due to lightning are discharged to ground.

(5) Question not attempted

78. Which of these protection devices detects fault but does not interrupt current ?

(1) Circuit breaker

(2) Fuse

(3) Relay

(4) MCB

(5) Question not attempted

79. Which of the following buses has both active power (P) and reactive power (Q) specified?

(1) Slack bus

(2) Load bus

(3) Generator bus

(4) Swing bus

(5) Question not attempted

80. An overcurrent relay connected to a 300/1 CT is set at 100% for load current of 240 A. Will the relay operate ?
(1) Yes
(2) No
(3) Depends on voltage
(4) Data insufficient
(5) Question not attempted

81. Sometimes a relay may fail to operate even when the fault point is within its reach. This phenomenon is called
(1) Under reach
(2) Over reach
(3) Discrimination
(4) Reliability
(5) Question not attempted

82. Which of the following relay is not affected by the arc resistance ?
(1) Impedance relay
(2) Reactance relay
(3) Mho relay
(4) Overcurrent relay
(5) Question not attempted

83. Which relay operates based on impedance measurement ?
(1) Distance relay
(2) Over current relay
(3) Buchholz relay
(4) Differential relay
(5) Question not attempted

84. What is not the advantage of static relay ?
(1) Fast response
(2) Low burden on C.T. & P.T.
(3) No sensitivity to voltage transients
(4) High resistance to shock and vibration
(5) Question not attempted

85. DC circuit breakers differ from AC circuit breakers mainly due to :
(1) Lower frequency
(2) absence of current zero crossing
(3) Use of insulators
(4) Larger transformer size
(5) Question not attempted

86. A three phase breaker is rated at 2000 MVA, 33 kV its making current will be :
(1) 89 kA (2) 20 kA
(3) 34 kA (4) 50 kA
(5) Question not attempted

87. The per-unit impedance of a circuit element of 0.15, if the base kV and base MVA are doubled.
(1) 0.075 (2) 0.15
(3) 0.30 (4) 0.60
(5) Question not attempted

88. The following sequence current were recorded in a power system under a fault condition :

(I+) = j 1.653 pu; (I–) = –J 0.5 pu; (I0) = –J 1.153

(1) Line to ground

(2) Three phase

(3) Line to line to ground

(4) Line to line

(5) Question not attempted

89. Two identical machines of 50 Hz, 13.2 kV, 15 MVA are connected in parallel. The machines has 20% positive and negative reactance, and 10% of zero reactance. For a symmetrical fault at the terminals, the fault current will be

(1) 2 per unit (2) 4 per unit

(3) 5 per unit (4) 10 per unit

(5) Question not attempted

90. A short circuit current is highest during :

(1) Light load

(2) Switching operation

(3) Fault condition

(4) Peak demand

(5) Question not attempted

91. Which of the basic electrical quantity is not likely to change during abnormal conditions in power system ?

(1) Current

(2) Voltage

(3) Frequency

(4) Temperature coefficient of conductor

(5) Question not attempted

92. If all the sequence fault currents in a power system are equal, then the fault is a

(1) three phase fault

(2) line to ground fault

(3) line to line fault

(4) double line to ground fault

(5) Question not attempted

93. A Thyristor (SCR) turns off when :

(1) Gate current is removed

(2) Anode-cathode current falls below holding current

(3) Reverse voltage is applied

(4) Temperature drops

(5) Question not attempted

94. Which device acts as a controlled switch in power electronics ?

(1) Diode (2) Zener diode

(3) Thyristor (4) BJT

(5) Question not attempted

95. The device used for controlled rectification in HVDC systems is :

(1) BJT (2) IGBT

(3) SCR (4) MOSFET

(5) Question not attempted

96. Which one is not a fundamental objective of a Current Sourced Inverter (CSI) - based HUDC control system ?

(1) To control the dc line current

(2) To control dc voltage

(3) To maintain adequate commutation margin

(4) To maximize converter reactive power consumption

(5) Question not attempted

97. The function of a converter station in HVDC system is to :

(1) Convert DC to AC only

(2) Only control voltage

(3) Convert AC to DC and vice versa

(4) Act as a relay

(5) Question not attempted

98. If the control angle $\alpha = 90°$, output voltage of the rectifier is

(1) Maximum

(2) Minimum non-zero

(3) Zero

(4) Negative

(5) Question not attempted

99. A thyristor half-wave controlled converter has a supply voltage of 240 at 50 Hz and a load resistance of 100 Ω. What will be the average value of current for firing angle of 30° ?

(1) 5.01 A (2) 10.01 A

(3) 1.01 A (4) 3.01 A

(5) Question not attempted

100. The ac supply of the half-wave controlled single-phase converter is $V = 240\sqrt{2}$ sin ωt. For the load R = 10 Ω and ωL = 0 Ω, the average output voltage will be :

The firing delay angle is $\frac{\pi}{6}$.

(1) 10.9 V (2) 100.9 V

(3) 50.9 V (4) 150.9 V

(5) Question not attempted

101. A half-bridge inverter with centre-tapped 40 V battery has a purely inductive load, L = 200 mH and frequency of 100 Hz. Determine the maximum load current.

(1) 150 mA (2) 450 mA

(3) 250 mA (4) 200 mA

(5) Question not attempted

102. How is the load voltage controlled in a chopper circuit ?

(1) By varying duty cycle

(2) By changing input voltage

(3) By filtering

(4) By using transformers

(5) Question not attempted

103. What is the purpose of chopper ?

(1) To convert a.c. voltage into d.c. voltage

(2) To convert a.c. voltage into higher level a.c. voltage

(3) To convert fixed d.c. voltage source into variable d.c. voltage

(4) To convert a.c. voltage into lower level a.c. voltage

(5) Question not attempted

104. In a DC chopper, input = 240 V, duty cycle = 0.5, Output voltage =

(1) 120 V (2) 240 V

(3) 480 V (4) 60 V

(5) Question not attempted

105. A step-down chopper produces output voltage :

(1) Always higher

(2) Always lower

(3) Switched between 0 and input

(4) Constant

(5) Question not attempted

106. UPFC is a combination of which two devices ?

(1) SVC and STATCOM

(2) TCSC and SSSC

(3) Shunt Synchronous Compensator and Series Synchronous Compensator

(4) SVC and SSSC

(5) Question not attempted

107. A STATCOM primarily controls :

(1) Active power

(2) Voltage magnitude

(3) Frequency

(4) Harmonics

(5) Question not attempted

108. Which microcontroller family does the 8051 belong to ?

(1) Intel (2) Atmel

(3) ARM (4) Motorola

(5) Question not attempted

109. Which of the following is an 8-bit Microcontroller ?

(1) 8086 (2) 8051

(3) 8085 (4) ARM7

(5) Question not attempted

110. The 8086 microprocessor is

(1) 4-bit (2) 8-bit

(3) 16-bit (4) 32-bit

(5) Question not attempted

111. Which of the following is used for temporary data storage in 8051 ?

(1) EEPROM (2) RAM

(3) Flash (4) ROM

(5) Question not attempted

112. The 8085 microprocessor is an IC having ____ Pins.

(1) 20 (2) 30

(3) 40 (4) 50

(5) Question not attempted

113. Which instruction load 16 bit data (immediate) into the pair, DL in 8085 microprocessor

(1) MOV B, A

(2) MVI A, 8FH

(3) LDA 2050H

(4) LXI D2051

(5) Question not attempted

114. 8086 is a microprocessor with :

(1) 8 -bit data bus

(2) 16-bit data bus

(3) 32-bit data bus

(4) 16-bit address bus only

(5) Question not attempted

115. Global variables in MATLAB :

(1) Are local to function

(2) Shared across workspace and functions

(3) Always assigned by value

(4) Are more efficient than locals

(5) Question not attempted

116. Which of the under given commands in MATLAB is used for labelling the figure ?

(1) Label (2) X label

(3) Title (4) Figure

(5) Question not attempted

117. Which of the following is a valid MATLAB command to create a row vector from 1 to 5 ?

(1) x = 1 to 5;

(2) x = [1:5];

(3) x = (1 2 3 4 5);

(4) x = vector(1, 5);

(5) Question not attempted

118. In an electro mechanical device, when both the direction of rotation and direction of electromagnetic torque are in same direction, the machine work as a :

(1) Generator
(2) Motor
(3) Transformer
(4) Machine will stop
(5) Question not attempted

119. A long solenoid is formed by winding 20 turns/cm. What current is necessary to produce a magnetic field of 20 mT inside the solenoid ?

(1) 2 A (2) 8 A
(3) 3 A (4) 5 A
(5) Question not attempted

120. If a DC series motor is started with no load, the speed may become dangerously high due to :

(1) Low current
(2) High current
(3) High flux
(4) High current and high flux
(5) Question not attempted

121. A DC generator without commutator is a

(1) AC Generator
(2) DC Motor
(3) DC Generator
(4) Induction motor
(5) Question not attempted

122. Lap winding is suitable for _____ current, _____ voltage d.c. generators.

(1) high, low (2) low, high
(3) low, low (4) high, high
(5) Question not attempted

123. Which of the following d.c. generator cannot build-up the voltage on open-circuit ?

(1) Shunt (2) Series
(3) Short shunt (4) Long shunt
(5) Question not attempted

124. The direction of EMF generated in a DC generator can be determined from :

(1) Lenz's law
(2) Kirchhoff's law
(3) Fleming's left-hand rule
(4) Fleming's right-hand rule
(5) Question not attempted

125. The commercial efficiency of a shunt generator is maximum when its variable loss equals ____ loss.

(1) constant
(2) stray
(3) iron
(4) friction and windage
(5) Question not attempted

126. An 8-pole lap connected armature has 960 conductors, a flux of 40 mWb per pole and a speed of 400 rpm. The emf generated will be :

(1) 312 volts

(2) 256 volts

(3) 128 volts

(4) 80 volts

(5) Question not attempted

127. Ward Leonard method is a speed control method for :

(1) DC shunt motor

(2) DC series motor

(3) Induction motor

(4) Universal motor

(5) Question not attempted

128. With the increase in load, the speed of a DC shunt motor

(1) Reduces slightly

(2) Remains constant

(3) Increases slightly

(4) Increases proportionally

(5) Question not attempted

129. In a single-phase induction motor, the pulsating field of the stator can be considered of two fields which are :

(1) Different in magnitude and rotating in opposite directions with synchronous speed

(2) Equal in magnitude but rotating in opposite directions with synchronous speed

(3) Equal in magnitude and rotating in same direction with synchronous speed

(4) Different in magnitude but rotating in same directions with synchronous speed

(5) Question not attempted

130. The frequency of the EMF in the stator of a 4 pole induction motor is 50 Hz and that in rotor is 1.5 Hz. At what speed is the motor running ?

(1) 1400 rpm (2) 1570 rpm

(3) 1455 rpm (4) 1503 rpm

(5) Question not attempted

131. The equivalent circuit of an induction motor resembles that of :

(1) Transformer

(2) DC generator

(3) Synchronous motor

(4) DC motor

(5) Question not attempted

132. The rotor current frequency in an induction motor is :

(1) Equal to supply frequency

(2) Always zero

(3) Equal to slip times supply frequency

(4) Constant

(5) Question not attempted

133. Cogging in induction motor is due to :

(1) Improper voltage

(2) Harmonics

(3) Matching of rotor and stator teeth

(4) Poor cooling

(5) Question not attempted

134. In an induction motor, with certain ratio of rotor to stator slots, run at 1/7 of speed, the phenomenon will be treated as

(1) Humming (2) Hunting

(3) Crawling (4) Cogging

(5) Question not attempted

135. The synchronous condensers are used to :

(1) Increase active power

(2) Improve voltage regulation

(3) Improve power factor

(4) Start synchronous motors

(5) Question not attempted

136. In a synchronous machines, the rotor speed is :

(1) Independent of supply frequency

(2) Equal to supply frequency

(3) Proportional to supply frequency

(4) Inversely proportional to supply frequency

(5) Question not attempted

137. For a 3-phase alternator with 60 turns per phase, sinusoidal flux of 0.04 Wb, and frequency of 50 Hz, calculates generated voltage per phase.

(1) 440 V

(2) 532.8 V

(3) 522.6 V

(4) 441 V

(5) Question not attempted

138. A buzzing sound is generally heard from a loaded transformer installed in a line. The reason for this sound is due to :

(1) Mechanical losses

(2) Stray losses

(3) Magnetostriction losses

(4) Core losses

(5) Question not attempted

139. The core of a transformer is laminated to

(1) Reduce copper loss

(2) Reduce hysteresis loss

(3) Reduce eddy current loss

(4) Increase flux flow

(5) Question not attempted

140. A single-phase transformer has 400 turns on the primary and 100 turns on the secondary. If the primary is connected to 200 V, what is the secondary voltage ?

(1) 25 V (2) 50 V

(3) 100 V (4) 500 V

(5) Question not attempted

141. Which of the following is NOT a transformer cooling method ?

(1) Air natural cooling

(2) Air blast cooling

(3) Oil immersed water cooling

(4) Radiation cooling

(5) Question not attempted

142. Which is to be short circuited on performing short circuit test on a transformer ?

(1) Low voltage side

(2) High voltage side

(3) Primary side

(4) Secondary side

(5) Question not attempted

143. A 25 kVA, 1-phase transformer has full-load copper loss of 300 W and core loss of 250 W. What is the efficiency at full load and 0.8 power factor lagging ?

(1) 94.12% (2) 95.6%

(3) 96.4% (4) 92.8%

(5) Question not attempted

144. A transformer rated at 25 kVA has copper losses of 400 W and iron losses of 300 W. At what load the efficiency will be maximum ?

(1) Full load

(2) 75% load

(3) Load at which copper loss = iron loss

(4) No load

(5) Question not attempted

145. Two transformers rated 50 kVA and 25 kVA are operating in parallel and supplying a total load of 60 kVA. How much load is shared by the 25 kVA transformer if both have the same per unit impedance ?

(1) 20 kVA (2) 25 kVA

(3) 15 kVA (4) 30 kVA

(5) Question not attempted

146. The percentage regulation of a transformer is defined as :

(1) The percentage increase in the terminal voltage of the transformer from no-load to full-load condition at varying applied voltage.

(2) The percentage decrease in the terminal voltage of the transformer from no-load to full-load condition at a constant applied voltage.

(3) The percentage decrease in the terminal voltage of the transformer from no-load to full-load condition at varying applied voltage.

(4) The percentage increase in the terminal voltage of the transformer from no-load to full-load condition at a constant applied voltage.

(5) Question not attempted

147. A 10 kVA, 230 V/115 V transformer is used as an auto-transformer to supply 230 V from 115 V. What is the kVA rating of the auto-transformer ?

(1) 10 kVA (2) 15 kVA

(3) 20 kVA (4) 25 kVA

(5) Question not attempted

148. The element of 500 watt electric iron is designed for use on a 200 V supply. What value of resistance is needed to be connected in series in order that the iron can be operated from 240 V supply ?

(1) 16 ohm (2) 24 ohm

(3) 40 ohm (4) 12 ohm

(5) Question not attempted

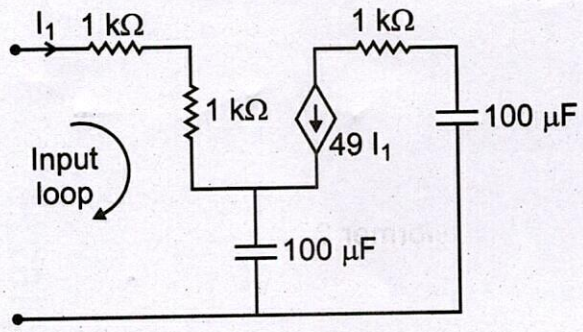
149. How many 200 W/220 V incandescent lamps connected in series would consume the same total power as a single 100 W/220 V incandescent lamp ?

(1) Not possible (2) 4

(3) 3 (4) 2

(5) Question not attempted

150. The equivalent capacitance of the input loop of the circuit shown is



(1) 2 μF (2) 100 μF

(3) 200 μF (4) 4 μF

(5) Question not attempted

रफ कार्य के लिए स्थान / SPACE FOR ROUGH WORK