RPSC

Previous Year Paper

Lecturer (2011)

प्रश्न पुस्तिका / QUESTION BOOKLET

विषय / Subject :

Electrical Engineering

Yacht Techeay 2011

कोड / Code : **08**

पुस्तिका में पृष्ठों की संख्या /
Number of Pages in Booklet : **16**

पुस्तिका में प्रश्नों की संख्या /
Number of Questions in Booklet : **100**

Electrical Engineering

08 विषय कोड | **A** बुकलेट सीरीज

समय / Time : 2 घंटे / Hours

पूर्णांक / Maximum Marks : 100

INSTRUCTIONS

1. Answer all questions.
2. All questions carry equal marks.
3. Only one answer is to be given for each question.
4. If more than one answers are marked, it would be treated as wrong answer.
5. Each question has four alternative responses marked serially as **1, 2, 3, 4**. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using **BLUE BALL POINT PEN.**
6. **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. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.)
7. The candidate should ensure that Series Code of the Question Paper Booklet and Answer Sheet must be same after opening the envelopes. In case they are different, a candidate must obtain another Question Paper of the same series. Candidate himself shall be responsible for ensuring this.
8. 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 as per rules.
9. Please correctly fill your Roll Number in O.M.R. Sheet. 5 marks will be deducted for filling wrong or incomplete Roll Number.

Warning : If a candidate is found copying or if any unauthorised material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted under Section 3 of the R.P.E. (Prevention of Unfairmeans) Act, 1992. Commission may also debar him/her permanently from all future examinations of the Commission.

निर्देश

1. सभी प्रश्नों के उत्तर दीजिए ।
2. सभी प्रश्नों के अंक समान हैं ।
3. प्रत्येक प्रश्न का केवल एक ही उत्तर दीजिए।
4. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा ।
5. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर-पत्रक पर नीले बॉल प्वाइंट पेन से गहरा करना है ।
6. **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 । किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।
7. प्रश्न-पत्र पुस्तिका एवं उत्तर पत्रक के लिफाफे को सील खोलने पर परीक्षार्थी यह सुनिश्चित कर ले कि उसके प्रश्न-पत्र पुस्तिका पर वही सीरीज अंकित है जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से प्रश्न पत्र की ही सीरीज वाला दूसरा प्रश्न-पत्र का लिफाफा प्राप्त कर लें। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।
8. मोबाईल फोन अथवा इलेक्ट्रोनिक यंत्र का परीक्षा कॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जावेगी।
9. कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानी पूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तांकों में से अनिवार्य रूप से काटे जायेंगे।

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 कराई जायेगी और आर. पी. ई. (अनुचित साधनों की रोकथाम) अधिनियम, 1992 के नियम 3 के तहत कार्यवाही की जायेगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

1 In relation to the synchronous machines, which one of the following statements is false?

(1) In salient pole machines, the direct-axis synchronous reactance is greater than the quadrature-axis synchronous reactance

(2) The damper bars help the synchronous motor self-start

(3) Short circuit ratio is the ratio of the field current required to produce the rated voltage on open circuit to the rated armature current

(4) The V-curve of a synchronous motor represents the variation in the armature current with field excitation, at a given output power

2 In a DC machine, which of the following statements is true ?

(1) Compensating winding is used for neutralizing armature reaction while inter pole winding is used for producing residual flux

(2) Compensating winding is used for improving commutation while inter pole winding is used for neutralizing armature reaction

(3) Compensating winding is used for improving commutation while inter pole winding is used for producing residual flux

(4) Compensating winding is used for neutralizing armature reaction while inter pole winding is used for improving commutation

3 A synchronous generator is feeding a zero power factor (lagging) load at rated current. The armature reaction is

(1) magnetizing

(2) demagnetizing

(3) cross-magnetizing

(4) ineffective

4 In a transformer, zero voltage regulation at full load is

(1) not possible

(2) possible at unity power factor load

(3) possible at leading power factor load

(4) possible at lagging power factor load

5 The DC motor, which can provide zero speed regulation at full load without any controller, is

(1) series (2) shunt

(3) cumulative compound (4) differential compound

6 A balanced three-phase, 50 Hz voltage is applied to a 3 phase, 4 pole, induction motor. When the motor is delivering rated output, the slip is found to be 0.05. The speed of the rotor m.m.f. relative to the rotor structure is

(1) 1500 r.p.m. (2) 1425 r.p.m.
(3) 25 r.p.m. (4) 75 r.p.m.

7 A ceiling fan uses

(1) split-phase motor.
(2) capacitor start and capacitor run motor.
(3) universal motor.
(4) capacitor start motor.

8 To eliminate the 5^{th} harmonic voltage from the phase voltage of an alternator, the coils need to be short pitched by an electrical angle of

(1) 30° (2) 36°
(3) 18° (4) 72°

9 The magnetizing current in a transformer is rich in

(1) 3^{rd} harmonic (2) 2^{nd} harmonic
(3) 7^{th} harmonic (4) 13^{th} harmonic

10 Auto-transformer is used in transmission and distribution

(1) When operator is not available
(2) When iron losses are to be reduced
(3) When efficiency considerations can be ignored
(4) When the transformation ratio is small

11 The surge impedance of a 400 km long overhead transmission line is 400 ohms. For a 200 km length of the same line, the surge impedance will be

(1) 200 ohms (2) 800 ohms
(3) 400 ohms (4) 100 ohms

12 For a given base voltage and base volt-amperes, the per unit impedance value of an element is x. The per unit impedance value of this element when the voltage and volt-amperes bases are both doubled is

(1) 0.5x (2) 2x
(3) 4x (4) x

13 The insulation resistance of a 20 km long underground cable is 8 mega ohm. Insulation resistance for similar cable of 10 km is

(1) 16 megaohm (2) 32 megaohm

(3) 4 megaohm (4) 2 megaohm

14 The insulation strength of an EHV transmission line is mainly governed by

(1) Load power factor (2) Switching over-voltages

(3) Harmonics (4) Corona

15 Keeping in view the cost and overall effectiveness the following circuit breaker is best suited for capacitor bank switching

(1) Vacuum (2) Air blast

(3) SF6 (4) Oil

16 The gauss seidel load flow method has following disadvantages. Tick the incorrect statement.

(1) Unreliable convergence

(2) Slow convergence

(3) Choice of slack bus affects convergence

(4) A good initial guess for voltages is essential for convergence

17 High voltage DC (HVDC) transmission is mainly used for

(1) Bulk power transmission over very long distances

(2) Inter-connecting two systems with the same nominal frequency

(3) Eliminating reactive power requirements in the operation

(4) Minimizing harmonics at the converter stations

18 If all the sequence voltages at the fault point 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

19 Which one of the following relays has the capability of anticipating the possible major fault in a transformer ?

(1) Over current relay (2) Differential relay

(3) Buchholz relay (4) Over fluxing relay

20 For transmission line which one of the following relations is true ?

(1) AD–BC = 1 (2) –AD–BC = 1

(3) AD–BC = –1 (4) AD–BC = 0

21 Feedback control systems are

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

22 The type number of control system with $G(s)\,H(s) = K(s+2)/s(s^2+2s+3)$ is

(1) One (2) Two

(3) Three (4) Four

23 The output of first order hold between two consecutive sampling instant is a

(1) Constant (2) Quadratic function

(3) Ramp function (4) Exponential function

24 Given a unity feedback system with $G(s) = K/s(s+4)$, the value of K for damping ratio of 0.5 is

(1) 1 (2) 4

(3) 16 (4) 64

25 Which one of the following is the most likely reason for large overshoot in a control system ?

(1) High gain in a system

(2) Presence of dead time delay in a system

(3) High positive correcting torque

(4) High retarding torque

26 The open-loop transfer function of a unity feedback control system is given by $G(s) = K(s+2)/s(s^2+2s+2)$

The centroid and angles of root locus asymptotes are respectively

(1) Zero and +90°, –90° (2) –2/3 and +60°, –60°

(3) Zero and +120°, –120° (4) –2/3 and +90°, –90°

27 How can steady state error in a system be reduced ?
(1) By decreasing the type of system
(2) By increasing system gain
(3) By decreasing the static error constant
(4) By increasing the input

28 For the equation, $s^3+4s^2+s+6=0$ the number of roots in the left half of s-plane will be
(1) zero (2) one
(3) two (4) three

29 The bode diagram approach is the most commonly used method for the analysis and synthesis of
(1) nonlinear feedback control systems only
(2) linear feedback control systems only
(3) open loop systems only
(4) all of the above

30 Which one of the following statements is correct?
Nichol's chart is useful for detailed study and analysis of
(1) Closed loop frequency response
(2) Open loop frequency response
(3) Closed loop and open loop frequency response
(4) None of these

31 A voltage source having an open-circuit voltage of 100 V and internal resistance of 50W is equivalent to a current source
(1) 2A in parallel with 50W. (2) 2A with 50W in series.
(3) 0.5A in parallel with 50W. (4) 2A in parallel with 100W.

32 Two resistors R_1 and R_2 give combined resistance of 4.5 Ω when in series and 1 Ω when in parallel, the resistances are
(1) 2 Ω and 2.5 Ω (2) 1 Ω and 3.4 Ω
(3) 1.5 Ω and 3 Ω (4) 4 Ω and 0.5 Ω

33 Three parallel resistive branches are connected across a dc supply. What will be the ratio of the branch currents $I_1:I_2:I_3$ if the branch resistances are in the ratio $R_1:R_2:R_3::2:4:6$?
(1) 3:2:6 (2) 2:4:6
(3) 6:3:2 (4) 6:2:4

34 Ideal current source have

(1) Zero internal resistance (2) Infinite internal resistance

(3) Low value of voltage (4) Large value of current

35 Kirchhoff's laws are valid for

(1) Linear circuits only

(2) Passive time invariant

(3) Nonlinear circuits only

(4) Both linear and nonlinear circuits only

36 Which of the following theorems is applicable for both linear and nonlinear circuits ?

(1) Superposition (2) Thevenin's

(3) Norton's (4) None of these

37 When a resistor R is connected to a current source, it consumes a power of 18 W. When the same R is connected to a voltage source having the same magnitude as the current source, the power absorbed by R is 4.5 W. The magnitude of current source and the value of R are

(1) $\sqrt{18}$ Aand $1\,\Omega$ (2) 3A and $2\,\Omega$

(3) 1A and $18\,\Omega$ (4) 6A and $0.5\,\Omega$

38 Millman's theorem yields equivalent

(1) Impedance or resistance

(2) Current source

(3) Voltage source

(4) Voltage or current source

39 When the power transferred to the load is maximum, the efficiency of power transfer is

(1) 25% (2) 75%

(3) 50% (4) 100%

40 In a balanced Wheatstone bridge, if the positions of detector and source are interchanged, the bridge will still remain balanced. This inference can be drawn from

(1) Reciprocity theorem (2) Duality theorem

(3) Compensation theorem (4) Equivalence theorem

41 Space charge region around a p-n junction

(1) does not contain mobile carriers

(2) contains both free electrons and holes

(3) contains one type of mobile carriers depending on the level of doping of the p or n regions

(4) contains electrons only as free carriers

42 The important characteristic of emitter-follower is

(1) high input impedance and high output impedance

(2) high input impedance and low output impedance

(3) low input impedance and low output impedance

(4) low input impedance and high output impedance

43 For a JFET, when VDS is increased beyond the pinch off voltage, the drain current

(1) Increases (2) Decreases

(3) Remains constant (4) First decreases and then increases.

44 A bistable multivibrator is a

(1) Free running oscillator (2) Triggered oscillator

(3) Saw tooth wave generator (4) Crystal oscillator

45 Transistor is a

(1) Current controlled current device.

(2) Current controlled voltage device.

(3) Voltage controlled-current device.

(4) Voltage controlled voltage device.

46 For NOR circuit SR flip flop the not allowed condition is _____.

(1) S=0, R=0 (2) S=0, R=1

(3) S=1, R=1 (4) S=1, R=0

47 The fan-out of a MOS-logic gate is higher than that of TTL gates because of its

(1) low input impedance (2) high output impedance

(3) low output impedance (4) high input impedance

48 n-type silicon is obtained by

(1) Doping with tetravalent element

(2) Doping with pentavalent element

(3) Doping with trivalent element

(4) Doping with a mixture of trivalent and tetravalent element

49 A'literal' in Boolean Algebra means

(1) a variable in its uncomplemented form only

(2) a variable or with its complement

(3) a variable in its complemented form only

(4) a variable in its complemented or uncomplemented form

50 Which of the following Boolean rules is correct ?

(1) $A+0=0$ (2) $A+1=1$

(3) $\overline{A+A}=\overline{A\cdot A}$ (4) $A+A\cdot B=\overline{A+B}$

51 Most of linear ICs are based on the two transistor differential amplifier because of its

(1) Input voltage dependent linear transfer characteristic.

(2) High voltage gain.

(3) High input resistance.

(4) High CMRR

52 Which of the following diodes is operated in reverse bias mode ?

(1) P-N junction (2) Zener

(3) Tunnel (4) Schottky

53 JFET is a

(1) Current controlled device with high input resistance

(2) Voltage controlled device with high input resistance

(3) Current Controlled Current Source (CCCS)

(4) Voltage Controlled Voltage Source (VCVS)

54 The depletion region in a Junction Diode contains

(1) only charge carriers (of minority type and majority type)

(2) no charge at all

(3) vacuum, and no atoms at all

(4) only ions i.e., immobile charges

55 Photo-electric emission current is proportional to

(1) frequency of the incident light

(2) incident light flux

(3) work function of photo-cathode

(4) angle of incidence of radiation

56 The magnetic susceptibility of a paramagnetic material is

(1) Less than zero

(2) Less than one but positive

(3) Greater than one

(4) Equal to zero

57 Magnetic current is composed of which of the following ?

(1) Only conduction component

(2) Only displacement component

(3) Both conduction and displacement component

(4) Neither conduction nor displacement component

58 The field at any point on the axis of a current carrying coil will be

(1) Perpendicular to the axis

(2) Parallel to the axis

(3) At an angle of 45° with the axis

(4) Zero

59 The coils having self inductance of 10 mH and 15 mH and effective inductance of 40 mH, when connected in series aiding. What will be the equivalent inductance if we connect them in series opposing ?

(1) 20 mH (2) 10 mH

(3) 5 mH (4) Zero

60 The energy stored in the magnetic field of a solenoid 30 cm long and 3 cm diameter wound with 1000 turns of wire carrying current of 10A is

(1) 0.015 J (2) 0.15 J

(3) 0.5 J (4) 1.15 J

61 The difference between the indicated value and true value of a quantity is

(1) gross error (2) absolute error

(3) dynamic error (4) relative error

62 For defining the standard meter, wavelength of which material is considered ?

(1) Neon (2) Krypton

(3) Helium (4) Xenon

63 Wire-wound resistors are unsuitable for use at high frequencies because

(1) They are likely to melt under excessive eddy current

(2) They exhibit unwanted inductive and capacitive effect

(3) They create more electrical noise

(4) They consume more power

64 Which of the following meters is an integrating type instrument ?

(1) Ammeter (2) Voltmeter

(3) Wattmeter (4) Energy meter

65 Industrial measuring instruments are of accuracy classes

(1) 0.5 and 1 (2) 0.5, 1, 1.5, 2.5 and 5

(3) 1, 1.5, 2.5 and 5 (4) 1.0, 0.2 and 0.5

66 Which of the following meters does not exhibit square law response ?

(1) Moving coil

(2) Moving iron

(3) Electrodynamometer

(4) Hot wire instrument

67 Decibel scale is useful while measuring voltages covering

(1) Wide frequency ratio (2) Wide voltage ratio

(3) Narrow frequency range (4) Narrow voltage range

68 Which of the following is free from hysteresis and eddy current errors ?
(1) Moving coil instrument
(2) Electrostatic instrument
(3) Moving coil permanent magnet type instrument
(4) Moving coil dynamometer type instrument

69 The primary current in a CT is dictated by
(1) The secondary burden (2) The core of transformer
(3) The load current (4) None of the above

70 What is clamp-on ammeter used for ?
(1) Low ac current (2) High ac current
(3) Low dc current (4) High dc current

71 Conductivity modulation is a phenomenon which occurs in
(1) Power MOSFEET (2) GTO thyristor
(3) IGBT (4) Power bipolar transistor

72 A thyristor can be termed as
(1) DC switch (2) AC switch
(3) Either (1) or (2) (4) Square wave switch

73 Suppose the anode current of a conducting SCR is 50A. If its gate current is reduced to one fifth, its anode current will become
(1) 10A (2) 50A
(3) 25A (4) Zero

74 Turn on and turn off time of transistor depend on
(1) Static characteristics (2) Junction capacitances
(3) Current gain (4) None of the above

75 It is preferable to use a train of pulse of high frequency for gate triggering of SCR in order to reduce
(1) dv/dt problem
(2) di/dt problem
(3) the size of the pulse transformer
(4) the complexity of the firing circuit

76 Which of the following does not cause permanent damage to an SCR ?
(1) High current (2) High rate of rise of current
(3) High temperature rise (4) High rate of rise of voltage

77 Static voltage equalization in series connected SCRs is obtained by the use of

(1) One resistor across the string
(2) Resistors of different value across each SCR
(3) Resistors of same value across each SCR
(4) One resistor in series with the string

78 A triac is a

(1) 2 terminal switch
(2) 2 terminal bilateral switch
(3) 3 terminal unilateral switch
(4) 3 terminal bidirectional switch

79 Triac cannot be used in

(1) AC voltage regulators (2) Cycloconverters
(3) Solid state type of switch (4) Inverter

80 Resonant convertors are basically used to

(1) Generate large peaky voltage
(2) Reduce the switching losses
(3) Eliminate harmonics
(4) Convert a square wave into a sine wave

81 A microprocessor is ALU

(1) And control unit on a single chip
(2) And memory on a single chip
(3) Register unit and I/O device on a single chip
(4) Register unit and control unit on a single chip

82 The suitable programmable counter for 8086 microprocessor is

(1) 8253 chip (2) 8254 chip
(3) 8359 chip (4) 8251 chip

83 The program counter in a 8085 microprocessor is a 16-bit register, because

(1) It counts 16-bits at a time
(2) There are 16- address line
(3) It facilitates the user for storing 16-bit data temporarily
(4) It has to fetch two 8-bit data at a time

84. Output of the assembler in machine code is referred to as
(1) Object program (2) Source program
(3) Macroinstruction (4) Symbolic addressing

85. Both the ALU and control section of CPU employ which special purpose storage location ?
(1) Buffers (2) Decoders
(3) Accumulators (4) Registers

86. Which logical operation is performed by ALU of 8085 to complement a number ?
(1) AND (2) NOT
(3) OR (4) EXCLUSIVE OR

87. In which unit is the performance of cache memory measured ?
(1) Hz (2) Bits/s
(3) cache constant (4) Hit ratio

88. In an Intel 8085 A, which is always the first machine cycle of an instruction?
(1) An op-code fetch cycle (2) A memory read cycle
(3) A memory write cycle (4) An I/O read cycle

89. What is an interrupt in which the external device supplies its address as well as the interrupt request known as ?
(1) Vectored interrupt (2) Maskable interrupt
(3) Non-maskable interrupt (4) None of the above

90. Which of the following is not a vectored interrupt ?
(1) RST 7.5 (2) RST 7
(3) TRAP (4) INTR

91. The keyword used to define a structure is
(1) Stru (2) Stt
(3) Struct (4) Structure

92. Header files often have the file extension
(1) .H (2) .HE
(3) .HEA (4) .HEAD

93 The #ifndef directive tests to see whether.....

(1) A class has been defined
(2) A variable has been given a value
(3) A class has no variable definitions
(4) Any objects of the class have been instantiated

94 The generic type in a template function

(1) Must be T
(2) Can be T
(3) Cannot be T for functions you create, but may be for C++'s built-in functions
(4) Cannot be T

95 A function is called automatically each time an object is destroyed is a

(1) Constructor (2) Destructor
(3) Destroyer (4) Terminator

96 The step by step instructions that solve a program are called

(1) An algorithm (2) A list
(3) A plan (4) A sequential structure

97 The type to be used in an instantiation of a class template follows

(1) The generic class name (2) The keyword template
(3) The keyword class (4) The template definition

98 When you pass a variable _____, C++ passes only the contents of the variable to the receiving function

(1) By reference (2) By value
(3) Globally (4) Locally

99 An array name is a

(1) Subscript (2) Formal parameter
(3) Memory address (4) Prototype

100 Overloaded functions are required to

(1) have the same return type
(2) have the same number of parameters
(3) perform the same basic functions
(4) none of the above

SPACE FOR ROUGH WOR