

Time : 2 Hours

Marks : 80

Instructions :

- (i) Each question carries ONE mark.
- (ii) Choose the correct or most appropriate answer from the given options to the following questions and darken, with Black Ball Point Pen only, the corresponding digit 1, 2, 3 or 4 in the circle pertaining to the question number concerned in the OMR Answer Sheet, separately supplied to you.

SECTION - A : CORE SUBJECT

1. The reactance offered by a capacitor to an alternating current of frequency 50 Hz is 20 ohms. If frequency is increased to 100 Hz, reactance becomes

- (1) 2.5 ohms
 (2) 5 ohms
 (3) 10 ohms
 (4) 15 ohms

$$X_L = 2\pi f L$$

$$= 2\pi \times 100 \times 20$$

$$= 4000 \frac{\text{ohm}}{s}$$

$$\frac{R_1}{R_2} = \frac{f_1}{f_2} = \frac{20}{R_2} = \frac{50}{100}$$

$$R_2 = \frac{20 \times 100}{50} = 40$$

2. An ac source of 200 V r.m.s. supplies active power of 600 watts and reactive power of 800 VAR. The r.m.s. current drawn from the source is

- (1) 10 A
 (2) 5 A
 (3) 3.75 A
 (4) 2.5 A

$$S = \frac{P}{\cos \phi} = \frac{P^2 + Q^2}{P}$$

$$= \frac{600^2 + 800^2}{600}$$

$$= \frac{1000000}{600} = 1666.67$$

$$I = \frac{S}{V} = \frac{1666.67}{200} = 8.33$$

3. A 100 mH inductor carries a sinusoidal current of 1 A r.m.s at a frequency of 50 Hz. The average power dissipated by the inductor is _____ watts.

- (1) 0
 (2) 0.25
 (3) 0.5
 (4) 1

$$P = V I \cos \phi$$

$$= 1 \times 1 \times 0 = 0$$

4. As compared to squirrel cage induction motor, a wound rotor induction motor is preferred when the major consideration is

- (1) High starting torque
 (2) Low windage losses
 (3) Slow speed operation
 (4) Low starting torque

5. Flame proof motors are used in

- (1) paper mills
 (2) steel mills
 (3) moist atmospheres
 (4) explosive atmospheres

6. Candela is the unit of
 (1) Luminous flux
 (3) Wavelength
 (2) Luminous intensity
 (4) Frequency
-
7. Inverse square law and Lambert's cosine law are associated with
 (1) Illumination
 (3) Magnetism
 (2) Electricity
 (4) Electric current
-
8. The ratio of the illumination when everything is clean to the illumination under normal working conditions is defined as
 (1) depreciation factor
 (3) utilization factor
 (2) waste light factor
 (4) absorption factor
-
9. The electrodes used for projection welding are
 (1) flat and smaller in diameter
 (3) round and smaller in diameter
 (2) flat and larger in diameter
 (4) round and larger in diameter
-
10. Induction heating takes place in
 (1) conducting but not magnetic materials
 (2) conducting materials may be magnetic or non magnetic in nature
 (3) insulating materials
 (4) conducting and magnetic materials
-
11. The most modern method of heating in food processing unit is
 (1) eddy current heating
 (3) induction heating
 (2) dielectric current
 (4) resistance heating
-
12. Steel pipes are manufactured by
 (1) Arc welding
 (3) Resistance welding
 (2) Argon arc welding
 (4) Thermit welding
-
13. A 60 W lamp given a luminous flux of 1500 lumen. Its efficiency is
 (1) 1500 lumen/watt
 (2) 250 lumen/watt
 (3) 25 lumen/watt
 (4) 2.5 lumen/watt

$$\frac{1500}{60} = 25$$

$$\frac{60}{1500} = \frac{1}{25}$$

14. Cooling of transformers is necessary to

- (2) (1) Increase the efficiency
 (2) Dissipate the heat generated in the windings
 (3) Reduce the losses
 (4) Reduce humming

15. Power loss in the open circuit and short circuit tests on a transformer gives approximately an account of the

- (1) Core losses and the copper losses respectively $P = I^2 R$
 (2) Copper losses and core losses respectively
 (3) Eddy current losses and hysteresis losses respectively
 (4) Hysteresis losses and eddy current losses respectively

16. The all-day efficiency of a transformer is the ratio of

- (2) (1) kWh output and kWh input in a month
 (2) kWh output and kWh input in a day
 (3) Output power and input power
 (4) Input power and output power

17. The ratio of primary to secondary voltage of a transformer is 2:1. The saving in terms of weight of copper required, if an autotransformer is used instead of a two winding transformer will be

- (1) (1) 50%
 (2) 33.33%
 (3) 66.67%
 (4) 97%
- 50%
 33.33%

18. For satisfactory parallel operation of two single phase transformers, which one of the following is not required to be fulfilled.

- (1) (1) kVA rating of the transformer should be equal
 (2) Transformers should be properly connected with regard to their polarity
 (3) Voltage rating of the primary windings should be suitable for the supply system voltage and frequency, also the turns ratio of the transformer must be equal
 (4) The percentage impedance of the two transformers should be equal.

19. The full load iron loss of a certain transformer is 100 W, what will be its iron loss at half load?

- (2) (1) 200 W
 (2) 100 W
 (3) 50 W
 (4) 25 W
- $\frac{1}{2} \times 100 = 25$
 $(\frac{1}{2})^2 \times 100 = 25$
 $\frac{1}{4} \times 100 = 25$

20. Which is the common method of cooling in a power transformer?

(2)

~~(1)~~ Air cooling

(2) Oil cooling

(3) Air-blast cooling

(4) Natural cooling

21. Aluminium is not used as winding wire for the armature of a dc machine because

(2)

(1) Aluminium has low resistivity

(2) A large winding space is taken by aluminium conductors and creates jointing problems

(3) The thermal conductivity of aluminium is low

~~(4)~~ Aluminium has low conductivity as compared to copper

22. The commutator segments of a dc machine are insulated from each other by a thin layer of

(3)

(1) Bakelite

(2) Mica

(3) PVC

(4) Hard rubber

23. The armature of a dc machine is laminated

(2)

(1) to reduce the hysteresis loss

(2) to reduce eddy current loss

(3) to reduce the mass

(4) to reduce the inductance

24. Three phase induction motors are widely used for industrial applications because

(1) They are rugged in construction, require less maintenance and are less expensive than other motors

(2) Their speed can be controlled very smoothly over a wide range

(3) Their operating characteristics are superior over other electrical motors

(4) They can be manufactured easily for any hp rating

25. The slip of a 400 V, 50 Hz, three phase, 4 pole induction motor when rotating at 1440 r.p.m. is

(1) 2 percent

(2) 3 percent

(4) 5 percent

(3) 4 percent

$$S = \frac{1500 - 1440}{1500} = \frac{60}{1500} = \frac{6}{150} = \frac{1}{25} = 4\%$$

6-D

60

$$N_r = N_s (1 - S)$$
$$\frac{N_r}{(1 - S)} = N_s \quad \text{So} \quad \frac{N_r - N_s}{N_s} = S$$
$$N_s = \frac{50 \times 60}{4} = 750$$
$$\frac{1440 - 1500}{1500} = \frac{N_s - N_r}{N_s} = \frac{1500 - 1440}{1500} = \frac{60}{1500} = 4\%$$

26. The torque slip characteristic of an induction motor is such that

T ∝ s

- (1) for lower value of slip, torque is directly proportional to slip and for higher values of slip, torque is inversely proportional to slip
- (2) for lower values of slip, torque is inversely proportional to slip and for higher values of slip, torque is directly proportional to slip
- (3) for lower values of slip, torque is directly proportional to the square of the slip and for higher values of slip, torque is inversely proportional to slip
- (4) for lower values of slip, torque is directly proportional to slip and for higher values of slip, torque is inversely proportional to square to slip

27. The power input in blocked-rotor test performed on a three phase induction motor is approximately equal to

- (1) Hysteresis loss in the core
- (2) I^2R loss in the windings
- (3) Eddy current loss in the core
- (4) Iron loss in the core

28. Blocked rotor test of an induction motor correspond, in case of a transformer to

- (1) Full load
- (2) Half full load
- (3) No load
- (4) Short circuit operation

29. In case of a shaded pole motor, shading coils are used to

- (1) Reduce winding losses
- (2) Reduce friction losses
- (3) Produce rotating magnetic field
- (4) Protect against sparking

30. In ac series motors armature coils are usually connected to commutator

- (1) through resistors
- (2) through inductors
- (3) through capacitors
- (4) solidly

31. In a single phase induction motors and commutator motors, the phase difference between the currents in the main and auxiliary windings is achieved by

- (1) placing the two windings at an angle of 90 degree electrical in the stator slots
- (2) applying two-phase supply across the two windings
- (3) introducing capacitive reactance in the auxiliary winding circuit
- (4) connecting the two windings in series across a single phase supply

A dc series motor when connected across an ac supply will

- 4
- (1) Develop the torque in the same direction
 - (2) Not develop any torque
 - ~~(3) Draw dangerously high current~~
 - (4) Develop a pulsating torque

33. A universal motor is one which has

- (3)
- (1) constant speed
 - (2) constant output
 - (3) capability of operating both on ac and dc with comparable performance
 - (4) maximum efficiency

34. Probability of occurrence of all the three phase short circuited fault in transmission system is

- (3)
- (1) 70%
 - (2) 20%
 - (3) 2 to 3%
 - (4) 50% LLL

35. Which one of the following is correct statement?

- (2)
- ~~(1) Circuit breaker and isolator do the same functions~~
 - (2) Circuit breaker can only break the circuit while isolator can break as well as make the circuit
 - (3) Circuit breaker and isolator both can only break the circuit
 - (4) Circuit breaker can break as well as make the circuit while isolator can only break the circuit

36. The primary component which ensures safety of a line from damage is

- (1)
- ~~(1) Relay~~
 - (2) Circuit breaker
 - (3) Bus bar
 - (4) Current transformer

37. The purpose of back up protection is to

- 4
- (1) increase the speed
 - (2) increase the reach
 - (3) leave no blind spot
 - (4) guard against failure of primary

38. Basic quantity measured in distance relay is

- (1)
- (1) Impedance
 - (2) Current difference
 - (3) Voltage difference
 - (4) Distance between two current transformers

39. The arcing contacts in a circuit breaker are made of
- (1) (1) Copper tungsten alloy (2) Porcelain
 (3) Electrolytic copper (4) Aluminium alloy
-
40. Circuit breakers usually operate under
- (1) (1) transient state of short circuit current
 (2) sub transient state of short circuit current
 (3) steady state of short circuit current
 (4) after DC component has ceased
-
41. In Merz price percentage differential protection of a Δ -Y transformer, the CT secondaries connection in the primary and secondary windings of the transformer would be in the form of
- (2) (1) Δ -Y (2) Y- Δ (3) Δ - Δ (4) Y-Y
-
42. Earthing transformer is used to
- (1) Improve neutral wire's current capacity
 (2) Avoid overheating of transformer
 (3) Provide artificial earthing
 (4) Avoid harmonics
-
43. Percentage differential protection is used to prevent
- (1) (1) Inter-turn faults (2) Heavy loads
 (3) External faults (4) Magnetizing current
-
44. The function of steel wire in ACSR conductor is to
- (1) compensate for skin effect
 (2) take care of surges
 (3) provide additional mechanical strength
 (4) reduce the inductance
-
45. The sag of conductors of a transmission line is 2.5 m when the span is 250 m. Now if the height of the supporting towers is increased by 25%, the sag will
- (4) (1) reduce by 25% (2) increase by 25%
 (3) reduce by 12.5% (4) remain unchanged
- $S = 2.5 \text{ m}$
 250 m
 $\downarrow S \propto \frac{1}{h^2}$
 $\frac{1}{1.5^2} \cdot \frac{1}{25^2} = \dots$

46. The insulator used on 132 kV transmission lines is generally

- (2) (1) Pin type
 (2) Disc type
 (3) Shackle type
 (4) Pin and shackle type

47. Corona loss increases with

- (1) (1) decrease in conductor size and increase in supply frequency
 (2) increase in both conductor size and supply frequency
 (3) decrease in both conductor size and supply frequency
 (4) increase in conductor size and decrease in supply frequency

(48) The inductance of single phase two wire power transmission line per km gets doubled when the distance between the

- (1) wires is doubled
 (2) wires is increased four times
 (3) wires is increased as square of the original distance
 (4) wires is halved

$$L \propto \frac{1}{d^2} = \frac{1}{(2d)^2}$$

$$\frac{1}{4}$$

49. The capacitance of an overhead transmission line increases with

- (A) increase in mutual geometrical mean distance
 (B) increase in height of conductors above ground

Select correct answer from the following:

- (2) (1) Both (A) and (B) are true
 (2) Both (A) and (B) are false
 (3) Only (A) is true
 (4) Only (B) is true

50. The concept of an electrically short, medium and long line is primarily based on

- (3) (1) nominal voltage of the line
 (2) physical length of the line
 (3) wavelength of the line
 (4) power transmitted over the line

51. The velocity of propagation of electromagnetic waves on overhead transmission line is

- (1) (1) 3×10^8 m/s
 (2) 3×10^8 km/s
 (3) 3×10^{10} m/s
 (4) 3×10^8 km/hour

52. Under no load conditions, the current in a transmission line is because of

- (1) Capacitance effect
- (2) Corona effect
- (3) Proximity effect
- (4) Back flow from earth

53. The purpose of guard ring in transmission line is to

- (1) reduce the earth capacitance of the lowest unit
- (2) increase the earth capacitance of the lowest unit
- (3) reduce the transmission line losses
- (4) increase the transmission line losses

54. The type of distributor used in residential area is normally

- (3) (1) single phase, two wire
- (2) three phase, three wire
- (3) three phase, four wire
- (4) two phase, four wire

55. Stringing charts are useful

- (1) for finding the sag in the conductor
- (2) in the design of tower
- (3) in the design of insulator string
- (4) for finding the distance between the towers

56. The sag of a transmission line is least effect due to

- (1) weight of the conductor
- (2) current through the conductor
- (3) atmospheric temperature
- (4) ice deposition on the conductor

57. The self Geo-metric Mean Distance (GMD) method is used to evaluate

- (1) Inductance
- (2) Capacitance
- (3) Resistance
- (4) Both inductance and capacitance

58. Hollow conductors are used in transmission lines to

- (1) reduce weight of copper
- (2) improve stability
- (3) reduce corona
- (4) increase power transmission capacity

59. A wattmeter has a full scale range of 2500 W. It has an error of +/- 1 percent of true value. The range of reading if true power is 1250 will be

- (1) 1225 W to 1275 W
- (2) 1245 W to 1255 W
- (3) 1200 W to 1300 W
- (4) 1237.5 W to 1262.5 W

$$\frac{2500 \pm 1}{1250} = 1200 \pm 1250$$

$$\frac{N_1}{N_2} = \frac{I_2}{I_1}$$

CT ratio
= 20/10

60. The nominal ratio of a current transformer is
- (1) primary winding current / secondary winding current
 - (2) rated primary winding current / rated secondary winding current
 - (3) number of turns of primary winding / number of turns of secondary winding
 - (4) rated secondary winding current / rated primary winding current

61. When measuring power with an electro dynamometer type wattmeter in a circuit where the load current is large

- (1) the current coil should be connected on the load side
- (2) the pressure coil should be connected on the load side
- (3) the pressure coil should be connected on the supply side
- (4) it is immaterial whether the current coil or the pressure coil is on the load side

62. The domestic supply voltage of 220V represents the

- (1) peak value
- (2) mean value
- (3) rms value
- (4) average value

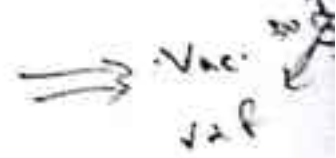
63. The power factor of a system is kept high in order to

- (1) reduce load handling capacity of electrical system
- (2) increase voltage regulation of the line
- (3) increase line losses
- (4) maximize the utilization of capacities of generators, lines and transformers

p.f ↑

64. Two waves of alternating voltages of same frequency are out of phase when the phase angle between them is

- (1) 180 degrees
- (2) 90 degrees
- (3) 0 degree
- (4) 360 degrees



65. In a series RLC circuit, at resonance frequency the

- (1) current is maximum
- (2) current is minimum
- (3) impedance is maximum
- (4) voltage across C is minimum

SECTION - B : GENERAL AWARENESS AND NUMERICAL ABILITY

66. Identify the National leader who was popularly known as 'The Grand Old Man of Indian Politics'

- (2) (1) Balgangadhar Tilak
 (2) Dadabhai Nauroji
 (3) Muhammad Ali Jinnah
 (4) Bipinchandrapal

67. Who discovered the 'Printing Press'?

- (1) (1) Gutenberg
 (2) Charless Kalin
 (3) Mose Felix
 (4) John Kane

68. One must be loyal to _____ country.

- (3) (1) his
 (2) her
 (3) one's
 (4) our

69. She has _____ a song.

- (1) (1) sung
 (2) singing
 (3) singed
 (4) sang

70. Identify the kind of sentence given below

He passed the test.

- (3) (1) Complex
 (2) Compound
 (3) Simple
 (4) Compound - Complex

71. 'Nayankara system' was an important military system introduced.

- (4) (1) Pallavas
 (2) Cholas
 (3) Western Chalukyas
 (4) Kakatiyas

72. Who built the popular Bhadrachalam Temple?

- (4) (1) Ibrahim Quli
 (2) Aliya Ramaraya
 (3) Tanashah
 (4) Kancharla Gopanna

73. 'Kunthala Jalapatham' is located in

- (1) Medak
- (3) Nizamabad

- (2) Adilabad
- (4) Warangal

74. 8085 microprocessor has _____ hardware interrupts.

- (1) 2
- (3) 4

- (2) 3
- (4) 5

75. What will be the output of the following program?

```
main()
{
float me = 1.1;
double you = 1.1;
if(me == you)
printf("I see you");
else
printf("I hate you");
}
```

- (1) I see you
- (3) Can't compare double and float

- (2) I hate you
- (4) No output displayed

76. The size of MAC address and IPv4 address is

- (1) 32 bits and 16 bits respectively
- (2) 16 bits and 32 bits respectively
- (3) 48 bits and 32 bits respectively
- (4) 48 bits and 16 bits respectively

$8 \times 24 = 192 \times 3 = 576 = 16 \times 36 = 16 \times 3 \times 12$

77. Find the missing term in the following series

8, 24, 12, ?, 18, 54

- (1) 26
- (3) 36
- (2) 24
- (4) 32

$8 \times 3 = 24$
 $24 \div 2 = 12$
 $12 \times 3 = 36$
 $36 \div 2 = 18$
 $18 \times 3 = 54$

V1

Booklet Code : **D**

78. X and Y are brothers. C and D are sisters. X's son is D's brother. How is Y related to C?

- (1) (1) Uncle (2) Grand Father
(3) Father (4) Mother

79. What percentage of 180.50 is 36.1?

- (1) (1) 20 (2) 25
(3) 20.50 (4) 22

80. Identify the author of Sanskrit Drama 'Abhignana Shakuntalam'.

- (1) (1) Kalidasa (2) Dignaga
(3) Charaka (4) Bhanabhat

□□□□□

180.50 is 36.1
36.1 / 180.50 = 20%

180.50 is 36.1
36.1 / 180.50 = 20%