

1. Choose the synonym of the given word.

Frightened

- (A) tensed (B) alerted (C) scared (D) anxious

33
17
5
594

2. Find the sum of all natural numbers between 1 and 100 which are multiples of 3?

- (A) 1683 (B) 1600 (C) 1540 (D) 815

3. A and B together can complete a piece of work in 4 days. If A alone can complete the same work in 12 days, in how many days can B alone complete that work?

- (A) 4 days (B) 6 days (C) 8 days

$$\begin{aligned} & \text{Work done by A in 1 day} = \frac{1}{12} \\ & \text{Work done by A and B together in 1 day} = \frac{1}{4} \\ & \text{Work done by B in 1 day} = \frac{1}{4} - \frac{1}{12} = \frac{1}{6} \\ & \text{Time taken by B to complete the work} = \frac{1}{\frac{1}{6}} = 6 \text{ days} \end{aligned}$$

4. Which number replaces the question mark?

-
- (A) 10 (B) 15 (C) 20 (D) 5

5. Find the least number by which 768 should be multiplied to get a perfect square.

- (A) 6 (B) 5 (C) 2

(D) 3

6. In the following question a word has been given, followed by four other words one of which cannot be formed by using the letters of the given word. Find that word.

INTELLIGENCE

- (A) TILLAGE (B) INCITE (C) GENTLE (D) NEGLECT

7. Which option can be added at the end of the given letters to form meaningful words?

SI (), Pr (), Tr (), Br (), S ()

- (A) ack (B) ick (C) ump.

(D) ash

8. Choose the correct spelling.

- (A) competible (B) compateble (C) compatible (D) competable

9. Fill in the blank with the best option.

Dad always wears his _____ ring.

- (A) signet (B) cygnet (C) medal (D) meddle

Direction for Q. 10–14: Read the paragraph below and fill in the blanks with the correct word from the options given. The number on the blank refers to the Question Number.

Sometimes we like to go for 10 picnic on 11 beach. There is nothing like 12 good swim to give you 13 appetite. Besides 14 exercise is good for you.

10. (A) an (B) a (C) the (D) none of these

11. (A) the (B) an (C) a (D) some

12. (A) an (B) some (C) a (D) the

13. (A) an (B) some (C) the (D) a

14. (A) a (B) an (C) the (D) none of these

15. Who elects the Vice-President of India?

- (A) Elected Members of Lok Sabha and Rajya Sabha.
(B) Members of Lok Sabha and Rajya Sabha.
(C) Elected Members of Lok Sabha, Rajya Sabha and State Assemblies.
(D) Members of Lok Sabha only.

16. Evaluate: $\sqrt{10.5625}$

- (A) 2.25 (B) 2.75 (C) 3.25 (D) 4.25

17. Which of the following is the earliest known literary source of ancient India and indeed of mankind?

- (A) Mahabharat (B) Ramayana (C) Rig Veda (D) Upanishads

18. Name the soccer player who scored the most goals in a calendar year by scoring his 86th goal of 2012.

- (A) David Beckham (B) Lionel Messi (C) Cristiano Ronaldo (D) Roberto Carlos

19. A, B, C started a business with their investments in the ratio $1 : 3 : 5$. After 4 months A invested the same amount as before and B as well as C withdrew half of their investments. The ratio of their profits at the end of the year is

- (A) $4 : 3 : 5$ (B) $5 : 6 : 10$ (C) $6 : 5 : 10$ (D) $10 : 5 : 6$

20. The area of rhombus, one side of which measures 25 cm and diagonal 30 cm is

- (A) 600 sq cm (B) 250 sq cm (C) 200 sq cm (D) 150 sq cm

21. On tossing three coins simultaneously then the probability of getting 3 heads, is

- (A) $\frac{1}{8}$ (B) $\frac{3}{8}$ (C) $\frac{2}{8}$ (D) $\frac{5}{8}$

22. Reaching the place of meeting 20 minutes before 8.50 hours, Sumit found himself 30 minutes earlier than the man who came 40 minutes late. What was the scheduled time of the meeting?

- (A) 8:00 (B) 8:05 (C) 8:10 (D) 8:20

23. 'The Land of the Midnight Sun' is

- (A) Norway (B) Italy (C) Russia (D) Belgium

24. In the Jalianwala Bagh Massacre of 1919 who ordered the shooting of peaceful protesters?

- (A) General Reginald E. H. Dyer (B) Michael O'Dwyer
(C) Viceroy Lord Chelmsford (D) Lord William Hunter

25. Simplify:
$$\frac{2\frac{1}{4} \div \frac{3}{7} \times \frac{1}{3}}{2\frac{1}{2} + 1\frac{3}{4} \div 3\frac{1}{2}}$$

$$\frac{\frac{9}{4} \div \frac{3}{7} \times \frac{1}{3}}{\frac{5}{2} + 1\frac{3}{4} \div 3\frac{1}{2}} = \frac{\frac{9}{4} \times \frac{7}{3} \times \frac{1}{3}}{\frac{5}{2} + \frac{7}{4} \times \frac{2}{7}} = \frac{\frac{21}{4}}{\frac{15}{4}} = \frac{7}{5}$$

- (A) $\frac{7}{12}$ (B) $\frac{5}{12}$ (C) $\frac{1}{12}$ (D) $\frac{7}{15}$

26.

Find the next term in the alphabetical-numeric series

Z1A, X2D, V6G, T21J, R88M, P445P, ?

- (A) N2676S (B) N2676T (C) T2670N (D) T2676N

$$A+B+C = 6600$$

$$3B + B + \frac{3B}{2} = 6600$$

$$4B + \frac{3B}{2} = 6600$$

$$7B = 6600$$

$$B = 6600 / 7$$

$$B = 942.857$$

$$B = 943$$

29.

Choose the synonym of the given word.

Completely

- (A) totally (B) partially (C) constantly (D) partly

30.

Choose the option that best completes the relationship.

cattle : herd :: sheep : ?

- (A) flock (B) swarm (C) shoal (D) mob

31.

Find n so that $\left(\frac{3}{5}\right)^4 \times \left(\frac{3}{5}\right)^3 = \left(\frac{3}{5}\right)^{2n-1}$

$$(3)^7$$

$$2n-1 = 7 \\ 2n = 8 \\ n = 4$$

- (A) 3 (B) 4 (C) 5 (D) 6

32.

Arrange the fractions $\frac{3}{4}, \frac{5}{12}, \frac{11}{18}, \frac{17}{24}$ in ascending order

- (A) $\frac{3}{4}, \frac{5}{12}, \frac{11}{18}, \frac{17}{24}$ (B) $\frac{5}{12}, \frac{11}{18}, \frac{17}{24}, \frac{3}{4}$ (C) $\frac{17}{24}, \frac{11}{18}, \frac{5}{12}, \frac{3}{4}$ (D) $\frac{5}{12}, \frac{3}{4}, \frac{17}{24}, \frac{11}{18}$

33. Some parts of a sentence have been jumbled up. Which one of the following sequences constructs the sentence correctly?

P: hard-won freedom and become a front-rank nation

Q: self-reliant and self-dependent

R: the President called upon the people to be

S: if they want to preserve their

14 40

- (A) RQSP (B) SPRO (C) RPSQ (D) SQRP

34. Manik is 14th from the right end in a row of 40 boys. What is his position from the left end?

- (A) 24th (B) 25th (C) 26th (D) 27th

6x

35. From a bag containing 4 black balls and 5 red balls, in how many ways can 5 balls be drawn if at least 3 balls are red?

- (A) 105 (B) 81 (C) 100 (D) 91

$$4C_2 \times 5C_3 + \\ 4C_1 \times 5C_4 + \\ \times 5C_5$$

36. A series of letters and numbers is given the terms of which follow certain definite pattern in groups. However, some terms in the series are missing, which are given in the same order as one of the alternatives below the series. Choose the correct alternative.

Z 25 Y B 23 X C W D 19 V E 17

- (A) A, 21, D, V (B) A, 27, C, V (C) X, 21, C, W (D) X, 27, F, W

37. Who was Agnes Gonxha Bojaxhiu Nobel Peace Price and Bharat Ratna winner better known as?

- (A) Mother Teresa (B) Agatha Christie (C) Mary Kom (D) Sonia Gandhi

38. In an examination a pupil's average marks were 63 per paper. If he had obtained 20 more marks for his geography paper and 2 more marks for his history paper, his average marks per paper would have been 65. How many papers were there in the examination?

- (A) 8 (B) 9 (C) 10 (D) 11

63
83, 85,

39. Which of the following is the tallest building (828 m) of the world built by architect Adrian Smith and has 160 floors with the world's fastest elevators?

- (A) Hydropolis (B) Ski Dubai (C) Burj Khalifa (D) Palm Islands

40.

Which river connects the great lakes of North America to the Atlantic Ocean?

- (A) St. Lawrence river
(C) Amazon river

- (B) Colorado river
(D) Mackenzie river

41.

If MINERAL is written as QRSTUVW and SOUND is written as ABCSD, then how will READER be written in the same code?

- (A) SBFefs (B) UTVDTU (C) TUDVUT (D) QDZCDQ

42.

Identify the part of the sentence that contains an error. If you think the sentence is correct, choose option (D).

- The court closed the park despite protests. No Error
(A) (B) (C) (D)

43.

Choose the most suitable preposition.

- He is an expert _____ insects.
(A) on (B) for (C) in (D) none of these

44.

Six majestic hill forts of Rajasthan have been recently added to UNESCO World Heritage Sites. Which of the following do *not* belong to list?

- (A) Chittorgarh (B) Kumbhalgarh (C) Jhalawar (D) Bala Kila Fort

45.

Who composed the famous song Sare Jahan Se Achha?

- (A) Naqsh Lyallpuri (B) Mohd. Iqbal
(C) Mirza Ghalib (D) Shakeel Badayuni

46.

Choose the appropriate verb that can be formed from the noun.

Beauty

- (A) beautification (B) beautify (C) beautified (D) beauties

47.

Who is the Vice Chairman of National Disaster Management Authority?

- (A) Dr. Manmohan Singh (B) Sri M. Shashidhar Reddy
(C) Sri J. K. Sinha (D) Sri T. Nandakumar

48. Find the next term in the series

BMO, EOQ, HQS

(A) KSU

(B) LMN

(C) SOV

(D) SOW

49. The Early Vedic Aryans did not know the use of which of the following metals?

(A) Iron

(B) Bronze

(C) Copper

(D) Gold

$$C.P = \frac{100}{80}$$

50. Choose one word out of the given alternatives, which cannot be formed from the letters of the word CONSULTATION

(A) CONSTANT

(B) NATION

(C) SALUTE

(D) STATION

$$C.P = \frac{100}{100+5}$$

51. Who was the first woman to walk in space from Salyut 7 Space Station?

(A) Susan Helus

(B) Svetlana Savitskaya

(C) Nimrata Randhawa Haley

(D) Marie Curie

$$25 - \frac{100}{100} = \frac{100}{105}$$

52. A tradesman sold an article at a loss of 20%. If the selling price had been increased by ₹ 100, there would have been a gain of 5%. What was the cost price of the article?

(A) ₹ 250

(B) ₹ 300

(C) ₹ 400

(D) ₹ 450

53. Which noted mathematician-astronomer, of the Gupta period, proposed that the Earth was round and it moves round the while rotating on its own axis?

(A) Aryabhatta

(B) Varahamihira

(C) Kalidasa

(D) Vatsyayana

54. Rohit was 4 times as old as his son 8 years ago. After 8 years, Rohit will be twice as old as his son. What is Rohit's present age?

(A) 30 years

(B) 40 years

(C) 50 years

(D) 52 years

55. Choose the appropriate verb that can be formed from the noun

Strength

(A) strengthen

(B) strong

(C) strengths

(D) stronger

$$P - 45 = ?$$

56. Where is the tallest statue of Jesus—as Christ the Redeemer stand with his arms outstretched, to mark the countries Independence?

- (A) Rio de Janeiro — Brazil (B) Atlanta — USA
(C) Tokyo — Japan (D) Machu Pichu — Peru

57. Which of the following is *not* a port of India?

- (A) Mangalore (B) Vishakhapatnam (C) Kandla (D) Bangalore

58. Two statements are given which are followed by two conclusions 1, 2. Choose the conclusions which logically follow from the given statements.

- Statements: I. Some kings are queens.
II. All queens are beautiful.

- Conclusions: 1. All kings are beautiful.
2. All queens are king.

- (A) only conclusion 1 follows (B) only conclusion 2 follow
(C) either 1 or 2 follow (D) neither 1 nor 2 follow

59. If the sides of a triangle are doubled then its area

- (A) remains the same (B) becomes doubled
(C) becomes three times (D) becomes four times

60. Fill in the blank with the best option.

When I was small, I often _____ with the other children in our block.

- (A) did play (B) was playing (C) played (D) play

61. A bag contains 600 coins of 25 p denomination and 1200 coins of 50 p denomination. If 12% of 25p coins and 24% of 50 p coins are removed, the percentage of money removed from the bag is nearly

- (A) 15.6% (B) 17.8% (C) 21.6% (D) 30%

62. If a man walks at the rate of 5 km/h, he misses a train by 7 minute. However, if he walks at the rate of 6 km/h, he reaches the station 5 minutes before the arrival of the train. Find the distance covered by him to reach the station.

- (A) 4 km (B) 6 km (C) 8 km

- (D) 10 km

1 pm \rightarrow 12
2

63. If the seventh day of a month is 3 days earlier than Friday, what day will it be on the 19th day of the month?
(A) Sunday (B) Monday (C) Wednesday (D) Friday

64. A bag contains 50 p, 25 p and 10 p coins in the ratio 5 : 9 : 4 amounting to ₹ 206. Find the number of coins of each type.

- (A) $\frac{100}{50 \times 62}, 120$ (B) 150, 270, 120 (C) $200, \frac{360}{10}, 160$ (D) $\frac{250}{250}, \frac{450}{250}, 200$

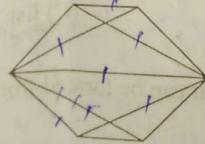
65. Who is the current Prime Minister of Australia?
(A) Julia Gillard (B) Kevin Rudd (C) John Howard (D) Andrew Fisher

66. A grocer purchased 80 kg of sugar at ₹ 13.50 per kg and mixed it with 120 kg sugar at ₹ 16 per kg. At what rate should he sell the mixture to gain 16%?

- (A) ₹ 16.20/kg (B) ₹ 17.40/kg (C) ₹ 17.80/kg (D) ₹ 18.20/kg

67. The Greek historian Megasthenes visited India during the reign of which Indian ruler?
(A) Samudragupta (B) Chandragupta Maurya
(C) Bindusa (D) Ashoka

68. Find the number of quadrilaterals in the given figure.



- (A) 6 (B) 7 (C) 9 (D) 11

69. Choose the correct spelling.
(A) Fahrenheit (B) Fahrenhiet (C) Fahrnhiet (D) Fahrehnrite

70. Who among the following is a current non-permanent member of the UN Security Council?
(A) Pakistan (B) Australia (C) Morocco (D) All of these

71. Which of the following planets is smaller than the Earth?

- (A) Saturn (B) Venus (C) Uranus (D) Neptune

72. Choose the most suitable preposition.

Do you know the reason _____ his absence.

- (A) on (B) of (C) for (D) none of these

73. The simple interest on a certain sum of money for $2\frac{1}{2}$ years at 12% per annum is ₹ 40 less than the simple interest on the same sum for $3\frac{1}{2}$ years at 10% per annum. Find the sum?

- (A) ₹ 450 (B) ₹ 600 (C) ₹ 700 (D) ₹ 800

74. Choose the odd pair of words.

- (A) blacksmith : anvil (B) carpenter : saw
(C) barber : scissor (D) goldsmith : ornaments

75. Choose the antonym of the given word.

Serial

- (A) random (B) order (C) list (D) abstract

76. Choose the appropriate noun that can be formed from the verb

Fly

- (A) flew (B) flight (C) flying (D) flies

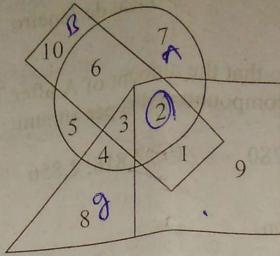
77. Which of the following facts is not true about the Himalayas?

- (A) The Himalayas were formed as result of the tectonic plate movements that collided India into Tibet.
(B) Mount Everest was named after a British Surveyor, Sir George Everest.
(C) The Himalayas are one of the oldest mountain ranges in the planet.
(D) The Nepalese call Mount Everest Sagarmatha or Goddess of Universe or Forehead of the Sky.

78. Where is the 2016 Olympics scheduled to be held?
 (A) Sydney (B) Montreal (C) Rio de Janeiro (D) Mexico City
79. Divide ₹ 1301 between A and B so that the amount of A after 7 years is equal to the amount of B after 9 years, the interest being compound at 4% per annum.
 (A) ₹ 676, ₹ 625 (B) ₹ 726, ₹ 780 (C) ₹ 816, ₹ 856 (D) ₹ 856, ₹ 926
80. Fill in the blank with the best option.
 Please be _____ when talking about others.
- (A) discrete (B) discreet (C) complement (D) vile
81. How many meaningful words can be made by changing only the consonants in the word MEAN so that each of the consonants is replaced by the previous letter in the English alphabet, by using each letter only once in each word?
 (A) 1 (B) 2 (C) 3 (D) 4
82. Choose the number pair/group which is different from others
 (A) 14, 12 (B) 24, 7 (C) 37, 4 (D) 42, 4
83. Which letter completes the puzzle?
-
- (A) M (B) L (C) U (D) W
84. In each of the following questions find out the alternative which will replace the question mark.
- CEDH : HDEC :: ? : PNRV
 (A) VRNP (B) RNPV (C) NRVP (D) VNRP

85.

In the following figure, the triangle represents girls, the circle athletes, the rectangle boys and the square disciplined.



The boys who are athletes and disciplined are indicated by which number?

- (A) 1 (B) 2 (C) 6 (D) 10

86. The HCF of two numbers is 31 and their LCM is 1488. If one of the numbers is 186, find the other.

- (A) 248 (B) 246 (C) 348 (D) 247

87. Who is the current Deputy Speaker of Lok Sabha?

- (A) Ms. Meira Kumar (B) Mr. Karia Munda
(C) Ms. Sushma Swaraj (D) Mr. P. J. Kurien

88. Choose the antonym of the given word.

Extinct

- (A) rare (B) ancient (C) prevalent (D) unknown

89. Simplify: $\left(2 - \frac{1}{3}\right) + \frac{2}{3} \times 1\frac{1}{4} \div \frac{3}{7}$ of $2\frac{5}{8}$

$$\frac{7}{12} \times \frac{7}{3} \Rightarrow \frac{49}{36} \times \frac{21}{8}$$

- (A) $2\frac{11}{17}$ (B) $3\frac{11}{27}$ (C) $2\frac{11}{27}$ (D) $2\frac{17}{27}$

90. Choose the appropriate noun that can be formed from the verb

Discover

- (A) discovered (B) discovery (C) discovering (D) discovers

91. In the following question, one term in the number series is wrong. Find out the wrong term.

121, 143, 165, 186, 209

(A) 143

(B) 165

(C) 186

(D) 209

92. Which of the following words will come second in the English dictionary?

(A) magical

(B) magnify

(C) material

(D) magnetic

93. Two pipes can fill a tank in 10 hours and 12 hours respectively while a third pipe empties the full tank in 20 hours. If all the three pipes operate simultaneously, in how much time will the tank be filled?

(A) 5 hour 20 minutes

(B) 6 hour 15 minutes

(C) 7 hour 30 minutes

(D) 8 hour 20 minutes

94. What is the official distance of running in a Marathon race?

(A) 40.293 km

(B) 42.195 km

(C) 30.248 km

(D) 36.210 km

Direction for Q. 95–97: Read the passage carefully and answer the question.

The sea-world is divided into three main oceans—the Pacific, the Atlantic and the Indian—and two smaller oceans—the Arctic or Northern Ocean and the Antarctic or Southern Ocean. The Pacific is by far the largest of these, for it covers half the sea-area of the world. In addition to the oceans there are other areas of sea, such as the Red Sea, the Mediterranean, the North Sea, the Caribbean Sea and the Black Sea.

95. The largest of these refers to which of the following in the text?

(A) Atlantic Ocean

(B) Pacific Ocean

(C) Indian Ocean

(D) Southern Ocean

96. The other areas of sea does *not* mention which of the following in the text

(A) Red Sea

(B) Black Sea

(C) North Sea

(D) Caspian Sea

97. The sea world is divided into _____ main oceans and _____ smaller oceans in the text.

(A) 3, 5

(B) 3, 2

(C) 2, 3

(D) 5, 3

98.

Arrange the words given below in a meaningful sequence.

1. Police 2. Punishment 3. Crime 4. Judge 5. Judgement

- (A) 3, 1, 2, 4, 5 (B) 1, 2, 4, 3, 5 (C) 5, 4, 3, 2, 1 (D) 3, 1, 4, 5, 2

99.

In the following arrangement of symbols, letters and numbers to answer the question given below it.

$\delta = \beta F 2 * K S 7 5 # \$ P L V 8 @ M U E 6 \uparrow Q G \odot 9 3 & T Y £$

How many such letters are there in the arrangement each of which is either immediately preceded by a symbol or immediately followed by a number, but not both?

- (A) 3 (B) 4 (C) 6 (D) 8

100. If L stands for +, M stands for -, N stands for \times , P stands for \div , then

$$14 N 10 L 42 P 2 M 8 = ?$$

$$14 \times 10 + 42 \div 2 - 8$$

$$182 \quad 91-8$$

$$140 + 16$$

- (A) 153 (B) 216 (C) 248 (D) 251

01. Installation of high voltage bus-bar in a sub-station requires

- (A) disc insulator (B) shackle insulator (C) post insulator (D) pin insulator

02. The vibration galvanometer has a

- (A) low-pass characteristic.
 (B) high-pass characteristic.
 (C) band-pass characteristic with very narrow passband.
 (D) band-stop characteristic with very narrow stopband.

03. Given a continuous time signal $s(t) = 5\cos(200\pi t)$. The minimum sampling rate required to avoid aliasing will be

- (A) 50 Hz (B) 100 Hz (C) 200 Hz (D) 400 Hz

04. Resistance units in valve type lighting arrestor is made from

- (A) nicrome wire.
 (B) parallel connection of carbon resistor.
 (C) parallel connection of metal film resistor.
 (D) silicon carbide.

$$T = \frac{2\pi}{200\pi}$$

$$t = \frac{\pi}{200\pi}$$

105. Schering bridge is used to

- (A) determine dielectric loss and capacitance.
- (B) measure low resistance.
- (C) determine incremental inductance.
- (D) measure mutual inductance.

106. Surge impedance of power cables used in series with transmission line is in the range

- (A) 400–600 Ω
- (B) 600–1500 Ω
- (C) 40–250 Ω
- (D) 200–500 Ω

107. A circuit having a resistance of 4Ω , an inductance of 0.5 H and a variable capacitance in series is connected across a 100 V , 50 Hz supply. The value of the capacitance which gives resonance is

- (A) $62.2 \mu\text{F}$
- (B) $20.3 \mu\text{F}$
- (C) $10.1 \mu\text{F}$
- (D) $43.2 \mu\text{F}$

108. Basic impulse level of 11 kV distribution system as per IS specification is

- (A) 100 kVp
- (B) 85 kVp
- (C) 75 kVp
- (D) 45 kVp

$$X_L = X_C$$

$$2\pi f L = \frac{1}{2\pi f C}$$

109. A Megger is essentially a

- (A) multimeter
- (B) crossed-coil ohmmeter
- (C) shunt type ohmmeter
- (D) series type ohmmeter

$$C = \frac{R}{2\pi f^2} \times 10^{-9}$$

110. The primary of a current transformer is never energized with its secondary

- (A) short circuited.
- (B) connected to unity power-factor load.
- (C) connected to lagging power-factor load.
- (D) open circuited.

111. For a slip ring induction motor if the rotor resistance is increased the

- (A) starting torque and efficiency decrease.
- (B) starting torque and efficiency increase.
- (C) starting torque increases but efficiency decreases.
- (D) starting torque decreases but efficiency increases.

112. Semiconductor strain gauges are preferred to metal resistance strain gauges because

- (A) semiconductor gauges have more linear transfer characteristics.
- (B) semiconductor gauges are less susceptible to temperature effect.
- (C) ~~semiconductor gauges have higher sensitivities.~~
- (D) semiconductor gauges can be easily mounted on the specimens.

113. Maximum torque of a 3-phase induction motor is

- (A) independent of rotor resistance.
- (B) directly proportional to square of rotor resistance.
- (C) inversely proportional to rotor resistance.
- (D) proportional to rotor resistance.

14. In an induction type energy-meter, 'creeping' takes place due to

- (A) decrease in the strength of the braking magnet.
- (B) improper lag adjustment.
- (C) ~~over-compensation of the frictional torque.~~
- (D) fluctuation of ambient temperature.

5. Transformer oil in a high voltage power transformer is required for

- (A) cooling purpose only.
- (B) insulating purpose only.
- (C) ~~both cooling and insulating purpose.~~
- (D) protective relaying purpose only.

6. A dc power supply has no-load voltage of 30 V and a full-load voltage of 25 V at full-load current of 1 A. Its output resistance and load regulation, respectively are

- (A) $5\ \Omega$ and 20%
- (B) ~~25 Ω and 20%~~
- (C) ~~5 Ω and 16.7%~~
- (D) $25\ \Omega$ and 16.7%

7. If the prime mover input of an alternator connected directly to an infinite bus is increased, then its

- (A) active power output increases
- (B) terminal voltage increases
- (C) frequency increases
- (D) reactive power output increases

8. A dc shunt motor runs at 600 rpm from a 240 V supply. Its armature has a resistance of 0.5 ohm and draws 30 amp. If an external resistance of 2.5 ohm is connected in series with the armature, while there is no change in armature or field current, the new speed is

- (A) ~~400 rpm~~
- (B) 800 rpm
- (C) ~~600 rpm~~
- (D) none of these

119. Transmission line can be most accurately modeled by
- (A) nominal π circuit (B) nominal T circuit
~~(C)~~ equivalent π circuit (D) none of these
120. Each resistor consumes 100 W when connected across 230 V supply. If two such resistors are connected in series across the 230 V supply, the power consumed by the two together is
- (A) 200 W (B) 25 W ~~(C) 50 W~~ (D) 100 W
121. For a Hydro-electric plant with low head and large water storage the most suitable turbine is
- (A) Francis turbine (B) Impulse turbine
~~(C)~~ Kaplan turbine (D) none of these
122. If the bandwidth of a control system is increased, the noise in the output of the system due to presence of sensor noise will
- ~~(A)~~ increase (B) decrease (C) not change (D) be zero
123. By increasing the gain K of type I system, the steady state error
- (A) increases (B) decreases
(C) remains unaltered at a positive non zero value.
~~(D)~~ remains zero
124. A long transmission line terminated at its characteristics impedance will have
- (A) a reflected wave with double the amplitude of that of the incident wave.
(B) a reflected wave with half the amplitude of that of the incident wave.
~~(C)~~ only incident wave but no reflected wave.
(D) only reflected wave but no incident wave.
125. For the slack bus in load flow study
- (A) voltage magnitude and reactive power are specified.
(B) active and reactive power are specified.
~~(C)~~ voltage magnitude and phase angle are specified.
(D) active power and phase angle are specified.

126. Holes are drilled on the disc of induction type energy meter at diametrically opposite positions to
(A) balance the disc (B) dissipate the energy due to eddy currents
(C) increase the deflecting torque (D) avoid creep on no load
127. Three capacitors, each of $0.30 \mu\text{F}$ capacitance are star connected to form a capacitor bank. The capacitance of each arm of an equivalent delta connected capacitor bank is
(A) $0.30 \mu\text{F}$ (B) $0.90 \mu\text{F}$ (C) $0.10 \mu\text{F}$ (D) $0.33 \mu\text{F}$
128. Owen bridge is used to
(A) determine dielectric loss and capacitance.
(B) measure high resistance
(C) determine self inductance
(D) measure mutual inductance
129. Two wattmeter, connected to measure power in a three phase balanced circuit, read 100 W each. The reactive power absorbed by the circuit is
(A) 0 Var (B) 100 Var (C) 200 Var (D) 300 Var
130. The shunt type ohmmeter is not suited for high resistance measurements because
(A) very low resistance of the meter would short the high unknown resistance.
(B) scale is highly cramped for high resistance values.
(C) full scale of the meter may be exceeded.
(D) battery can not supply the necessary current for proper meter deflection.
131. Screened cables are used to make the electric field distribution within the cable
(A) tangential (B) radial (C) rotating (D) none of these
132. String efficiency of a string of disc insulators can be improved by using
(A) graded discs (B) static shields (C) insulated cross-arm (D) all of these
133. For the measurement of peak value of an impulse voltage, which of the following Disruptive Discharge Voltage (DDV) is measured?
(A) zero (B) $10\% \text{ DDV}$ (C) $50\% \text{ DDV}$ (D) $100\% \text{ DDV}$

134. Which of the following transducers is used for transmitting as well as receiving acoustic energy in a ultrasonic flow meter?

- (A) LVDT
~~(C)~~ piezoelectric crystals

- (B) RTD
(D) thermistor

135. The wave-shape of a standard lightning impulse voltage is given by

- (A) $0.2/50 \mu s$ ~~(B)~~ $1.2/50 \mu s$ (C) $2/50 \mu s$ (D) $2.2/50 \mu s$

136. In the ohmmeter method of temperature measurement involving thermistor, the output voltage vs temperature characteristic can be linearised by connecting

- (A) a resistance of proper value in series with the sensor.
~~(B)~~ a resistance of suitable value in parallel with the sensor.
(C) a capacitance of appropriate value in series with the sensor.
~~(D)~~ an appropriate capacitance in parallel with the sensor.

$$\frac{1 \times 10^9}{100} = 10^7$$

137. Insulation resistance of 1 m length of a cable is $10^4 \text{ M}\Omega$. the insulation resistance of 100 m length of the same cable will be

- (A) $10^2 \text{ M}\Omega$ (B) $10^4 \text{ M}\Omega$ (C) $10^6 \text{ M}\Omega$ (D) $10^8 \text{ M}\Omega$

138. The ratio of the readings of two wattmeter connected to measure power in a balanced three-phase system is 5 : 3 and the load is inductive. The power factor of the load is

- ~~(A)~~ 0.92 lagging ~~(B)~~ 0.92 leading
(C) 0.6 lagging

139. Which of the following thermocouples is suitable for measuring a temperature around 2100°C ?

- (A) copper - constantan ~~(B)~~ tungsten - tungsten + rhenium
(C) chromel - alumel (D) nicrosil - nisil

140. According to Indian Standards, the breakdown voltage of new untreated oil should be

- (A) $10 \text{ kV}_{\text{rms}}$ ~~(B)~~ $20 \text{ kV}_{\text{rms}}$ ~~(C)~~ $30 \text{ kV}_{\text{rms}}$ (D) $60 \text{ kV}_{\text{rms}}$

141. A lead sheath is used in an under ground cable to

- ~~(A)~~ prevent ingress of moisture.
(C) provide adequate insulation.

- (B) provide mechanical strength.
(D) increase the capacitance to earth.

2. The p.u. reactance of a 30 MVA, 13.2 kV alternator is 0.4 p.u. The p.u. value for a base voltage of 13.8 kV and 50 MVA will be

- (A) 0.667 p.u. (B) 0.638 p.u. (C) 0.383 p.u. (D) 0.610 p.u.

33. The flux set up in the magnetic core of a transformer is determined by.

- (A) voltage ratio of the transformer.
(B) voltage applied across the primary winding.
(C) leakage reactance of the windings.
(D) reluctance of the magnetic circuit.

$$0.4 \times \frac{1}{\Phi} \left(\frac{13.2}{13.8} \right)^2$$

44. In slip test on a 3-phase alternator, the maximum and minimum voltage per phase are V_1 and V_2 respectively whereas the maximum and minimum phase currents are found to be I_1 and I_2 respectively. The value of the d -axis synchronous reactance x_d and q -axis synchronous reactance x_q are determined as

(A) $x_d = \frac{V_1}{I_1}$, $x_q = \frac{V_2}{I_2}$

(B) $x_d = \frac{V_1}{I_2}$, $x_q = \frac{V_2}{I_1}$

(C) $x_d = \frac{V_1}{(I_1 - I_2)}$, $x_q = \frac{V_2}{(I_1 + I_2)}$

(D) $x_d = \frac{(V_1 + V_2)}{(I_1 - I_2)}$, $x_q = \frac{(V_1 - V_2)}{(I_2 + I_1)}$

145. The insulation resistance of a piece of 10 km long single core under ground cable is $10 \text{ M}\Omega$. The I.R. for a length of 25 km the same cable would be

- (A) $1.6 \text{ M}\Omega$ (B) $4 \text{ M}\Omega$ (C) $25 \text{ M}\Omega$ (D) $62.5 \text{ M}\Omega$

146. The type of circuit breakers preferred for EHT application is

- (A) bulk oil CB
(C) air blast CB

(B) minimum oil CB
(D) SF₆ CB

$$\frac{10}{25} = 25$$

147. The differential protection for the windings of an alternator responds to

- (A) overload.
(B) rotor earth fault.
(C) inter-turn short circuit of stator winding.
(D) none of these

148. Regenerative breaking occurs when
- (A) number of poles is decreased in a pole-changing induction motor.
 - (B) the load is lowered by a hoisting machine.
 - (C) the load is lifted by a hoisting machine.
 - (D) both (A) and (B).
149. A 3-phase induction motor while supplying a constant load has the fuse of one line suddenly blows off. The motor will continue to run with line current nearly increased to
- (A) 3 times
 - (B) 6 times
 - (C) 5 times
 - (D) $\sqrt{3}$ times
150. Transmission of bulk power between India and Sri Lanka is possible
- (A) using ac over-head transmission line.
 - (B) using ac submarine cable.
 - (C) using either ac or dc submarine cable.
 - (D) using dc submarine cable.
151. In per unit method of representation of a power system, the base value of
- (A) impedance is same for the entire system.
 - (B) voltage is same for the entire system.
 - (C) MVA is same for entire system.
 - (D) MVA should be in the proportion of transformer ratio.
152. For a uniformly loaded dc distribution fed at one end, the maximum voltage drop is found to be 10 V. If it is fed at both ends at the same voltage, the maximum voltage drop would be
- (A) 2.5 V
 - (B) 5.0 V
 - (C) 10 V
 - (D) 20 V
153. The equal area criterion is employed for the determination of the
- (A) steady state stability limit of single-machine-infinite bus system.
 - (B) swing curve of single-machine-infinite bus system.
 - (C) transient stability limit of single-machine-infinite bus system.
 - (D) determination of critical clearing time.

154. A synchronous phase modifier, used for voltage control in a line

- (A) is a static device.
(B) is a rotating machine, driven by an induction motor.
~~(C)~~ always draws leading var from the bus.
~~(D)~~ none of these

155. A three phase fault in a power system is

- (A) the most common type of fault.
~~(B)~~ usually the most severe type of fault.
(C) results in equal magnitude for positive and negative sequence currents.
(D) results in equal value for positive, negative and zero sequence currents.

156. Harmonic restraint feature is imparted to transformer differential relays to prevent maloperation due to

- (A) power swing.
~~(B)~~ magnetising inrush current.
(C) mismatch of C. T. ratios.
(D) unequal voltages on the two sides of a transformer.

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157. Bode magnitude plot of a system is 0 dB and its maximum phase is -180 degree. Possible transfer function of the system is

- ~~(A)~~ $\frac{1-s}{1+s}$ (B) $\frac{1}{s^2}$ (C) e^{-sT} (D) none of these

158. A 1-phase diode bridge rectifier connected from 100 V rms ac supply is feeding a resistive load. Neglecting diode drop, the output average voltage is approximately.

- ~~(A)~~ 90.0 V ~~(B)~~ 63.7 V (C) 141 V (D) 45 V

$$\frac{2 \times \sqrt{2}}{\pi} \cdot \frac{200 \times 1}{2} = 63.7$$

159. Transient stability of a power system can be improved by

- ~~(A)~~ faster fault clearing
~~(B)~~ both (A) and (B)
(C) fast-acting excitation system
(D) none of these

$$= \frac{63.7}{2}$$

Var compensators are used to

- (A) increase the active power transmission capacity of a line.
 (B) increase the reactive power transmission capacity of a line.
 (C) both (A) and (B).
 (D) none of these.

~~161.~~ In a substation

- (A) lightning arrester has lowest insulation level
(B) transformer has lowest insulation level
(C) busbar has lowest insulation level
(D) insulation level of lightning arrester, transformer and busbar must be same

162. A unity feedback system with open-loop transfer function $G(s) = \frac{9}{s(s+p)}$ is critically damped. The value of the parameter p is

163. A satellite rotates about a planet at the rate of 360° per 24 hours. The planet attracts a 1 kg mass with 10 N force at a distance of 6000 km. The distance of the satellite from the centre of the planet is

- (A) between 20,000 km and 30,000 km (B) between 30,000 km and 40,000 km
~~(C) between 40,000 km and 50,000 km~~ (D) well above 50,000 km

164. Primary reason of using bundle conductor is

- (A) to reduce the line inductance.
 - (B) to improve stability limit.
 - (C) to increase the power transfer capability.
 - (D) to reduce corona.

65. The unit step response of a series RLC circuit is under damped if

- (A) $\left(\frac{R}{2L}\right)^2 < \frac{1}{LC}$

(B) $\left(\frac{R}{2L}\right)^2 = \frac{1}{LC}$

(C) $\left(\frac{R}{2L}\right)^2 > \frac{1}{LC}$

(D) none of these

166. For a transmission line supported at different elevations at the two ends, the tension is maximum at the
(A) shorter support (B) taller support
(C) mid point (D) horizontal point on the line
167. The reactors are used in transmission line to
(A) increase the maximum power transfer capability.
(B) minimise the transmission losses.
(C) minimise the fault current.
(D) improve corona performance.
168. Salient pole generators are used in hydel power plant as
(A) salient pole machines are suitable to run at low speed.
(B) salient pole machines are suitable to run at high speed
(C) salient pole machines are more stable.
(D) salient pole machines are water cooled.
169. If the input to T-flipflop is 100 Hz signal, the final output of the three T-flipflops in cascade is
(A) 1000 Hz (B) 500 Hz (C) 333 Hz (D) 12.5 Hz
170. A piezoelectric transducer (in the form of a rectangular slab) has voltage sensitivity of 0.012 V-m/N and permittivity of $125 \times 10^{-10} \text{ F/m}$. The charge sensitivity of the transducer is
(A) 150 pC/N (B) 75 pC/N (C) $9.6 \times 10^{-7} \text{ C/N}$ (D) 10416.67 pC/N
171. Most severe non-uniform field is developed with
(A) two sphere electrode arrangement. (B) point-point electrode arrangement.
(C) plate-rod electrode arrangement. (D) two parallel plate electrode arrangement.
172. Three resistors having resistances having 50Ω , 100Ω and 150Ω are star connected terminals A, B and C respectively. The resistance of branch BC of the equivalent delta connected resistor is
(A) 275Ω (B) 450Ω (C) 550Ω (D) 600Ω

173. An electric is developing 10 kW at a speed of 900 rpm. The torque available at the shaft is
(A) 106 N-m (B) 1.7 N-m (C) 10,000 N-m (D) 450 N-m
174. For measuring the magnitude as well as direction of displacement using LVDT, it is used in conjunction with.
(A) an amplitude modulator followed by a low-pass filter.
(B) a phase-sensitive demodulator followed by a low-pass filter. 10
(C) a twin-T network.
(D) an integrator.
175. A sphere gap voltmeter always gives a response on the basis of applied wave's
(A) average value (B) rms value (C) peak/ $\sqrt{2}$ (D) peak value
176. Which one of the following materials has the highest relative permittivity?
(A) water (B) transformer oil (C) epoxy resin (D) mica
177. Ballistic galvanometer is used
(A) as a null detector in ac bridges (B) as a null detector in dc bridges
(C) for measuring short-duration current (D) for measuring short-duration electric charge
178. A porous solid dielectric has a relative permittivity of 4. It is to be impregnated by a liquid dielectric whose relative permittivity should ideally be
(A) 2 (B) 4 (C) 8 (D) none of these
179. A travelling wave of magnitude 100 V in transmission line of surge impedance 400Ω passes into a cable of surge impedance 50Ω . What will be the magnitude of the wave while travelling in the cable?
(A) 800 V (B) 100 V (C) 20 V (D) 12.5 V $100 \times 20 = 2000$
180. The impulse response of a system described by the differential equation $\frac{d^2y}{dx^2} + y(t) = x(t)$ will be
(A) a constant
(B) an impulse function
(C) a sinusoid
(D) an exponentially decaying function

188. The continuous time system described by $y(t) = x(t^2)$ is
- (A) causal, linear and time varying.
 - (B) causal, non-linear and time varying.
 - (C) non causal, non-linear and time-invariant.
 - (D) non causal, linear and time-invariant.
189. Zero-order hold used in practical reconstruction of continuous time signals is mathematically represented as a weighted sum of rectangular pulses shifted by:
- (A) any multiples of the sampling interval.
 - (B) integer multiples of the sampling interval.
 - (C) one sampling interval.
 - (D) 1 second intervals.
190. Three identical amplifiers with each one having a voltage gain of 50, input resistance of $1\text{ k}\Omega$ and output resistance of $250\ \Omega$, are cascaded. The open circuit voltage gain of combined amplifier is
- (A) 49 dB
 - (B) 51 dB
 - (C) 98 dB
 - (D) 102 dB
191. The probable speed of a plane three phase induction motor at full load, when supplied from 50 Hz source is
- (A) 1250 rpm
 - (B) 1480 rpm
 - (C) 1530 rpm
 - (D) 1650 rpm
192. The total power in a balanced three phase ac circuit
- (A) is constant at every instant of time.
 - (B) pulsates about a mean value at half the supply frequency.
 - (C) pulsates about a mean value at supply frequency.
 - (D) pulsates about a mean value at twice the supply frequency.
193. A 3-phase synchronous motor with constant excitation drives a certain load drawing electrical power from infinite bus at leading pF. If the shaft load decrease
- (A) the power angles decreases while power factor increases.
 - (B) both power angle and power factor increase.
 - (C) both power angle and power factor decrease.
 - (D) the power angle increases while power factor decreases.

194. Stranded conductors are preferred to solid over head conductors as
(A) they are more flexible.
(B) they may be wound over a drum for easy transportation.
(C) may be designed to have larger effective cross section.
(D) all of these
195. A group of delta connected capacitors delivers 90 kVAR. The same capacitors, when connected in star across the same source, would deliver.
(A) 10 MVAR (B) 30 MVAR (C) 90 MVAR (D) 270 MVAR
196. Subranging ADC is a modification of
(A) flash ADC architecture. (B) dual-slope integrating type ADC
(C) quad-slope integrating ADC (D) counter type ADC
197. The gray code for decimal number 6 is equivalent to
(A) 1100 (B) 1001 (C) 0101 (D) 0110
198. The all day efficiency is of important consideration in case of
(A) a power transformer (B) a distribution transformer
(C) both kind of transformers (D) rectifier transformer
199. When the spacing between the conductors in an over head line is increased
(A) the line inductance decreases but the capacitance increases.
(B) the line capacitance decreases but the inductance increases.
(C) both the inductance and the capacitance decreases.
(D) both the inductance and the capacitance increases.
200. The p.u. reactance of a 25 MVA, 13.2 kV alternator 0.5 pu. On a base of 50 MVA and 13.8 kV the p.u. value shall be
(A) 0.4575 p.u. (B) 0.9149 p.u. (C) 1.0000 p.u. (D) 1.8299 p.u.