

075/23

Question Booklet Alpha Code

A

Question Booklet Sl. No.

Total Number of Questions : 100

Time : 90 Minutes

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C & D**.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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1. Specific resistance of a conductor depends on
 - A) Conductor diameter
 - B) Conductor material
 - C) Conductor length
 - D) Conductor radius
2. When five resistors each of $14\ \Omega$ are connected in parallel, the net resistance of the combination is _____ ohms.
 - A) 14
 - B) 70
 - C) 5.6
 - D) 2.8
3. Given 3 equal resistances. How many combinations of these three resistances can be made ?
 - A) 4
 - B) 6
 - C) 3
 - D) 5
4. Node analysis is an application of
 - A) KVL
 - B) KCL
 - C) Ohm's law
 - D) Joule's law
5. Electric power is
 - i. Voltage \times current
 - ii. Rate of energy
 - iii. Rate of work done
 - iv. Capacity to build voltage
 - A) i
 - B) i and ii
 - C) i, ii and iii
 - D) all of the above
6. The rms value of Sinusoidal ac current is equal to its value at an angle of
 - A) 60°
 - B) 30°
 - C) 45°
 - D) 90°
7. Internal resistances of a voltage source and current source are increased, what happens to their power output ?
 - A) Decrease for both
 - B) Increase for both
 - C) Increase for voltage source and decrease for current source
 - D) Decrease for voltage source and increase for current source
8. Peak factor of a Sinusoidal wave is
 - A) 1.11
 - B) 1.33
 - C) 1.41
 - D) 1.66
9. The value of equivalent load resistance R to be connected across a battery of internal resistance r to get maximum power transfer to the load is
 - A) $R > r$
 - B) $R < r$
 - C) $R = 0$
 - D) $R = r$

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10. For a battery the terminal voltage decreases with
 - A) Increase in load
 - B) Decrease in load
 - C) Increase in electrolyte concentration
 - D) Decrease in electrolyte concentration

11. In a three phase system, the voltage between 2 phases is
 - A) Terminal voltage
 - B) Line voltage
 - C) Phase voltage
 - D) None

12. In a three phase system, voltage across phase to neutral is called
 - A) Line voltage
 - B) Terminal voltage
 - C) Phase voltage
 - D) Neutral voltage

13. For same line current and line voltages, power taken by delta connected load is
 - A) Greater than star connected load
 - B) Less than star connected load
 - C) Equal to star connected load
 - D) Cannot judge

14. In a three phase ac circuit, the sum of all three generated voltages is
 - A) Infinite
 - B) One
 - C) Zero
 - D) 3 times maximum value

15. If time period of an alternating voltage is increased, what happens to its average value ?
 - A) Increases
 - B) Remains same
 - C) Can't determine
 - D) Decreases

16. In a parallel plate capacitor of capacitance value c , a plate is inserted at the middle of the capacitor. What happens to its capacitance ?
 - A) Remains same
 - B) Doubles
 - C) Became halved
 - D) Quarter the value of initial capacitance

17. If rms voltage of V volts gets transformed to another circuit to get $10 V$ rms, then the impedance of the transformed circuit will be
 - A) Higher than initial circuit
 - B) Lower than initial circuit
 - C) Cannot be determined
 - D) 10 times the first circuit

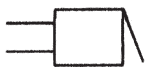
18. If number of turns, area of core and length of magnetic path are doubled, what happens to the inductance of a coil ?
 - A) 2 times
 - B) 4 times
 - C) remains same
 - D) 8 times

A

19. An instantaneous change in voltage is not possible in
 A) Capacitor B) Inductor C) Resistor D) Battery
20. Between 1 mA to 20 mA, electric shock will be
 A) just bearable B) painful C) stop breathing D) fibrillation of heart
21. One Webber is equal to _____ Maxwell.
 A) 10^8 B) 10^6 C) 10^{-8} D) 10^{-6}
22. The MMF in a magnetic circuit is equal to
 A) Effective voltage applied to the core B) Effective current flow to the core
 C) Flux in the core D) Both A) and B)
23. A charge q is located at the centre of a cube, the electric flux through any face is
 A) $\frac{4\pi q}{4\pi\epsilon_0}$ B) $\frac{4\pi q}{6(4\pi\epsilon_0)}$ C) $\frac{2\pi q}{4\pi\epsilon_0}$ D) $\frac{2\pi q}{6(4\pi\epsilon_0)}$
24. Relation between electric flux density (D) and field intensity (E) with relative and absolute permittivity is expressed by
 A) $E = \frac{D}{\epsilon_0\epsilon_r}$ B) $E = \frac{D\epsilon_0}{\epsilon_r}$ C) $E = \frac{\epsilon_0\epsilon_r}{D}$ D) $E = \frac{D\epsilon_r}{\epsilon_0}$
25. Which of the following types of charges on surface has position but not the dimensions ?
 A) Line charge B) Surface charge
 C) Volume charge D) None of the above
26. During thunderstorm a 50 C charge is discharged between clouds. The time of discharge is 20 ms. Determine the lightning current.
 A) 3 MA B) 5 MA
 C) 2.5 MA D) None of the above
27. A capacitor is charged from a battery. After fully charged the battery is removed and a identical uncharged capacitor is connected in parallel. The total energy of the combination is
 A) Increases by a factor of 2 B) Remain constant
 C) Decreases by a factor of 2 D) None of the above
28. C is the capacitance of a parallel plate capacitor with air as dielectric. If half portion is filled with a dielectric with permittivity of ϵ_r , then the expression for new capacitance is
 A) $\frac{C}{2}[1 + \epsilon_r]$ B) $\frac{C}{4}[1 + \epsilon_r]$ C) $\frac{C}{2}[1 - \epsilon_r]$ D) $\frac{C}{4}[1 - \epsilon_r]$

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29. Find the average current in an indicator, if the total current in the inductor is 50A.
A) 50 A B) $50/\sqrt{2}$ A C) 20 A D) 25 A
30. During Faraday's electromagnetic induction experiment, the mechanical effort of movement of magnet near a coil produce electricity in that coil. This can be explained on the basis of
A) Lenz's law and conservation of charge
B) Lenz's law and conservation of energy
C) Faraday's law and conservation of energy
D) Faraday's law and conservation of charge
31. Colour rendering index of LED lamps
A) 60 – 75 B) 70 – 95 C) 95 – 100 D) 55 – 60
32. Unit of Luminance is
A) $\frac{\text{candela}}{\text{meter}}$ B) $\frac{\text{meter}^2}{\text{candela}}$ C) $\left(\frac{\text{lumen}}{\text{steradian}}\right) \frac{1}{\text{meter}^2}$ D) $\frac{\text{steradian}}{\text{meter}^2}$
33. Minimum size of earth conductor for 30 – 50 HP motor in SWG is
A) 5 SWG B) 2 SWG C) 1 SWG D) 6 SWG
34. One lamb should be controlled from 6 different places, for that how many intermediate and two way switches are needed ?
A) 3 intermediate and 2 two way switch B) 4 intermediate and 2 two way switch
C) 5 intermediate and 1 two way switch D) 6 intermediate and 2 two way switch
35. Application of limit switch is
A) Limit the signal level
B) Convert electrical signal to mechanical action
C) Convert mechanical motion to electricity
D) None of the above
36. The following symbol in electrical engineering is used for representing



- A) MCCB B) Fuse
C) Buzzer D) Two point starter

37. IE Rule 88 deals with
- A) Shielding of equipment B) Guarding in electrical system
C) Earthing of cable sheath D) None of the above
38. The length of thread in GI conduit is
- A) 11 mm – 27 mm B) 5 mm – 10 mm
C) 27 mm – 35 mm D) 15 mm – 30 mm
39. What is the short time temperature rating of XLPE cable ?
- A) 130°C B) 110°C C) 90°C D) 80°C
40. Typical tripping time for 'C' type MCB is of
- A) 0.04 to 1 Second B) 0.04 to 5 Second
C) 0.04 to 3 Second D) 0.4 to 5 Second
41. Sometimes one wattmeter read negative, when conducting 3 phase power measurement using two wattmeter. When does it occur ?
- A) When power factor is unity
B) When power factor is less than 0.5
C) When power factor is less than 0.5 lagging
D) When power factor is greater than 0.5 lagging
42. How can be connect the pressure coil of a wattmeter is, which consists of two pressure coils ?
- A) Series or parallel B) Series only
C) Parallel only D) Cannot be connected at all
43. Integrating principle in the digital measurement is the conversion of
- A) Voltage to current B) Current to voltage
C) Voltage to frequency D) Frequency to voltage
44. Which of the following statement is/are correct about Owen's bridge ?
- i. Measurement of unknown inductance.
ii. Measurement of incremental permeability.
iii. Measurement of incremental inductance.
- A) Only i B) Only i and ii
C) Only ii and iii D) All of the above (i, ii and iii)

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45. A circle is seen on the screen of a CRO when two time varying signals of same frequency and same magnitude are applied to X and Y plates of CRO. The relative phase difference is
A) 360° B) 90° C) 180° D) 45°
46. Calibration of a voltmeter is done through
A) A hertz meter B) An ampere hour meter
C) A signal generator D) A potentiometer
47. What would be the sensitivity of an ammeter which requires change of 2A in its coil to produce a change in deflection of the pointer by 6 mm ?
A) 0.3 mm/A B) 0.3 A/mm
C) 3 mm/A D) 3 A/mm
48. A 0 to 300 V voltmeter has guaranteed accuracy of 1% full scale reading. The voltage measured by the instrument is 96 V. The percent limiting error is
A) 0.32% B) 3.13% C) 1.81% D) 0.81%
49. If an instrument has cramped scale for larger values, then it follows
A) Uniform law B) Square law
C) Logarithmic law D) None of the above
50. The power of a 1-phase 3.3 kV load drawing a current of 30 A is required to be measured by means of a wattmeter having potential terminals marked as 110 V and current terminals as 6 A. What is the transformation ratio of the CT ?
A) 5 A B) 0.2 A C) 18.33 A D) 0.5 A
51. If an alternating voltage source is connected to a power transformer, its no load current would be
A) Sinusoidal and lagging the voltage by 90°
B) Sinusoidal and lagging the voltage by less than 90°
C) Sinusoidal and leading the voltage by 90°
D) Sinusoidal and leading the voltage by less than 90°
52. Voltage regulation of a large transformer is mainly influenced by
A) No load current and load power factor
B) Winding resistances and load power factor
C) Leakage fluxes and load power factor
D) Winding resistances and core loss

53. As the load on the transformer is increased, the core losses
- A) Decrease slightly
 - B) Increase slightly
 - C) Remain constant
 - D) May decrease or increase slightly depending upon the nature of load
54. 'Crawling' in an induction motor is due to
- A) Space harmonics produced by winding currents
 - B) Insufficient starting torque
 - C) Slip-ring rotor
 - D) Time harmonics in supply
55. In a three phase induction motor, torque and supply voltage are related as
- A) $T \propto V^{1/2}$
 - B) $T \propto V$
 - C) $T \propto V^2$
 - D) $T \propto 1/V$
56. A three phase slip-ring induction motor is wound for four poles in stator and six poles in rotor. When a three phase balanced voltage source at 50 Hz is applied to the motor, it will run at
- A) 1500 rpm
 - B) 1000 rpm
 - C) 750 rpm
 - D) Not run
57. A synchronous motor and an induction motor are connected to a common feeder line. To operate the feeder line at unity power factor, the synchronous motor should be
- A) Under-excited
 - B) Over-excited
 - C) Normally-excited
 - D) Disconnected from the common terminal
58. Which of the following single phase motor has highest starting torque ?
- A) Capacitor start motor
 - B) Repulsion motor
 - C) Shaded pole motor
 - D) Split-phase motor
59. In an AC servomotor, the control winding is supplied with input voltage of
- A) Any frequency compared to the reference winding but of the same phase
 - B) Any frequency compared to the reference winding but with 90° phase difference
 - C) Same frequency as the reference winding voltage and also having same phase
 - D) Same frequency as the reference winding voltage but with 90° phase difference

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60. For a given stepper motor, which of the following torque has the highest numerical value ?
A) Pull in torque B) Pull out torque C) Holding torque D) Detent torque
61. The interpoles in DC machines have a tapering shape in order to
A) reduce the overall weight
B) increase the acceleration of commutation
C) reduce the saturation in the interpoles
D) economics on the material required for interpoles and their windings
62. If two 8-pole DC machines of identical armature are wound, one with lap winding and the other with wave winding, then
A) wave wound machine will have more rated current and more voltage
B) lap wound machine will have more rated voltage and more current
C) lap wound machine will have more rated voltage and less current
D) wave wound machine will have more rated voltage and less current
63. If the speed of a DC motor increases with load torque, then it is a
A) series motor
B) permanent magnet motor
C) differentially compounded motor
D) cumulatively compounded motor
64. A DC shunt motor having unsaturated magnetic circuit runs at 1500 rpm with rated voltage. If the applied voltage is half of rated voltage, the motor will run at
A) 750 rpm B) 1000 rpm C) 1200 rpm D) 1500 rpm
65. A DC shunt motor has external resistances of R_a and R_f in the armature and field circuits respectively. Armature current at starting can be reduced by keeping
A) R_a maximum and R_f minimum B) R_a maximum and R_f maximum
C) R_a minimum and R_f minimum D) R_f maximum and R_a minimum
66. An electric train employing a DC series motor is running at a fixed speed. When a sudden slight drop in the mains voltage occurs, what result will occur ?
A) rise in speed and drop in current
B) drop in speed and rise in current
C) rise in speed and rise in current
D) drop in speed with current unaltered

A

67. A pair of similar DC shunt generators operates in parallel and supply a common load. It is required to switch off machine 1 and allow machine 2 to supply the entire load. The following operations are to be used to achieve this
- switch off the main switch of machine 1
 - reduce the field current of machine 1
 - increase the field current of machine 2
 - ensure that machine 1 just floats.
- The correct sequence of these operations are
- iv iii ii i
 - ii iii iv i
 - ii iv iii i
 - iii ii iv i
68. The most suitable generator for welding purpose is
- shunt generator
 - separately excited generator
 - cumulative compound generator
 - differential compound generator
69. In DC shunt motors, the field excitation is kept maximum value during starting to
- increase acceleration time
 - decrease starting torque
 - reduce armature heating
 - prevent voltage dip in the supply mains
70. Three point starters of DC shunt motors are not used in applications where speed variation by field flux control is required because
- the motor may stop at very high speeds
 - the motor may stop at very low speeds
 - the motor may stop both at very high and at very low speeds
 - the motor may run away
71. For variable heads of near about less than 30 m, which type of turbine is used in hydropower station ?
- Pelton turbine
 - Kaplan turbine
 - Francis turbine
 - None of these

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72. In DC transmission line
- A) it is necessary for the sending end and receiving end to be operated in synchronism
 - B) the effects of inductive and capacitive reactance are greater than in an AC transmission line of the same rating
 - C) power transfer capability is limited by stability considerations
 - D) there is no effects due to inductive and capacitive reactances
73. Series capacitive compensation on EHV transmission lines is used to
- A) reduce the voltage profile
 - B) reduce the line loading
 - C) improve the protection of the line
 - D) improve the stability of the system
74. Type of tidal energy generator which uses in a large dam is known as
- A) barrage
 - B) lagoon
 - C) tidal stream
 - D) gateway
75. In an open cycle MHD steam power plant, the temperature at the entrance of MHD duct is
- A) 1000 – 1250 K
 - B) 1500 – 2000 K
 - C) 2000 – 2500 K
 - D) 2500 – 3000 K
76. The angle at which a PV panel is installed from the horizontal affect its output. The ideal angle from horizontal surface is
- A) $10^\circ - 20^\circ$
 - B) $20^\circ - 30^\circ$
 - C) $30^\circ - 45^\circ$
 - D) $50^\circ - 60^\circ$
77. Wind mill called as 'Darriens' mill is
- A) Flexible boom mill
 - B) Vertical axis mill
 - C) Horizontal axis single blade mill
 - D) Horizontal axis bicycle wheel mill
78. What is the average wind velocity observed on earth ?
- A) 14 m/sec
 - B) 9 m/sec
 - C) 4 m/sec
 - D) 1 m/sec
79. The type of insulator used on line up 33 KV is
- i. Pin insulator
 - ii. Reel insulator
 - iii. Post insulator
 - iv. Strain insulator
- A) i and ii
 - B) ii and iii
 - C) i and iv
 - D) iii and iv

A

80. What is the angle between the pole and stay in overhead lines ?
 A) 60° B) 45° C) 10° D) 30°
81. The output of an AND gate is high when
 A) All inputs are high B) All inputs are low
 C) Any one of the inputs are high D) Any one of the inputs are low
82. The decimal number corresponding to binary number 1101101.1011 is
 A) 119.5786 B) 111.7856
 C) 109.6875 D) 191.8657
83. Which of the following statement is/are correct about De-Morgan's theorem ?
 i. The complement of a product variable is equal to the sum of the complement of the variables.
 ii. The complement of a sum variable is equal to the product of the complement of the variables.
 iii. The complement of two or more variables OR ed is equal to the AND ing of the complement of the individual variables.
 A) Only i B) Only i and ii
 C) Only iii D) All of the above (i, ii and iii)
84. A digital circuit which accepts two input bits, one input carry bit and generates a sum output bit and a carry bit is known as
 A) BCD adder B) Full adder C) Half adder D) None of these
85. Which of the following flip-flop has invalid states in the output when all inputs are high ?
 A) S R Flip-flop B) J K Flip-flop C) D Flip-flop D) Both B) and C)
86. The maximum voltage that appears across a diode in full wave rectifier during its blocking state is called
 A) Cut in Voltage B) Ripple Voltage
 C) Forward Breakdown Voltage D) Peak Inverse Voltage
87. Which of the following method is/are not used for triggering a Thyristor ?
 A) di/dt triggering B) light triggering
 C) forward voltage triggering D) none of the above

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88. Which of the following is a bidirectional Thyristor ?
A) SCR B) TRIAC C) IGBT D) FET
89. Which of the following commutation method is employed in series inverters ?
A) Line commutation B) Natural commutation
C) Load commutation D) All of the above
90. Which of the following is a dc regulated power supply that performs only stepdown of voltage ?
A) Cuk converter B) Buck converter
C) Cyclo converter D) None of these
91. Which of the following consists of a mechanical valve operated through an electrical coil ?
A) Pneumatic valve B) Plug valve
C) Hydraulic valve D) Solenoid valve
92. Which of the following starter is most economical and suitable for starting a 3.5 KW SCIM ?
A) Auto transformer starter B) Star delta starter
C) Direct on line starter D) Two point starter
93. Two motors A and B are operated such a way that motor B should start only after motor A has started. Which of the following arrangement is correct for this operation ?
i. Insert a normally open contact of contactor A in series with the contactor coil B.
ii. Insert a normally closed contact of contactor A in series with the contactor coil B.
iii. Insert a normally open contact of contactor B in series with the contactor coil A.
A) Only i B) Only iii C) Only i and ii D) Only ii
94. Which of the following sequence of connection is/are correct about an AC motor control circuit ?
i. Line – Fuse – N/C push button switch – N/O push button switch – OLR – Relay coil – Neutral
ii. Line – Fuse – N/C push button switch – Neutral – N/O push button switch – OLR – Relay coil
iii. Line – Fuse – N/C push button switch – N/O push button switch – OLR – Neutral – Relay coil
A) Only ii B) Only iii
C) Only i D) All of the above (i, ii and iii)

A

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Space for Rough Work