



Direction Q 11 : There is a certain relation between two given words on one side of :: and one word is given on another side of :: while another word is to be found from the given alternatives, having the same relation with this word as the given pair has. Select the best alternative.

11. Moon : Satellite :: Earth : ?

A) Sun

B) Planet

C) Solar system

D) Asteroid

Direction Q 12 : There is a certain relation between two given numbers on one side of :: and one number is given on another side of :: while another number is to be found from the given alternatives , having the same relation with this number as the given pair has. Select the best alternative.

12. 6 : 24 :: 4 : ?

A) 2

B) 6

C) 8

D) 16

Direction Q 13: In the given question, four words have been given, out of which three are alike in some manner and the fourth one is different. Choose out the odd one.

13. A) Wheat

B) Paddy

C) Jowar

D) Mustard

Direction Q 14: In the given question, four numbers are given. Out of these, three are alike in a certain way but the rest one is different. Choose the one which is different from the rest three.

14. A) 43

B) 53

C) 63

D) 73

Direction Q 15 : In the given question, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern.

15. 1, 4, 9, 16, 25, (.....)

A) 35

B) 36

C) 48

D) 49

16. If in a certain language, MADRAS is coded as NBESBT, how is BOMBAY coded in that code ?

A) CPNCBX

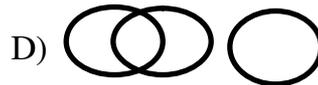
B) CPNCBZ

C) CPOCBZ

D) CQOCBZ



17. Which of the following diagrams correctly represents Elephants, wolves, Animals ?



18. Rashtriya Ekta Diwas is observed across India on 31st October to commemorate the birth anniversary of

- A) Shri Lal Bahadur Shastri
- C) Choudhry Charan Singh

- B) Sardar Vallabh Bhai Patel
- D) Shri Hemwati Nandan Bahuguna

19. Which of the following is a Ramsar Convention Site ?

- A) Sambhar Salt Lake
- C) Gangotri Glacier

- B) Ranthambore Tiger Reserve
- D) Pench Tiger Reserve

20. Which of the following has most number of divisors ?

- A) 99
- B) 101
- C) 176
- D) 182

21. The difference between a number and its three-fifth is 50. What is the number ?

- A) 75
- B) 100
- C) 125
- D) none of these

22. Bob Dylan, who is the 2016 Noble Prize Winner for Literature hails from which of the following countries ?

- A) Germany
- C) France
- B) United States of America
- D) Russia

23. If $A : B = 8 : 15$, $B : C = 5 : 8$ and $C : D = 4 : 5$, then $A : D$ is equal to

- A) 2 : 7
- B) 4 : 15
- C) 8 : 15
- D) 15 : 4

24. Which of the following pair is not correctly matched ?

- A) Pheeljar Lake – Uttar Pradesh
- B) Phuskar Lake – Rajasthan
- C) Sat Jal – Uttarakhand
- D) Tso Moriri – Laddakh

25. A train moves with a speed of 108 kmph. Its speed in meters per second is

- A) 10.8
- B) 18
- C) 30
- D) 38.8



26. The approximate number of words in an ideal sentence is
A) 5 to 7 words B) 12 to 14 words C) 20 to 22 words D) \leq 30 words
27. Which of the following mode of presentation is most retained by the reader's brain ?
A) Tables B) Text C) Numbers D) Figures
28. On heating ice, its density
A) Increases B) Decreases
C) Remains unchanged D) None of the above
29. Which of the following research methods, doesn't result in an immediate commercial product or idea ?
A) Applied Research B) Basic Research
C) Patent-oriented Research D) All of the above
30. The normal life span of a patent is generally
A) 10 years B) 15 years
C) 8 years D) 20 years
31. If a class of 20 students is consisted of ten students of age of 19 years, four students of age of 20 years and six students of 25 years, the average age of class comes out to be
A) 21.3 years B) 21 years C) 19 years D) 22 years
32. Which is the best way to dilute acid with water ?
A) Addition of water to acid at room temperature
B) Addition of water to acid at room temperature, while heating
C) Addition of acid to water, while heating
D) Addition of acid to water at room temperature
33. Which option is least related to a qualitative approach ?
A) Unstructured B) Flexible
C) Numerical D) Open
34. An interview schedule is a
A) Research Objective B) Data Collection Method
C) Sampling Method D) Variable
35. "Banarasi Saree" can be well protected under the following intellectual property right
A) Copyright B) Layout Design of Integrated Circuits
C) Geographical Indication D) Patent



36. The Harvard referencing system is also known as
- A) The short-title system
 - B) The author-date system
 - C) The reference by number system
 - D) The author-number system
37. Schedule is filled by _____, whereas questionnaire is filled by _____
- A) Respondent, Enumerator
 - B) Enumerator, Respondent
 - C) Everybody, Respondent
 - D) Respondent, Everybody
38. Error arising due to rejecting a correct Null Hypothesis, is termed as
- A) Type I Error
 - B) Type II Error
 - C) Determinant Errors
 - D) Non-determinant Errors
39. Which of the following is not regarded as the central tendency of a given datum ?
- A) Arithmetic Mean
 - B) Median
 - C) Mode
 - D) Variance
40. Which of the following statistical operation is best suited for ascertaining the difference in the average results of two groups ?
- A) Arithmetic mean
 - B) t-test
 - C) Mode
 - D) Median
41. Which aspect of the research process could be responsible for the unintended introduction of error in a study ?
- A) Wrong analysis method
 - B) Faulty calculations
 - C) Flawed sampling methods
 - D) All of the above
42. One is guilty of plagiarism if he/she
- A) Make use of the works of others to gather information
 - B) Use the work of another and misrepresent it as his/her own
 - C) Make use of the works of others to support his/her own arguments
 - D) Examine the ideas and arguments of others to help him/her shape his/her own thoughts or views on a particular issue



43. Drawing information or content from the work of another without acknowledging the source by citing a reference is considered to be plagiarism in all of the following cases except
- A) Using the exact words of the author
 - B) Using data that the author has compiled through his/her independent investigation
 - C) Using information from the author's work that is regarded as common knowledge in the discipline
 - D) Reproducing in your paper a chart contained in the author's work
44. Which of the following indicator shows pink color at basic pH ?
- A) Methyl orange
 - B) Cresol red
 - C) Phenolphthalein
 - D) None of the above
45. What is 5,236 microlitres in litres ?
- A) 5.236 litres
 - B) 0.005236 litres
 - C) 0.05236 litres
 - D) 0.5236 litres
46. Law of Conservation of Mass was discovered by
- A) Charles Darwin
 - B) Louis Pasteur
 - C) Alexander Flemming
 - D) Antoine Laurent Lavoisier
47. If algae population develops twice in one day, the pond becomes fully occupied by algae on 30th day. The pond was half occupied on
- A) 29th day
 - B) 15th day
 - C) 14th day
 - D) 28th day
48. According to the empirical rule, approximately what percent of the data should lie within mean $\pm 2\sigma$?
- A) 75%
 - B) 68%
 - C) 99.7%
 - D) 95%
49. Examples of personal protective equipment in the laboratory do not include
- A) Long sleeve shirts
 - B) Lab coats
 - C) Goggles and long pants
 - D) Contact lenses
50. In general, Ultraviolet light should be considered dangerous, if
- A) it has a wavelength longer than 250 nm
 - B) it has a wavelength shorter than 250 nm
 - C) it has a wavelength longer than 400 nm
 - D) it is seen to have a greenish glow



PART B

51. Two transformers of identical voltages but different capacities are operated in parallel, for satisfactory load sharing
- A) Impedances should be equal
 - B) Per unit impedance must be equal
 - C) Per unit impedance and X/R ratio must be equal
 - D) Impedance and X/R ratio must be equal
52. Zero sequence currents can flow from a line into a transformer bank if the windings are
- A) Grounded star/Delta
 - B) Delta/Star
 - C) Star/Star grounded
 - D) Delta/Delta
53. The magnitude of various voltage drops that occur in an alternator, depends on
- A) power factor of the load
 - B) load current
 - C) power factor x load current
 - D) power factor x (load current)²
54. The injected e.m.f. in the rotor of induction motor must have
- A) zero frequency
 - B) the same frequency as the slip frequency
 - C) the same phase as the rotor e.m.f.
 - D) high value for the satisfactory speed control
55. In case the air gap in an induction motor is increased
- A) the magnetizing current of the rotor will decrease
 - B) the power factor will decrease
 - C) speed of motor will increase
 - D) the windage losses will increase
56. A three phase 400 V, 50 Hz synchronous motor is working at 50 percent load. In case an increase in the field current of the motor causes a reduction in the armature current, it can be concluded that
- A) the motor is delivering reactive power to the mains
 - B) the motor is absorbing reactive power from the mains
 - C) the motor is neither absorbing nor delivering reactive power
 - D) none of the above
57. In capacitor start single-phase motors
- A) current in the starting winding leads the voltage
 - B) current in the starting winding lags the voltage
 - C) current in the starting winding is in phase with voltage in running winding
 - D) none of the above



58. Which of the following governs the response of an unforced reactive circuit ?
A) Magnitude of the voltage source B) Magnitude of interconnection of elements
C) Time constant of circuit D) All of these
59. When a pure LC parallel circuit is in resonance, the circuit condition can be represented by
A) Short circuit B) Open circuit
C) A normal parallel circuit D) None of these
60. What is the condition for Maximum Power Transfer in AC Circuit ?
A) $Z_L = Z_{TH}$ B) $Z_L = Z_{TH}^*$ C) $Z_L < Z_{TH}$ D) $Z_L = 2 Z_{TH}$
61. Which of the following condition is common to both Series and Parallel resonance ?
A) Impedance is minimum
B) Power factor is unity
C) Power is low
D) Q-Factor depends on voltage amplification
62. When a resistance is connected across an AC Voltage source, the frequency of power wave is
A) Equal to the frequency of voltage wave
B) Equal to the frequency of current wave
C) Double to the frequency of voltage and current wave
D) None of these
63. The form factor of a rectangular wave is
A) 1 B) 1.11 C) 1.15 D) 1.414
64. A single phase 50-Hz generator supplies an inductive load of 5000 kW at a power factor of 0.707 lagging means of an overhead transmission line 20 km long. The line resistance and inductance is 0.0195 Ω /km and 0.63 mH/km. The voltage at the receiving end is required to be kept constant at 10 kV. Then, voltage regulation of the line is
A) 21.75% B) 2.2175% C) - 21.75 % D) 22.75%
65. The relation between R, L and C for successful commutation in a series inverter is
A) $R > 4L/C$ B) $R^2 > 4L/C$ C) $R < 4L/C$ D) $R^2 < 4L/C$
66. Which chopper circuit uses saturable reactor ?
A) Auxiliary commutated B) Jones chopper
C) Morgan chopper D) Load commutated chopper



67. The resistance switching employed for arc extinction in circuit breakers have its critical resistance equal to

- A) $\sqrt{\frac{C}{L}}$ B) $0.5\sqrt{\frac{L}{C}}$ C) $0.5\sqrt{\frac{C}{L}}$ D) $\frac{1}{2n}\sqrt{\frac{C}{L}}$

68. The power plant has a maximum demand of 15 MW. The load factor is 50%, and the plant factor is 40%. The operating reserve is

- A) 3.0 MW B) 3.75 MW C) 6.0 MW D) 7.5 MW

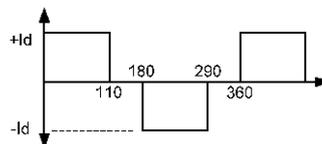
69. A suspension type insulator with three units of capacitance C and ground capacitance of 0.2C, the string efficiency is

- A) 78 % B) 80 % C) 82 % D) 84 %

70. Source inductance in AC side and freewheeling diode in DC side in the controlled rectifiers will

- A) Improve and degrade the supply power factor respectively
 B) Improves the supply power factor in both cases
 C) Degrades the supply power factor in both cases
 D) Degrade and improve the supply power factor respectively

71. Line current drawn by a single-phase, fully controlled bridge rectifier with a freewheeling diode is shown in figure. The displacement factor is equal to



- A) $\cos 70^\circ$ B) $\cos 110^\circ$ C) Unity D) $\cos 140^\circ$

72. A surge voltage of 1000 kV is applied to an overhead line with its receiving end open. If the surge impedance of the lines of the line is 500Ω , then the total surge power in the line is

- A) 2000 MW B) 500 MW C) 2 MW D) 0.5 MW

73. If a 500 MVA, 11kV, 3-phase generator at 50 Hz feeds through a transfer impedance of $(0.0 + j0.605)\Omega$ per phase, an infinite bus also at 11 kV, then the maximum steady state power transfer on the base of 500 MVA and 11 kV is

- A) 1.0 p.u. B) 0.8 p.u. C) 0.5 p.u. D) 0.4 p.u.

74. If in a short transmission line, resistance and inductive reactance are found to be equal and regulation appears to be zero, then the load will be

- A) having unity power factor B) having zero power factor
 C) be 0.707 leading D) be 0.707 lagging



84. Full-load voltage regulation of a power transformer is zero when power factor of the load is near
A) unity and leading B) zero and leading
C) zero and lagging D) unity and lagging
85. A negative feedback closed-loop system is supplied to an input of 5 V. The system has a forward gain of 1 and a feedback gain of 1. What is the output ?
A) 1.0 V B) 1.5 V C) 2.0 V D) 2.5 V
86. The transfer function must describe both the _____ and the _____ characteristics of a component.
A) time - dependent, steady state B) time - independent, steady state
C) time - dependent, dynamic D) steady state, dynamic
87. What limits the alternating current in a capacitor ?
A) Limited by the opposing voltage brought about by the charge on the capacitor
B) Limited by the opposing current brought about by the charge on the capacitor
C) Limited by the opposing flux brought about by the charge on the capacitor
D) None
88. For what values of alternating voltage and alternating current does Ohm's law apply to a pure resistance ?
A) for the instantaneous value B) for the peak value
C) for the effective or RMS value D) for all the above
89. Capacitors behave like _____ for very low frequencies and like _____ for very high frequencies, respectively.
A) Short circuit, Open circuit B) Open circuit, Short circuit
C) Short circuit, Short circuit D) Open circuit, Open circuit
90. At resonance, the parallel RLC circuit behaves like a
A) Pure inductor B) Pure capacitor C) Pure resistor D) None
91. For very large frequency (ω), the parallel RLC circuit behaves like
A) Capacitor B) Inductor C) Resistor D) None
92. The voltage, current and resistance at a Short Circuit (SC) and an Open Circuit (OC) are _____ respectively.
A) SC: $v = V, i = 0, R = \infty$; OC: $v = 0, i = I, R = 0$
B) SC: $v = 0, i = I, R = \infty$; OC: $v = V, i = 0, R = 0$
C) SC: $v = V, i = I, R = 0$; OC: $v = 0, i = 0, R = \infty$
D) SC: $v = 0, i = I, R = 0$; OC: $v = V, i = 0, R = \infty$



SPACE FOR ROUGH WORK