All India Mock BPSC TRE 3.0 Class 9 to 10 Mathematics 02-Mar-2024

Directions (1-2): Fill in the blanks with suitable articles like 'a', 'an' and 'the.

Q1. She is ___ United States senator.
(a) an
(b) a
(c) the
(d) More than one of the above
(e) None of the above

Q2. We need __ light in this room
(a) an
(b) a
(c) the
(d) More than one of the above
(e) None of the above

Q3. Which of the following is not a part of the classroom?
(a) Chalk
(b) Model
(c) Tap
(d) More than one of the above
(e) None of the above

Q4. Which among the following is not a cereal?
(a) barley
(b) mustard
(c) gram
(d) More than one of the above
(e) None of the above

Q5. There are five hens in the ____
(a) coop
(b) kennel
(c) hive
(d) More than one of the above
(e) None of the above

Q6. Daughter of paternal grandmother is known as
(a) Sister
(b) Mother
(c) Aunt
(d) More than one of the above
(e) None of the above

Q7. Sister's Father is known as
(a) Father
(b) Uncle
(c) Cousin
(d) More than one of the above
(e) None of the above

Q8. Amir dressed ___ for the award ceremony.
(a) up
(b) put
(c) down
(d) More than one of the above
(e) None of the above

Q9. 'अच्छा' अर्थ वैशिष्ट्य बताने वाला उपसर्ग कौन सा है?
(a) नि
(b) पर
(c) सु
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q10. निम्नलिखित में से किस शब्द में 'अ' उपसर्ग नहीं जुड़ा है?
(a) अटल
(b) अपमान
(c) अथाह
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q11. 'डिबिया' शब्द में मूल शब्द व प्रत्यय को अलग-अलग कीजिए-
(a) डिब + इया
(b) डिब्बा + इया
(c) डिबि + या
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q12. निम्नलिखित में से प्रत्यय रहित शब्द कौन सा है?
(a) मर्मज्ञ
(b) वैज्ञानिक
(c) कृपालु
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q13. निम्नलिखित में से शुद्ध वाक्य है-
(a) गौतम ऋषि की पत्नी का नाम अहील्या था
(b) राजीव निरपराधी है
(c) अग्नि प्रज्वलित हो रही है
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q14. निम्नलिखित वाक्यों में से किस वाक्य में सर्वनाम का अशुद्ध प्रयोग हुआ है?
(a) वह स्वयं यहाँ नहीं आना चाहती
(b) आपके आग्रह पर मैं दिल्ली जा सकता हूँ
(c) मैं तेरे को घड़ी दूँगा।
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q15. निम्नलिखित में से किस विकल्प में दिये गये शब्द परस्पर पर्यायवाची हैं?
(a) सलिल, तोय
(b) चपला, रजनी
(c) भुजंग, कुंजर
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q16. निम्नलिखित में से किस विकल्प में दिये गये शब्द परस्पर पर्यायवाची नहीं हैं?
(a) पीयूष, सुधा, सोम
(b) अरण्य, विपिन, कांतार
(c) दामिनी, यामिनी, उर्मि
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q17. निम्नलिखित में से कौन सा शब्द 'सूर्य' का पर्यायवाची नहीं है?
(a) दिवा
(b) दिवाकर
(c) दिनकर
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q18. दिए गए शब्दों के आधार पर उत्तर दीजिए-
(i) सोम (ii) अक्षि (iii) सुधाकर (iv) तृण
उपर्युक्त शब्दों में 'चन्द्रमा ' के पर्यायवाची कौन से हैं?
(a) (i) और (iv)
(b) (ii) और (iii)
(c) (i) और (iii)
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q19. निम्नलिखित में से किस सामासिक शब्द का विग्रह सही है?
(a) पथभ्रष्ट = पथ के लिए भ्रष्ट
(b) चतुर्भुज = चार हैं भुजाएँ जिसकी
(c) पंचमणि = बहुमूल्य मणि
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q20. निम्नलिखित में से किस सामासिक पद का विग्रह गलत है?
(a) पुरुषोत्तम = पुरुषों में जो है उत्तम
(b) चरणकमल = कमल के समान चरण
(c) गुणहीन = गुण के लिए हीन
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q21. निम्नलिखित में से कौन सा सामासिक पद सही नही है?
(a) ग्राम का उद्धार = ग्रामोद्धार
(b) जीवन से मुक्ति = जीवनमुक्ति
(c) धर्म से उन्मुख = धर्मविमुख
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q22. 'भौरा', 'कोयल', 'सखी' किस शब्द के अनेकार्थी हैं:
(a) अलि
(b) अंत
(c) अनंता
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q23.निम्नलिखित में से किस शब्द के सभी शब्द अशुद्ध हैं?
(a) वेषभूषा, विशिष्ठ
(b) उत्कर्ष, बहिष्कार
(c) निषाद, वाष्प
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q24. निम्नलिखित में से शुद्ध वर्तनी वाले शब्द का चयन कीजिए-
(a) जीजीविषा
(b) जिजीविषा
(c) जिजिविषा
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q25. निम्नलिखित में से किस विकल्प के सभी शब्द शुद्ध हैं?
(a) अनुग्रहित, कवयित्रि, ज्योत्सना
(b) अनुगृहीत, कवयित्री, ज्योत्स्ना
(c) अनुग्रहीत, कवियित्री, जयोत्सना
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q26. वर्तनी की दृष्टि से कौन-सा शब्द अशुद्ध है?
(a) क्षत्रिय
(b) परिणती
(c) कनिष्ठ
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q27. इनमें से किस विकल्प में सही विलोम-युग्म है?
(a) अति-रति
(b) तिमिर-तरुण
(c) अर्पण- ग्रहण
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q28. 'आविर्भाव' शब्द का विलोम शब्द है-
(a) निरामिष
(b) तिरोभाव
(c) यथार्थ
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q29. इनमें से कौन सा विलोम-युग्म सही नहीं है?
(a) प्रवृति – निवृत्ति
(b) बोधगम्य – दुरूह
(c) श्लाघा – आत्मप्रशंसा
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q30. 'अनभिज्ञ' का विलोम है-
(a) अज्ञ
(b) प्रज्ञ
(c) अभिज्ञ
(d) उपर्युक्त में से एक से अधिक
(e) उपर्युक्त में से कोई नहीं

Q31. Two inlet pipes A and B can fill empty cistern in 6 and 10 hrs respectively. They are switched on together but pipe B had to be closed 1 hour before the cistern was full. How many hours did they take to fill the cistern?
(a) 4½hr
(b) 5¾ hr
(c) 3⅓ hr
(d) More than one of the above
(e) None of the above

Q32. $81 \div 3^3 \times 4 - 10 = ?$
(a) 1
(b) 2
(c) 0
(d) More than one of the above
(e) None of the above

Q33. Sum of a two digit number and number obtained by reversing digits is 66. Sum of digits of the number is?
(a) 5
(b) 6
(c) 12
(d) More than one of the above
(e) None of the above

Q34. A dealer marks a washing machine for Rs. 7500 and allows a discount of 6% on it. Find the selling price
(a) 6850
(b) 7050
(c) 7250
(d) More than one of above
(e) None of above

Q35. The sum of the cubes of two number in the ratio 3:4 is 5824. Find the sum of these two numbers.
(a) $(5824)^{1/3}$
(b) 28
(c) 24
(d) More than one of above
(e) None of above

Q36. Loss of 20% on selling price is equal to x% loss in cost price. what is x?
(a) 20%
(b) 30%
(c) $16\frac{2}{3}\%$
(d) More than one of above
(e) None of above

Q37. In a motor 1, out of 120 machine parts, 5% pats were defective. In motor 2, out of 80 machine parts, 10 % were defective. For the two motors considers together, the percentage of defective machine parts were
(a) 7
(b) 6.5
(c) 7.5
(d) More than one of above
(e) None of above

Q38. If $(2^3)^2 = 4^x$, then 3^x, is equal to
(a) 3
(b) 6
(c) 9
(d) More than one of above
(e) None of above

Q39. Tropic of Cancer passes through:
(a)Chhattisgarh, Gujarat, Jharkhand
(b)Uttar Pradesh, Kerala, Tamil Nādu
(c)Odisha, Andhra Pradesh, Jharkhand
(d) More than one of the above
(e) None of the above

Q40. Which of the following is an example of a behavioral method for controlling air pollution?
(a) Carpooling
(b) Installing air filters
(c) Upgrading to electric vehicles
(d) More than one of the above
(e) None of the above

Q41. When was "Bihar Bandhu" Newspaper started in Bihar?
(a) 1872
(b) 1855
(c) 1845
(d) More than one of the above
(e) None of the above

Q42. Which of the following is a primary treatment process in wastewater treatment?
(a) Aeration
(b) Sedimentation
(c) Filtration
(d) More than one of the above
(e) None of the above

Q43. How does noise pollution affect mental health?
(a) It causes anxiety
(b) It leads to depression
(c) It increases stress levels
(d) More than one of the above
(e) None of the above

Q44. Which of the following is an example of biomedical solid waste?
(a) Food waste from a restaurant
(b) Hazardous waste from a factory
(c) Sharps waste from a hospital
(d) More than one of the above
(e) None of the above

Q45. Who composed the songs of Phaag Raag in Bihar?
(a) Naval kishor Singh
(b) Kavi Vidyapith
(c) Rajashah
(d) More than one of the above
(e) None of the above

Q46. When was the Times of India published in Bihar?
(a) 1986
(b) 1988
(c) 1955
(d) More than one of the above
(e) None of the above

Q47. When was the Gaya Museum established in Bihar?
(a) 1980
(b) 1988
(c) 1970
(d) More than one of the above
(e) None of the above

Q48. When was Kameshwar Singh Darbhanga Sanskrit University established in Bihar?
(a) 1959
(b) 1962
(c) 1961
(d) More than one of the above
(e) None of the above

Q49. Former Indian cricketer Mahendra Singh Dhoni has launched the made-in-India camera drone named 'Droni'. Droni is manufactured by _____?
(a) Horizon Aerospace
(b) HaveUs Aerotech
(c) Garuda Aerospace
(d) More than one of the above
(e) None of the above

Q50. Union Minister of Road Transport and Highways Nitin Gadkari inaugurated the 81st annual session of the Indian roads Congress in _____.
(a) Bhopal
(b) Lucknow
(c) Indore
(d) More than one of the above
(e) None of the above

Q51. Which team won the Women's T20 World Cup for the sixth time when they beat South Africa?
(a) Australia
(b) India
(c) Pakistan
(d) More than one of the above
(e) None of the above

Q52. Which team was named the winner of the 13th Hockey India Senior Women National Championship in 2023?
(a) Kerala
(b) Odisha
(c) Madhya Pradesh
(d) More than one of the above
(e) None of the above

Q53. Ellora Ajanta International Festival 2023 is held in which state in India?
(a) Maharashtra
(b) Tamil Nadu
(c) Madhya Pradesh
(d) More than one of the above
(e) None of the above

Q54. The World's largest island is -
(a) Greenland
(b) Iceland
(c) New Guinea
(d) More than one of the above
(e) None of the above

Q55. The longest sea beach in India is -
(a) Chapora beach
(b) Diu beach
(c) Marina beach
(d) More than one of the above
(e) None of the above

Q56. Which one of the following regions is most rich in coal deposits?
(a) Brahmaputra Valley
(b) Damodar Valley
(c) Mahanadi Valley
(d) More than one of the above
(e) None of the above

Q57. The layer where the decrease in temperature with increasing altitude is totally absent is -
(a) Troposphere
(b) Ionosphere
(c) Stratosphere
(d) More than one of the above
(e) None of the above

Q58. The term "Doab" means -
(a) a land between two mountains
(b) a land between two lakes
(c) a land between two rivers
(d) More than one of the above
(e) None of the above

Q59. Who was the first Governor General of India?
(a) Lord William Bentick
(b) Lord Dalhousie
(c) Lord Cornwallis
(d) More than one of the above
(e) None of the above

Q60. Which act ended the "Trade Monopoly" of the East India Company?
(a) Regulating Act of 1773
(b) Pitt's India Act of 1784
(c) The Charter Act of 1813
(d) More than one of the above
(e) None of the above

Q61. Which among the following was also known as the Bandobast system?
(a) Zabti
(b) parukh
(c) Nasaq
(d) More than one of the above
(e) None of the above

Q62. Which one of the following began with the Dandi March?
(a) Home Rule Movement
(b) Non-Cooperation Movement
(c) Civil Disobedience Movement
(d) More than one of the above
(e) None of the above

Q63. Which of the following statements is not correct?
(a) Swami Dayananda Saraswati founded the Arya Samaj.
(b) Dr Annie Besant was a theosophist.
(c) Mahatma Gandhi was born in Gandhinagar
(d) More than one of the above
(e) None of the above

Q64. During India's freedom struggle, which one of the following led to the first 'All India Hartal'?
(a) Protest against the Rowlatt Act
(b) Protest against Jallianwalla Bagh Massacre
(c) Trial of Mahatma Gandhi
(d) More than one of the above
(e) None of the above

Q65. A law passed by a state on a concurrent subject gets precedence over the law of the center-
(a)if it was passed earlier than the central law
(b)if it was passed by the state legislature and approved by the President before enactment of the central law
(c)if the Supreme Court so decides
(d) More than one of the above
(e) None of the above

Q66. The Constitution of India has created-
(a)A very weak center
(b)A very strong center
(c) A Centre which is weak during normal times but very strong during emergencies
(d) More than one of the above
(e) None of the above

Q67. Recommendations to the President of India on the specific Union-State fiscal relations are made by the
(a) Finance Minister
(b) Reserve Bank of India
(c) Finance Commission
(d) More than one of the above
(e) None of the above

Q68. What is the composition of Nitrogen and Oxygen in the Atmosphere?
(a) 78% and 21%
(b) 72% and 21%
(c) 72% and 27%
(d) More than one of the above
(e) None of the above

Q69. Which of the following is an example of terrestrial food chain?
(a) Phyto-planktons →small fish →large fish→ egret
(b) Grass→ insects →frog →snake →hawk/otter
(c) Bull kelp →sea urchin→ gray whale →killer whale
(d) More than one of the above
(e) None of the above

Q70. The over-lapping network of food-chains in an ecosystem is called:
(a) Ecosystem
(b) Trophic Level
(c) Food web
(d) More than one of the above
(e) None of the above

Q71.
If $3\tan\theta = 2\sqrt{3}\sin\theta$, $0° < \theta < 90°$, then the value of $\frac{\text{cosec}^2 2\theta + \cot^2 2\theta}{\sin^2\theta + \tan^2 2\theta}$ is:
(a) 4/13
(b) 20/39
(c) 4/3
(d) More Than one of the above
(e) None of the above

Q72. O is a point in the interior of Δ ABC such that OA = 12 cm, OC = 9 cm, ∠AOB = ∠BOC = ∠COA and ∠ABC = 60°. What is the length of (in cm) of OB?
(a) $6\sqrt{3}$
(b) $4\sqrt{6}$
(c) $4\sqrt{3}$
(d) More Than one of the above
(e) None of the above

Q73. An article is sold at a certain price. If it is sold at $33\frac{1}{3}$%of this price, there is a loss of $33\frac{1}{3}$%What is the percentage profit if the article is sold at 80% of its original selling price?
(a) 60%
(b) 50%
(c) 70%
(d) More Than one of the above
(e) None of the above

Q74. The value of
$$\frac{3(\cot^2 47° - \sec^2 43°) - 2(\tan^2 23° - \text{cosec}^2 67°)}{(\text{cosec}^2(68° + \theta) - \tan^2(\theta + 61°) - \tan^2(22° - \theta) + \cot^2(29° - \theta)}$$
is:
(a) -1
(b) 1
(c) 5
(d) More Than one of the above
(e) None of the above

Q75. When the price of an item was reduced by 20%, its sale increased by x%. If there is an increase of 25% in receipt of the revenue, then the value of x is:
(a) 55.35
(b) 57.75
(c) 56.25
(d) More Than one of the above
(e) None of the above

Q76. What is the area (n unit squares) of the region enclose by the graphs of the equations 2x – 3y + 6= 0, 4x + y = 16 and y = 0?
(a) 12
(b) 10.5
(c) 14
(d) More Than one of the above
(e) None of the above

Q77. The slant height and radius of a right circular cone are in the ratio 29 : 20. If its volume is $4838.4\ \pi\ \text{cm}^3$, then its radius is:
(a) 28 cm
(b) 20 cm
(c) 24 cm
(d) More Than one of the above
(e) None of the above

Q78. If the selling price of 7 articles is equal to the cost price of 8 articles, then what is the profit percentage (correct to one decimal place?
(a) 14.3%
(b) 13.9%
(c) 15.4%
(d) More Than one of the above
(e) None of the above

Q79. The value of $0.4\bar{6} + 0.7\overline{23} - 0.3\bar{9} \times 0.\bar{7}$ is:
(a) $0.\overline{97}$
(b) $0.\overline{57}$
(c) $0.\overline{87}$
(d) More Than one of the above
(e) None of the above

Q80. In an examination, average marks of a student per paper were 71. If he would have obtained 35 more marks in sciences; 11 more marks in history and 4 more marks in computer science, his average marks per paper would have been 76. How many papers were there in the examination?
(a) 10
(b) 12
(c) 18
(d) More Than one of the above
(e) None of the above

Q81. In ΔPQR, S is a point on the side QR such that ∠QPS = 1/2 ∠PSR, ∠QPR = 78° and ∠PRS = 44°. What is the measure of ∠PSQ?
(a) 68°
(b) 56°
(c) 64°
(d) More Than one of the above
(e) None of the above

Q82. The value of $X + \frac{1}{X} = 2\ find\ \ X^{99} + X^{999} + X^{9999}$?
(a) 3
(b) 4
(c) 5
(d) More Than one of the above
(e) None of the above

Q83.
If $2x - y = 2$ and $xy = \frac{3}{2}$, then what is the value of $x^3 - \frac{y^3}{8}$?
(a) $\frac{9}{2}$
(b) $-\frac{5}{4}$
(c) $\frac{13}{4}$
(d) More Than one of the above
(e) None of the above

Q84. The income of A is 2/3 if B's income and the expenditure of A is 3/4 of B's expenditure. If 1/3 of the income of B is equal to the expenditure of A, then the ratio of the savings of A to those of B is:
(a) 5 : 3
(b) 3 : 5
(c) 4 : 3
(d) More Than one of the above
(e) None of the above

Q85. G is the centroid of a triangle ABC, whose sides, AB = 35 cm, BC = 12 cm, and AC = 37 cm. The length of BG is (correct to one decimal place):
(a) 11.7 cm
(b) 12.9 cm
(c) 12. 3 cm
(d) More Than one of the above
(e) None of the above

Q86. A covered a distance of 240 km at a certain speed. Had his speed been 8 km/h less, then the time taken would have been one hour more for covering the same distance. How much time (in hours) will be take to cover a distance of 480 km at his original speed?
(a) 9
(b) 11
(c) 10
(d) More Than one of the above
(e) None of the above

Q87. If $1 + 2\tan^2\theta + 2\sin\theta\sec^2\theta = \frac{a}{b}$, $0° < \theta < 90°$, then $\frac{a+b}{a-b} = ?$
(a) sin θ
(b) cos θ
(c) cosec θ
(d) More Than one of the above
(e) None of the above

Q88. A sum of money becomes Rs.11,880 after 4 years and Rs.17,820 after 6 years on compound interest, if the interest is compounded annually. What is the half of the sum (in Rs.)?
(a) 2,410
(b) 2,530
(c) 2,640
(d) More Than one of the above
(e) None of the above

Q89. The radius of a spherical balloon is inflated from 3.5 cm to 4.9 cm by pushing air into it. What is the percentage increase in the volume of the original balloon?
(a) 173.6%
(b) 174.4%
(c) 74.4%
(d) More Than one of the above
(e) None of the above

Q90. The numbers of students in section A and section B of a class are 50 and 62, respectively. The average score in mathematics of all the students is 75. If the average score of students in section A is 20% more than that of students in section B, then what is the average score of studens in section A (correct to one decimal place)?
(a) 87.5
(b) 82.6
(c) 84.3
(d) More Than one of the above
(e) None of the above

Q91. If the sum of 40% of a number and 30% of the same number is 70, then the number is:
(a) 200
(b) 100
(c) 150
(d) More Than one of the above
(e) None of the above

Q92. A solid metallic cuboid of dimensions 12 cm × 54 cm × 72 cm is melted and covered into 8 cubes of the same size. What is the sum of the lateral surface areas (in cm^2) of 2 such cubes?
(a) 2268
(b) 1944
(c) 2592
(d) More Than one of the above
(e) None of the above

Q93. ABCD is a quadrilateral in which AB ∥ DC. E and F are the midpoints of the diagonals AC and BD, respectively. If AB = 18 cm and CD = 6 cm, there EF = ?
(a) 8 cm
(b) 6 cm
(c) 12 cm
(d) More Than one of the above
(e) None of the above

Q94. A sum of Rs.46,800 is divided among A, B, C and D in such a way that the ratio of the combined shares of A and D to the combined share of B and C is 8 : 5. The ratio of the share of B to that of C is 5 : 4. A receives Rs.18,400. If x is the difference between the shares of A and B and y is the difference between the shares of C and D, then what is the value of (x – y) (in Rs.)?
(a) 7000
(b) 6000
(c) 6500
(d) More Than one of the above
(e) None of the above

Q95. A person marks an article 36% above the cost price and offers 30% dis count on the marked price. What is the loss or gain percentage?
(a) Loss 6.5%
(b) Loss 4.8%
(c) Gain 8.5%
(d) More Than one of the above
(e) None of the above

Q96. A loan is to be returned in two equal yearly instalments. If the rate of interest is 10% p.a. compounded annually and each instalment is Rs.5,808, then 60% of the total interest (nearest to a Rs.) charged in this scheme is:
(a) 917
(b) 911
(c) 922
(d) More Than one of the above
(e) None of the above

Q97. Th curved surface area and the volume of a cylindrical object are 88 cm^2 and 132 cm^3, respectively. The height (in cm) of the cylindrical object is:
$\left(Take\ \pi = \frac{22}{7}\right)$
(a) $4\frac{2}{3}$
(b) 4
(c) 6
(d) More Than one of the above
(e) None of the above

Q98. In ΔLMN, LM = $5\sqrt{2}$ cm, LN = 13 cm and ∠LMN = 135°. What is the length (in cm) of MN?
(a) 7
(b) 8
(c) $8\sqrt{2}$
(d) More Than one of the above
(e) None of the above

Q99. S and T are points on the sides PQ and PR, respectively, of Δ PQR such that PS × PR = PQ × PT. If ∠Q = 96° and ∠PST = ∠PRQ + 34°, then ∠QPR = ?
(a) 24°
(b) 25°
(c) 22°
(d) More Than one of the above
(e) None of the above

Q100.
$(\frac{\tan^3\theta}{\sec^2\theta} + \frac{\cot^3\theta}{\operatorname{cosec}^2\theta} + 2\sin\theta\cos\theta) \div (1+\operatorname{cosec}^2\theta+\tan^2\theta)$, $0° < \theta < 90°$, is equal to:
(a) cosecθ secθ
(b) Cosecθ
(c) sinθ cosθ
(d) More Than one of the above
(e) None of the above

Q101. If the sum of two positive numbers is 65 and the square root of their product is 26, then the sum of their reciprocals is :
(a) 7/52
(b) 5/52
(c) 1/52
(d) More Than one of the above
(e) None of the above

Q102. The ratio of the distance between two places A and B to the distance between places B and C is 3 : 5. A man travels from A to B at a speed of x km/h and from B to C at a speed of 50 km/h. If his average speed for the entire journey is 40 km/h, then what is the value of (x – 10) : (x + 1)?
(a) 11 : 10
(b) 20 : 31
(c) 31 : 20
(d) More Than one of the above
(e) None of the above

Q103. A and B can do a work in $26\frac{2}{3}$ days. B and C together can complete the same work in 48 days, while A and C together can complete the same work in 30 days. How long (in days) will A alone take to complete 60% of the work?
(a) 20
(b) 32
(c) 24
(d) More Than one of the above
(e) None of the above

Q104. The sum of the interior angles of a regular polygon A is 1260 degrees and each interior angles of a regular polygon B is $128\frac{4}{7}$ degrees. The sum of the number of sides of polygons A and B is:
(a) 17
(b) 16
(c) 19
(d) More Than one of the above
(e) None of the above

Q105. Eight years ago, the ratio of ages of A and B was 5 : 4. The ratio of their present age is 6 : 5. What will be the sum (in years) of the ages of A and B after 7 years from now?
(a) 80
(b) 102
(c) 112
(d) More Than one of the above
(e) None of the above

Q106. The base of a right prism is a triangle with sides 16 cm, 30 cm and 34 cm. Its height is 32 cm. The lateral surface area (in cm^2) and the volume (in cm^3) are, respectively.
(a) 2560 and 7680
(b) 2688 and 7680
(c) 2624 and 7040
(d) More Than one of the above
(e) None of the above

Q107. The graphs of the equations $4x + \frac{1}{3}y = \frac{8}{3}$ and $\frac{1}{2}x + \frac{3}{4}y + \frac{5}{2} = 0$, intersect at a point P. The point P also lies on the graph of the equation:
(a) x + 2y – 5 = 0
(b) 3x – y – 7 = 0
(c) x – 3y – 12 = 0
(d) More Than one of the above
(e) None of the above

Q108. The value of $\left(2\frac{6}{7} \text{ of } 4\frac{1}{5} \div \frac{2}{3}\right) \times 5\frac{1}{9} \div \left(\frac{3}{4} \times 2\frac{2}{3} \text{ of } \frac{1}{2} \div \frac{1}{4}\right)$ is :
(a) 25
(b) 19
(c) 23
(d) More Than one of the above
(e) None of the above

Q109. Let $x = (433)^{24} - (377)^{38} + (166)^{54}$. What is the units digit of x?
(a) 8
(b) 9
(c) 7
(d) More Than one of the above
(e) None of the above

Q110. If $7\sin^2\theta + 4\cos^2\theta = 5$ and θ lies in the first quadrant, then what is the value of $\frac{\sqrt{3}\sec\theta+\tan\theta}{\sqrt{2}\cot\theta-\sqrt{3}\cos\theta}$?
(a) $2(1+\sqrt{2})$
(b) $3\sqrt{2}$
(c) $2(\sqrt{2}-1)$
(d) More Than one of the above
(e) None of the above

Q111. The surface area of a sphere is 221.76 cm^2. Its volume (in cm^3) is (correct to one decimal place) : $\left(Take\ \pi = \frac{22}{7}\right)$
(a) 315.6
(b) 289.8
(c) 310.5
(d) More Than one of the above
(e) None of the above

Q112. If $2x^2+5x+1 = 0$, then one of the values of $x - \frac{1}{2x}$ is:
(a) $\sqrt{17}/2$
(b) $13/2$
(c) $5/2$
(d) More Than one of the above
(e) None of the above

Q113. In ΔABC, $\angle B = 78°$, AD is a bisector of $\angle A$ meeting BC at D, and AE $\perp$ BC at E. if $\angle DAE = 24°$, then the measure of $\angle ACB$ is:
(a) 30°
(b) 38°
(c) 32°
(d) More Than one of the above
(e) None of the above

Q114. Let $0° < \theta < 90°$, $(1+\cot^2\theta)(1+\tan^2\theta)\times(\sin\theta - \text{cosec}\theta)(\cos\theta - \sec\theta)$ is equal to:
(a) $\sin\theta + \cos\theta$
(b) $\sin\theta\cos\theta$
(c) $\sec\theta\,\text{cosec}\theta$
(d) More Than one of the above
(e) None of the above

Q115. The volume of a solid hemisphere is 19.404 cm^3. Its total surface area (in cm^2) is: $\left(Take\ \pi = \frac{22}{7}\right)$
(a) 27.72
(b) 34.65
(c) 41.58
(d) More Than one of the above
(e) None of the above

Q116.
$\frac{(1+\sec\theta\ \text{cosec}\theta)^2(\sec\theta-\tan\theta)^2(1+\sin\theta)}{(\sin\theta+\sec\theta)^2+(\cos\theta+\text{cosec}\theta)^2}$, $0° < \theta < 90°$, is equal to:
(a) $1 - \cos\theta$
(b) $1 - \sin\theta$
(c) $\cos\theta$
(d) More Than one of the above
(e) None of the above

Q117. Alloy A contains metals x and y only in the ratio 5 : 2, while alloy B contains them in the ratio 3 : 4. Alloy C is prepared by mixing alloys A and B in the ratio 4 : 5. The percentage of x in alloy C is:
(a) $55\frac{1}{9}$
(b) $55\frac{2}{9}$
(c) $55\frac{5}{9}$
(d) More Than one of the above
(e) None of the above

Q118.
If a 10-digit number s divisible by 72, then the value of $\sqrt$
(a) $\sqrt{30}$
(b) $\sqrt{27}$
(c) $\sqrt{28}$
(d) More Than one of the above
(e) None of the above

Q119.
$\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)} \times \frac{\sqrt{\sec^2\theta+\text{cosec}^2\theta}}{\tan\theta+\cot\theta}$, $0° < \theta < 90°$, is equal to
(a) $\tan\theta$
(b) $\sec\theta$
(c) $\cot\theta$
(d) More Than one of the above
(e) None of the above

Q120. If $a+b = 8$, $ab = 10$, then the value ofC $a^3 + b^3$ is :
(a) 312
(b) 215
(c) 272
(d) More Than one of the above
(e) None of the above

Q121. In Δ PQR S , U and T are the points on the sides QR, PR and PQ respectively. PQ = (QR+5)cm, PQ = (PR+2) cm. If the perimeter of Δ PQR is 32 cm, then PR is equal to:
(a) 10 cm
(b) 13 cm
(c) 11 cm
(d) More Than one of the above
(e) None of the above

Q122. Let $x = \frac{5\frac{3}{4}-\frac{3}{7}\times 15\frac{3}{4}+2\frac{2}{35}\div 1\frac{11}{28}}{\frac{3}{4}\div 5\frac{1}{4}+5\frac{3}{5}\div 3\frac{4}{15}}$, when y is added to x, the result is 7/13. What is the value of y?
(a) 1/13
(b) 9/13
(c) 4/13
(d) More Than one of the above
(e) None of the above

Q123. The value of $\frac{1}{4-\sqrt{15}}-\frac{1}{\sqrt{15}-\sqrt{14}}+\frac{1}{\sqrt{14}-\sqrt{13}}-\frac{1}{\sqrt{13}-\sqrt{12}}+\frac{1}{\sqrt{12}-\sqrt{11}}-\frac{1}{\sqrt{11}-\sqrt{10}}+\frac{1}{\sqrt{10}-3}-\frac{1}{3-\sqrt{8}}$ is:
(a) $2-2\sqrt{2}$
(b) $4+2\sqrt{2}$
(c) $4-2\sqrt{2}$
(d) More Than one of the above
(e) None of the above

Q124. If sin A = 5/13 and 7cot B = 24, then the value of (secA cosB)(cosecB tanA) is:
(a) 65/42
(b) 13/14
(c) 15/31
(d) More Than one of the above
(e) None of the above

Q125. The sum of and difference between the LCM and HCF of two numbers are 512 and 496, respectively. If one number is 72, then the other number is:
(a) 56
(b) 64
(c) 40
(d) More Than one of the above
(e) None of the above

Q126. The angle of elevation of the top of a tower $25\sqrt{3}$ m high from two points on the level ground on its opposite sides are 45° and 60°. What is the distance (in m) between the two points (correct to one decimal place)?
(a) 45.3
(b) 58.4
(c) 68.3
(d) More Than one of the above
(e) None of the above

Q127. ABCD is a cyclic quadrilateral and BC is a diameter of the circle. If ∠DBC = 29°, then ∠BAD =?
(a) 129°
(b) 119°
(c) 111°
(d) More Than one of the above
(e) None of the above

Q128. Three fractions x, y and z are such that x > y > z. When the smallest of them is divided by the greatest, the result is 9/16, which exceeds y by 0.0625. if $x+y+z = 2\frac{3}{12}$ then what is the value of x+z?
(a) 5/4
(b) 3/4
(c) 7/4
(d) More Than one of the above
(e) None of the above

Q129. If $x^2 - \sqrt{7}x + 1 = 0$, then what is the value of $x^5 + \frac{1}{x^5}$?
(a) $19\sqrt{7}$
(b) $21\sqrt{7}$
(c) $25\sqrt{7}$
(d) More Than one of the above
(e) None of the above

Q130. The value of $\frac{4\tan^2 30°+\sin^2 30°\cos^2 45°+\sec^2 48°-\cot^2 42°}{\cos 37°\sin 53°+\sin 37°\cos 53°+\tan 18°\tan 72°}$ is:
(a) 35/48
(b) 59/48
(c) 49/24
(d) More Than one of the above
(e) None of the above

Q131. The radius of the base of cylindrical tank is 4 m. If three times the sum of the areas of its two circular faces is twice the area of its curved surface, then the capacity of the tank is:
(a) 54π
(b) 144π
(c) 96π
(d) More Than one of the above
(e) None of the above

Q132. If $\frac{22\sqrt{2}}{4\sqrt{2}-\sqrt{3+\sqrt{5}}} = a+\sqrt{5}b$, with a, b > 0, then what is the value of (ab) : (a+b)?
(a) 7 : 8
(b) 7 : 4
(c) 4 : 7
(d) More Than one of the above
(e) None of the above

Q133. Two pipes A and B can fill a cistern in $12\frac{1}{2}$ hours and 25 hours, respectively. The pipes were opened simultaneously, and it was found that, due to leakage in the bottom, it took one hour and 40 minutes more to fill the cistern. If the cistern is full, in how much time (in hours) will the leak alone empty 70% of the cistern?
(a) 40
(b) 35
(c) 30
(d) More Than one of the above
(e) None of the above

Q134. In ΔABC, ∠A = 66° and ∠B = 50°. If the bisectors of ∠B and ∠C meet at P, then ∠BPC – ∠PCA = ?
(a) 93°
(b) 91°
(c) 83°
(d) More Than one of the above
(e) None of the above

Q135. The monthly expenses of a person are $66\frac{2}{3}$% more than her monthly savings. If her monthly income increase by 44% and her monthly expenses increase by 60%, then there is an increase of Rs.1,040 in her monthly savings. What is the initial expenditure (in Rs.)?
(a) 10,000
(b) 12,000
(c) 13,000
(d) More Than one of the above
(e) None of the above

Q136. The value of $\frac{3(cosec^2 26°-\tan^2 64°)+(\cot^2 42°-\sec^2 48°)}{\cot(22°-\theta)-cosec^2(62°+\theta)-\tan(\theta+68°)+\tan^2(28°-\theta)}$ is:
(a) 3
(b) 4
(c) -2
(d) More Than one of the above
(e) None of the above

Q137. ABCD is a cyclic quadrilateral. Sides AB and DC, when produced, meet at E and sides AD and BC when produced, meet at F. If ∠ADC = 76° and ∠AED = 55°, then ∠AFB is equal to:
(a) 34°
(b) 26°
(c) 27°
(d) More Than one of the above
(e) None of the above

Q138. If $\cos\theta = \frac{12}{13}$, then the value of $\frac{sin\theta(1-\tan\theta)}{tan\theta(1+cosec\theta)}$ is:
(a) 25/78
(b) 35/234
(c) 35/108
(d) More Than one of the above
(e) None of the above

Q139. If $x^2 - 3x + 1 = 0$, then the value of $\frac{\left(x^4+\frac{1}{x^2}\right)}{(x^2+5x+1)}$ is :
(a) 9/4
(b) 27/8
(c) 5/2
(d) More Than one of the above
(e) None of the above

Q140. A shopkeeper marks an article at such a price that after giving a discount of $12\frac{1}{2}$%on the marked price, he still earns a profit of 15%. If the cost price of the article is Rs.385, then the sum of the marked price and the selling price (in Rs.) of the article is:
(a) 948.75
(b) 849.50
(c) 984.75
(d) More Than one of the above
(e) None of the above

Q141. A and B worked together and received a total of Rs.18,000 for 15 days. A's efficiency in the work was 5 times that of B's. The daily wage of A (in Rs.) was:
(a) 800
(b) 600
(c) 1,000
(d) More Than one of the above
(e) None of the above

Q142. If x=32.5, y = 34.6 and z = 30.9, then the value of $x^3 + y^3 + z^3 - 3xyz$ is 0.98K, where k is equal to:
(a) 1033
(b) 933
(c) 1026
(d) More Than one of the above
(e) None of the above

Q143. If $\frac{sec\theta-\tan\theta}{sec\theta+\tan\theta} = \frac{1}{7}$, θ I lies in first quadrant, then the value of $\frac{cosec\theta+\cot^4\theta}{cosec\theta-ot^2\theta}$ is:
(a) 19/5
(b) 22/3
(c) 37/12
(d) More Than one of the above
(e) None of the above

Q144. A sum of money at simple interest amounts to Rs.6,000 in 4 years and to Rs.6,750 in 7 years at the same rate per cent of interest. The sum (in Rs.) is:
(a) 5,100
(b) 4,800
(c) 5,000
(d) More Than one of the above
(e) None of the above

Q145. The sum of the digits of the least number which when divided by 36, 72, 80 and 88 leaves the remainders 16, 52, 60 and 68, respectively, is:
(a) 17
(b) 11
(c) 16
(d) More Than one of the above
(e) None of the above

Q146.
The expression $(\tan\theta + \cot\theta)(\sec\theta+\tan\theta)(1-\sin\theta)$, $0° < \theta < 90°$, is equal to:
(a) sec θ
(b) cosec θ
(c) cot θ
(d) More Than one of the above
(e) None of the above

Q147. A sum of Rs.8,400 amounts to Rs.11,046 at 8.75% p.a. simple interest in a certain time. What will be the simple interest (in Rs.) on a sum of Rs.10,800 at the same rate for the same time?
(a) 3,402
(b) 3,204
(c) 3,024
(d) More Than one of the above
(e) None of the above

Q148. The circumference of the base of a cylindrical vessel is 264 cm and its height is 50 cm. The capacity (in litres) of the vessel is: $\left(Take\ \pi = \frac{22}{7}\right)$
(a) 277.2
(b) 278.4
(c) 280.6
(d) More Than one of the above
(e) None of the above

Q149. The value of
$9 \div \left\{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{6} \div \left(\frac{3}{4}-\frac{1}{3}\right) of \frac{2}{9}\right\}$ is:
(a) 540/173
(b) 340/173
(c) 480/173
(d) More Than one of the above
(e) None of the above

Q150. A well with inner radius 3 m, is dug 6 m deep. The soil taken out of it has been spread evenly all around it to a width of 2 m to form an embankment. The height (in m) of the embankment is:
(a) $4\frac{1}{2}$
(b) $4\frac{1}{4}$
(c) $3\frac{3}{8}$
(d) More Than one of the above
(e) None of the above

Solutions

S1. Ans.(a)
Sol. Before a vowel sound, 'an' is used to ensure smooth pronunciation. "United" starts with a vowel sound, making "an" the appropriate article.

S2. Ans. (b)
Sol. "Light" begins with a consonant sound, so "a" is used as the indefinite article to introduce it in the sentence.

S3. Ans.(c)
Sol. A tap is generally not found in a classroom setting, which typically includes items like chalk and models but not plumbing fixtures.

S4. Ans.(d)
Sol. Both mustard and gram are not cereals. Barley is a cereal grain, whereas mustard (a condiment crop) and gram (a legume) do not belong to the cereal category. Cereals are grasses cultivated for the grains they produce, which are used for food, feed, and fodder. Mustard is grown for its seeds used to make mustard condiment and oil, and gram (chickpea) is a legume known for its edible seeds.

S5. Ans.(a)
Sol. Hens are kept in a coop, which is a cage or pen for poultry. The other options do not correctly house hens.

S6. Ans.(c)
Sol. The daughter of your paternal grandmother (your father's mother) is your father's sister, making her your aunt.

S7. Ans.(a)
Sol. Your sister's father is also your father, as you share the same parent.

S8. Ans.(a)
Sol. "Dressed up" means to wear formal or elaborate clothes, which is suitable for an award ceremony.

S9. Ans.(c):
Sol. 'अच्छा' अर्थ वैशिष्ट्य बताने वाला उपसर्ग 'सु' है, इसके प्रयोग से बनने वाले शब्द हैं- सुडौल, सुजान, सुशील, सुलोचना, सुयोग, सुपूत, सुबुद्धि, सुपात्र, सुगम आदि।

S10. Ans.(b):
Sol. अटल, अथाह और अछूता शब्दों में 'अ' उपसर्ग है, लेकिन 'अपमान' शब्द में 'अप' उपसर्ग है, जिसका अर्थ है बुरा, हीन।

S11. Ans.(b):
Sol. मूल शब्द 'डिब्बा' है तथा प्रत्यय 'इया है इसका अर्थ है 'वाला', यह लघुत्व बोधक स्त्री प्रत्यय है।

S12. Ans.(a):
Sol. 'मर्मज्ञ' प्रत्यय रहित शब्द है। 'वैज्ञानिक' शब्द में 'इक' प्रत्यय है। 'कृपालु' शब्द में 'आलू' प्रत्यय है।

S13. Ans.(c):
Sol. 'अग्नि प्रज्वलित हो रही है' सही वाक्य है।

S14. Ans.(c):
Sol. 'मैं तेरे को घड़ी दूँगा' इस वाक्य में 'तेरे को' का प्रयोग गलत है इसके स्थान पर 'तुझे' या 'तुम्हें' का प्रयोग उचित है।

S15. Ans.(a):
Sol. सलिल और तोय, पानी के पर्यायवाची हैं।

S16. Ans.(c):
Sol. पीयूष, सुधा और सोम, 'अमृत' के पर्यायवाची हैं। अरण्य, विपिन और कांतार, 'वन' के पर्यायवाची हैं। दामिनी का पर्यायवाची शब्द विद्युत है, यामिनी का पर्यायवाची शब्द 'रात्रि' है, उर्मि का पर्यायवाची शब्द लहर है।

S17. Ans.(a):
Sol. दिवाकर, दिनकर 'सूर्य' के पर्यायवाची हैं। दिवा, दिन का पर्यायवाची है।

S18. Ans.(c):
Sol. सोम और सुधाकर चन्द्रमा के पर्यायवाची हैं। 'अक्षि' आँख का पर्यायवाची है तथा 'तृण' घास का पर्यायवाची है।

S19. Ans.(b):
Sol. 'चतुर्भुज = चार हैं भुजाएँ जिसकी', इसमें सामासिक शब्द का विग्रह सही है।

S20. Ans.(c):
Sol. गुणहीन = गुण के लिए हीन , यह गलत है|
गुणहीन = गुण से हीन, यह सही विग्रह है।

S21. Ans.(c):
Sol. धर्मविमुख = धर्म से विमुख, यह सही विग्रह है।

S22. Ans.(a):
Sol. 'भौरा', 'कोयल' और 'सखी', अलि शब्द के अनेकार्थी हैं।

S23. Ans.(a):
Sol. सही वर्तनी है -वेशभूषा, विशिष्ट।

S24. Ans.(b):
Sol. सही वर्तनी है – जिजीविषा।

S25. Ans.(b):
Sol. शब्दों की सही वर्तनी है - अनुगृहीत, कवयित्री, ज्योत्स्ना।

S26. Ans.(b):
Sol. 'परिणती' की शुद्ध वर्तनी 'परिणति' है।

S27. Ans.(c):
Sol. सही विलोम-युग्म 'अर्पण- ग्रहण' है।

S28. Ans.(b):
Sol. 'आविर्भाव' शब्द का विलोम शब्द 'तिरोभाव' है।

S29. Ans.(c):
Sol. श्लाधा का अर्थ 'आत्मप्रशंसा' है, इसलिए इसका विलोम शब्द 'निंदा' है।

S30. Ans.(c):
Sol. अनभिज्ञ का अर्थ – जो किसी बात को जानता न हो। अभिज्ञ का अर्थ – जानकार, ज्ञाता।

S31. Ans.(e)
Sol.

A (6) — 5
30
B (10) — 3

$(5+3) \times t + 5 \times 1 = 30$

$t = \frac{25}{8}$

Total time $= \frac{33}{8} = 4\frac{1}{8}\ hr.$

S32. Ans.(b)
Sol. $81 \div 27 \times 4 - 10 = 2$

S33.Ans(b)
Sol.
Let the number be 10a+b

ATQ,

$(10a+b)+(10b+a)=66$

$\Rightarrow 11(a+b)=66$

$\Rightarrow a+b=6$

S34. Ans.(b)
Sol.

$SP = 7500 \times \frac{(100-6)}{100}$

$= \frac{7500 \times 94}{100} = 75 \times 94 = 7050$

S35. Ans.(b)
Sol.

$(3x)^3 + (4x)^3 = 5824$

$27x^3 + 64x^3 = 5824$

$81\ x^3 = 5824$

X=4

sum $= 3x + 4x = 28$

S36. Ans.(c)
Sol.
Loss = CP–SP

ATQ, $\frac{CP-SP}{SP} = \frac{20}{100} = \frac{1}{5}$

SP = 5 CP – 5SP

6 SP = 6 CP

$\frac{SP}{CP} = \frac{5}{6} = \frac{5x}{6x}$

Thus, $\frac{CP-CP}{CP} = \frac{6X-5X}{6X} = \frac{1}{6} \times 100$

$= 16\frac{2}{3}\%$

S37. Ans.(a)
Sol.
In type I machine parts.

No. of defective parts $\frac{5}{100} \times 120 = 6$

In type II, no of defective $= \frac{10}{100} \times 80 = 8$

In total defective $= \frac{8+6}{200} = \frac{7}{100} = 7\%$

S38. Ans.(e)
Sol.

ATQ, $(2^3)^2 = 4^x$

$\Rightarrow 4^x = 64$

Therefor; x = 3

$3^x = 3^3 = 27$

S39. Ans.(a)
Sol. The correct answer is a, Chhattisgarh, Gujarat, Jharkhand.
The Tropic of Cancer passes through Chhattisgarh, Gujarat and Jharkhand, At the time of its naming, the sun was positioned in the Cancer constellation during the June solstice.
Information booster-
•The Tropic of cancer is an imaginary line that is at an angle of 23.50 0, It is north of the equator which passes through the middle of India.
•There are 17 countries through which the tropic of cancer passes.

S40. Ans.(a)
Sol. Behavioral methods involve changes in individual or collective behavior that can reduce air pollution. Carpooling, for example, reduces the number of vehicles on the road, thereby reducing emissions. Other examples of behavioral methods include using public transportation, biking or walking, and reducing energy consumption at home or in the workplace

S41. Ans.(a)
Sol. In 1872, Bihar Bandhu, a Hindu newspaper founded by Balakrishna Bhatt and Keshavram Bhatt, started publication from Calcutta but its press to Patna in 1874.

S42. Ans.(b)
Sol. The correct answer is (b) Sedimentation. Sedimentation is a primary treatment process in wastewater treatment, where solid particles in the wastewater settle down due to gravity, separating them from the liquid. This process helps remove larger particles and some suspended solids from the wastewater before further treatment.

S43. Ans.(d)
Sol. The correct answer is (d) More than one of the above. Noise pollution can indeed affect mental health in multiple ways. It can cause anxiety, lead to depression, and increase stress levels. Prolonged exposure to high levels of noise can have a detrimental impact on one's psychological well-being, making it important to address and mitigate noise pollution for the sake of mental health.

S44. Ans.(c)
Sol. Biomedical solid waste refers to waste generated by healthcare facilities, including hospitals, clinics, and laboratories. This can include items such as used needles, syringes, and other sharps, as well as medical equipment, infectious waste, and pharmaceuticals. Proper management and disposal of biomedical waste is important to prevent the spread of disease and protect public health.

S45. Ans.(a)
Sol. Navalkishor Singh composed the songs of Phaag Raag in Bihar.

S46. Ans.(a)
Sol. In 1986 was the Times of India published in Bihar.

S47. Ans.(c)
Sol. In 1970 was the Gaya Museum established in Bihar.

S48. Ans.(c)
Sol. Kameshwar Singh Darbhanga Sanskrit University established in 1961 in Bihar.

S49. Ans.(c)
Sol. Former Indian cricketer **Mahendra Singh Dhoni** has launched the **made-in-India camera drone** named **'Droni'** with advanced features manufactured by **Garuda Aerospace.**
More Details:
- Dhoni is the brand ambassador of Garuda Aerospace, a company which has attempted to offer drone solutions for agricultural pesticide spraying, solar panel cleaning, industrial pipeline inspections, mapping, surveying, public announcements, and delivery services.
- It has ventured into the consumer drone market with 'Droni'.

S50. Ans.(b)
Sol. Union Minister of Road Transport and Highways **Nitin Gadkari** inaugurated the 81st annual session of the Indian roads Congress in **Lucknow.**
More Details:
- He was accompanied by the Chief Minister of Uttar Pradesh Yogi Adityanath.
- In the inaugural ceremony of the Indian Roads Congress, the Union Minister of Road Transport and Highways said that by 2024 projects worth rupees five lakh crore will start in Uttar Pradesh.
- The road projects worth rupees eight crores have been approved for Uttar Pradesh.
- India will reduce the use of Fossil fuel-run transport systems in the next five years.

S51. Ans.(a)
Sol. ICC Women's T20 World Cup Final: Australia won the Women's T20 World Cup for the sixth time when they beat South Africa by 19 runs in the final at Newlands.

S52. Ans.(c)
Sol. Hockey Madhya Pradesh was named the winner of the 13th Hockey India Senior Women National Championship in 2023.

S53. Ans.(a)
Sol. Ellora Ajanta International Festival 2023 was held in Maharashtra.
Additional Info-
- The Ajanta Ellora International Festival 2023 festival is a celebration of the cultural heritage and diversity of the region and promises to be a feast for the senses.
- The festival showcases the Ellora and Ajanta caves 'artwork and architecture, as well as performances by local and international artists.
- Ellora is a UNESCO World Heritage Site located in the Aurangabad district of Maharashtra, India.
- The Ajanta Ellora International Festival was first launched in 1985.

S54. Ans.(a)
Sol. Greenland is the world's largest island with a total area of 836,109 sq mi (2,166,086 sq km).
An island or isle is any piece of subcontinental land that is surrounded by water. Very small islands such as emergent land features on atolls can be called islets, skerries, cays, or keys and very large islands are like Greenland, Madagascar, etc.
- Greenland, the world's largest island, lying in the North Atlantic Ocean.
- It covers an area of 2,130,800 km2 (970 sq mi)
- Greenland is noted for its vast tundra and immense glaciers.
- Although Greenland remains a part of the Kingdom of Denmark, the island's home-rule government is responsible for most domestic affairs.
- The Greenlandic people are primarily Inuit (Eskimo).
- The capital of Greenland is Nuuk (Godthåb).

S55. Ans.(c)
Sol. Marina Beach in Chennai is the longest natural beach in India.
- Marina Beach is the longest beach in India.
- Marina beach is located in Chennai, Tamil Nadu.
- It lies along the Bay of Bengal.
- Marina Beach is also the world's second-longest beach.

- The beach was renovated by Governor Mountstuart Elphinstone Grant Duff in the 1880s.
- Two prominent statues of Mahatma Gandhi is situated on the Marina beach.
- Marina Beach is one of the most crowded beaches in India.

S56. Ans.(b)
Sol. Damodar Valley region is most rich in coal deposits.
- The most important Gondwana coal fields in India are located in Damodar Valley. Over 97 per cent of coal reserves occur in the valleys of Damodar, Sone, Mahanadi and Godavari. They lie in the Jharkhand-Bengal coal belt and the important coal fields in this region are Raniganj, Jharia, Bokaro, Giridih, and Karanpura.

S57. Ans.(c)
Sol. The Stratosphere is the layer where the decrease in temperature with increasing altitude is totally absent. Temperature rises as one moves upward through the stratosphere.
- The stratosphere defines a layer in which temperatures rises with increasing altitude. At the top of the stratosphere the thin air may attain temperatures close to 0oC. This rise in temperature is caused by the absorption of ultraviolet (UV) radiation from the Sun by the ozone layer. Such a temperature profile creates very stable atmospheric conditions. Consequently, the stratosphere is almost completely free of clouds or other forms of weather.

S58. Ans.(c)
Sol. Doab is a term used for a tract of land lying between two rivers.
- This term is mainly used in South Asia and particularly in Pakistan and India.
- For example, Indus and its tributaries formed doab in the northern plains.
- Doab is made from 'do' which means two and 'ab' means water or river.

S59. Ans.(a)
Sol. Lord William Bentinck (1828-35) was the 1st Governor-General of British India. His tenure is known for the social reforms such as Abolition of Sati in 1829, Suppression of Thugi, and Suppression of Infanticide etc. English was introduced as a medium of higher education, Charter act 1833 was passed by which East India Company ceased to be a trading company. Some corrective measures in civil services were taken. This seven years period was an epoch for administrative reforms in India.

S60. Ans.(c)
Sol. Charter act of 1813 ended the monopoly of the East India Company in India, however, the company's monopoly in trade with China and trade in tea with India was kept intact.
- The Charter Act of 1813 ended the commercial trade monopoly of the East India Company except for trade in tea and trade with China.
- Salient features of the charter:
- The East India Company was, however, allowed to enjoy the monopoly of China trade and trade in tea.
- From 1793 to 1813 the company did not permit the Christian missionaries to work for the Indian people due to fear of hurting religious sentiments of Indians.
- But the Charter act of 1813 opened India to Christian Missionaries and permitted them to propagate English and preach their religion.
- A sum of rupees one lakh annually was provided for the revival and improvement of literature and promotion of knowledge of the sciences among the inhabitants of the British territories in India.
- Thus, through the Act, the British government assumed the responsibility of Indian people's education.
- This was the first step towards the idea of state responsibility for education.

S61. Ans.(a)
Sol. Akbar introduced the Dahasala or Zabati system of land revenue collection in 1580-82 to alleviate the problems arising due to fixing prices every year and doing settlements of revenues of previous years. In this system, average produce of ten years was derived. One third of this average produce was fixed in Rupees per Bigha and fixed as share of the state (Mal). Rest two third share was left to the cultivators (Kharaj).
- There were various methods of land revenue assessment during the Mughal period. Let us see the salient features of each one by one:
- **Zabti-**
- It was the most important method of land revenue assessment during the Mughal era and was also known as the Bandobast System.
- The practice was introduced by Sher Shah.
- Akbar appointed karoris (officers for assessment and collection of tax) all over North India.
- Under this system, the land was measured and according to the productivity and price prevailing in the area, the revenue known as dastur ul Amal was fixed.
- All the revenue collection was done in cash.
- This system was prevalent in Delhi, Allahabad, Awadh, Agra, Lahore, and Multan.

S62. Ans.(c)
Sol. The Salt March, also known as the Dandi March and the Dandi Satyagraha, was an act of non violent civil disobedience in colonial India initiated by Mohandas Karamchand Gandhi to produce salt from the seawater in the coastal village of Dandi, as was the practice of the local populace until British officials introduced taxation on salt production, deemed their sea-salt reclamation activities illegal, and then repeatedly used force to stop it.

- M. K. Gandhi on March 12, 1930, started March his from the Sabarmati Ashram with 72 people and reached Dandi coastal Gujarat on April 6, 1930.
- He broke the salt law by picking up a handful of salt at Dandi and announced the commencement of the Civil Disobedience Movement.
- On March 12, 1930, Indian independence leader Mohandas Gandhi begins a defiant march to the sea in protest of the British salt monopoly.
- Britain's Salt Acts prohibited Indians from collecting or selling salt, a staple in the Indian diet.
- Citizens were forced to buy the vital mineral from the British.
- The Salt March was a 24-day Salt March, which was non-violent in nature.

S63. Ans.(c)
Sol. Mahatma Gandhi was born in Porbandar.

- Arya Samaj was founded by Swami Dayanand Saraswati in 1875. The organisation voiced for causes like widow remarriage and education of girl children.
- Annie Besant as President of the Theosophical Society After joining the society in 1889, she started writing and giving lectures about theosophy. She moved to India in 1893 to continue her social work after her guru, Madame Blavatsky, passed away.

S64. Ans.(a)
Sol. First, all India hartal on April 6, was a "hartal" organised where Indians would suspend all business and fast as a sign of their opposition and civil disobedience would be offered against specific law. This event is known as the Rowlatt Satyagraha.

- The Anarchical and Revolutionary Crimes Act of 1919, popularly known as the Rowlatt Act, was a law, applied during the British India period.
- It was a legislative council act passed by the Imperial Legislative Council in Delhi on 18 March 1919, indefinitely extending the emergency measures of preventive indefinite detention, imprisonment without trial and judicial review enacted in the Defence of India Act 1915 during the First World War.
- It was enacted in the light of a perceived threat from revolutionary nationalists of re-engaging in similar conspiracies as had occurred during the war which the Government felt the lapse of the Defence of India Act would enable.

S65. Ans.(b)
Sol. In case of a conflict between the Central law and the state law on a subject enumerated in the Concurrent List, the Central law prevails over the state law. But, there is an exception. If the state law has been reserved for the consideration of the president and has received his assent, then the state law prevails in that state.

S66. Ans.(b)
Sol. The Central law and the state law on a subject enumerated in the Concurrent List, the Central law prevails over the state law it represent strong center.

- Indian Constitution is quasi-federal i.e., it comprises of a strong centre and state wherein parliament is empowered to legislate on subjects not specifically mentioned in Constitution (residuary subjects). Where state and centre both legislate on the same subject the central law shall prevail. During an emergency, it acquires unitary form. Due to this reason, it is called "Quasi federal". So, the Constitution made arrangements for the strong centre.

S67. Ans.(c)
Sol. The correct answer is Finance Commission.
Finance Commission

- Article 280 of the Constitution provides for the Finance commission.
- It is constituted by the President of India every fifth year or at a such earlier time, as he thinks of it.
- It consists of a chairman and four other members to be appointed by the President.
- Functions of Finance Commission-
- The distribution of the net proceeds of taxes to be shared between the Centre and the states, and the allocation between the states of the respective shares of such proceeds.
- The principles that should govern the grants-in-aid (under Article 275 of the Constitution) to the states by Centre out of Consolidated Fund of India.
- The recommendations made by the Finance Commission are only of advisory nature and hence not binding on the government.
- Recommendations to the President of India on the specific Union-State fiscal relations are made by Finance Commission.

S68. Ans.(a)

Sol. The correct option is 78% and 21%. The composition of the atmosphere is comprises of 78% of Nitrogen, 21% of Nitrogen and 1% of other gases like Neon, Argon, Helium, Carbon dioxide etc.

S69. Ans.(b)

Sol. The correct answer is option b i.e., Grass→ insects →frog →snake →hawk/otter. The transfer of food materials from producers to consumers of different levels in an ecosystem, in a cyclic pathway, is called a food chain.

S70. Ans.(c)

Sol. The over-lapping network of food-chains in an ecosystem is called a food-web. So many food chains often operate in an ecosystem having more than one type of producers and consumers in common. Under such conditions food – transfer in the ecosystem takes place through many routes.

S71. Ans.(b)

Sol.

$$\cos\theta = \frac{\sqrt{3}}{2} \rightarrow \theta = 30°$$

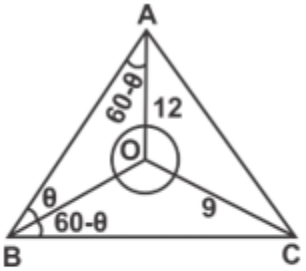
$$\frac{\text{cosec}^2 2\theta + \cot^2 20}{\sin^2\theta + \tan^2 20}$$

$$\frac{\frac{4}{8}+\frac{1}{8}}{\frac{1}{4}+3}$$

$$\frac{5}{3} \times \frac{4}{13} = \frac{20}{39}$$

S72. Ans.(a)

Sol.



$\Delta AOB \sim \Delta BOC$

$$\frac{OB}{OC} = \frac{AO}{BO}$$

$$BO^2 = 12 \times 9$$

$$= 6\sqrt{3}$$

S73. Ans.(a)

Sol.

Let original SP = 300

SP = 100(when it sold at $33\frac{1}{3}$ %of original SP)

loss = $33\frac{1}{3}$%

CP	SP
3	2
↓	↓ ×50
150	100

CP = 150, If SP = 300×80% = 240

New profit percent = 90/150×100

= 60%

S74. Ans.(a)

Sol.

$$\frac{3(\cot^2 47° - \sec^2 43°) - 2(\tan^2 23° - \text{cosec}^2 67°)}{(\text{cosec}^2(68°+\theta)) - \tan^2(\theta+61°) - \tan^2(22°-\theta) + \cot^2(29°-\theta))}$$

$$\frac{3(\cot^2 47° - \text{cosec}^2 47°) - 2(\tan^2 23° - \sec^2 23°)}{(\text{cosec}^2(68+\theta) - \cot^2(68+\theta) - \tan^2(\theta+61) + \tan^2(\theta+61))}$$

= -1

S75. Ans.(c)

Sol.

5	4
—	—
4	5

$$\frac{4}{5} : \frac{5}{4}$$

16 : 25

$$\frac{9}{16} \times 100 = 56.25\%$$

S76. Ans.(c)

Sol.

2x – 3y +6 =0 .....equation (II)

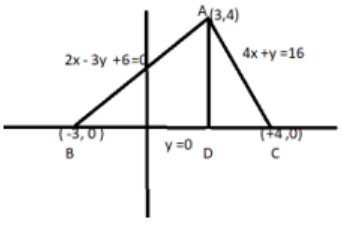
When y =0 then x = -3

4x + y = 16 ....equation(I)

When y = 0 then x =4

After solving equation

(I) and (II)Intersection point = (3,4)



By figure ABC is a tringle whose base BC=7 and height AD=4

Then area of the region,

Ar = $\frac{1}{2} \times 4 \times 7$

= 14 unit^2

S77. Ans.(c)
Sol.

Let l = 29x, h= 21x, r = 20x

$\frac{1}{3} \times 21x \times 400x^2 = \frac{48384}{10}$

$x^3 = \frac{4384 \times 3}{21 \times 10 \times 400}$

$= \frac{1728}{1000} = \frac{12}{10}$

$r = 20 \times \frac{12}{10}$

= 24 cm

S78. Ans.(a)
Sol.

CP = 7, SP = 8

$P\% = \frac{1}{7} \times 100$

= 14.3% (approx.)

S79. Ans.(c)
Sol.

$0.4\overline{6} + 0.7\overline{23} - 0.3\overline{9} \times 0.\overline{7}$

$\frac{42}{90} + \frac{716}{990} - \frac{28}{90}$

$= 0.\overline{87}$

S80. Ans.(a)
Sol.

$71x + 35 + 11 + 4 = 76x$

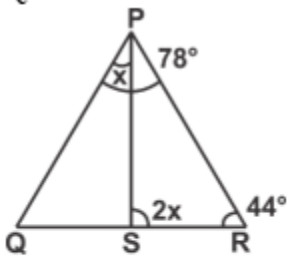
$5x = 50$

$x = 10$

= 10

S81. Ans.(c)
Sol.

Q = 180-122 = 58°



In ΔQPS

58+x = 2x

X = 58°

PSQ = 180-2×58

= 180-116

= 64°

S82. Ans.(a)
Sol.

= Put x = 1 then, $x^{99}+x^{999}+x^{9999}$

$= 1^{99}+1^{999}+1^{9999}$

= 3

S83. Ans.(c)
Sol.

2x-y = 2

$x - \frac{y}{2} = 1$

$(x - \frac{y}{2})^3 = 1^3$

$X^3 - \frac{y^3}{8} = 1^3 + 3x \times \frac{y}{2}(x - \frac{y}{2})$

$= 1 + \frac{9}{4} = \frac{13}{4}$

S84. Ans.(b)
Sol.

	A	B
I →	2x	3x
E→	3y	4y

$3x \times \frac{1}{3} = 3y$

$\frac{x}{y} = \frac{3}{1}$

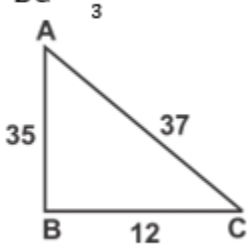
I → 6 : 9

E → 3 : 4

S → 3 : 5

S85. Ans.(c)
Sol.

$BG = \frac{37}{3}$



= 12.3 cm

S86. Ans.(c)
Sol.

$\frac{s(s-8)}{8} = 240$

S = 48

$t = \frac{480}{48} = 10$ hrs

S87. Ans.(c)
Sol.

$1+2\tan^2\theta + 2\sin\theta\sec^2\theta = \frac{a}{b}$

By C & D

$\frac{2+2\tan^2\theta+2\sec\theta\tan\theta}{2\tan^2\theta+2\sec\theta\tan\theta} = \frac{a+b}{a-b}$

$\frac{a+b}{a-b} = \frac{2\sec\theta(\sec\theta+\tan)}{2\tan\theta(\sec\theta+\tan)}$

$= \text{cosec}\theta$

S88. Ans.(c)
Sol.

11880 : 17820
2 : 3

2 : 3
2 : 3
4 : 9
↓ ↓×1320
5200 11880

Half $= \frac{5280}{2} = 2640$ Rs

S89. Ans.(b)
Sol.

5 : 7
5 : 7
5 : 7
125 : 343

$\frac{218}{125}\times 100$

$= 174.4\%$

S90. Ans.(b)
Sol.

	A	B
No.	50	62
Avg.	6x	5x

$\frac{300+310x}{112} = 75$

$x = \frac{840}{61}$

$6x = \frac{840}{61}\times 6$

$= 82.6$

S91. Ans.(b)
Sol.

Let x be number

$x \times \frac{7}{10} = 70$

$x = 100$

S92. Ans.(c)
Sol.

$12\times54\times72 = 8\times x^3$

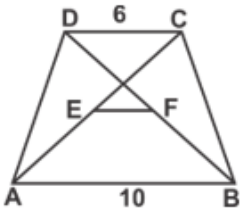
$x = 18$

$2\times324\times4 = 2592\ \text{cm}^2$

S93. Ans.(b)
Sol.

$EF = \frac{18-6}{2}$

$= 6$ cm



S94. Ans.(b)
Sol.

$\frac{A+D}{B+C} = \frac{8\times9}{5\times9} = \frac{72}{45}, \frac{B}{C} = \frac{5}{4}\times\frac{5}{5} = \frac{25}{20}$

117 ____ 46800

1 ____ 400

B = 10000, C = 8000

A+D = 28800, D = 28800-18400= 10400

A-B = 18400-10000

= 8400= x

D−C = 2400 = Y

X-Y = 6000

S95. Ans.(b)
Sol.

100 136

Discount = 30%

$= 136 \times \frac{7}{10}$

$= 95.2$

$= 4.8\%$ loss

S96. Ans.(c)
Sol.

10 ×11 11 ×11
100 121

Both installments are equal.

121unit ____5808

1 unit = 48

Total interest = 11 +21 = 32

32unit ____ 48×32

= 1536

60% of 1536 = 921.6

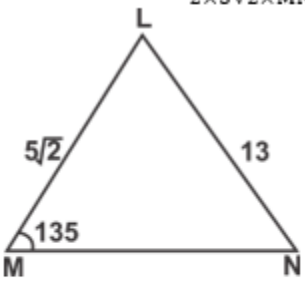
= 922 (approx.)

S97. Ans.(a)
Sol.

$$\frac{2\pi rh}{\pi r^2 h} = \frac{88}{132}$$
$$r = 3$$
$$2 \times \frac{22}{7} \times 3 \times h = 88$$
$$h = \frac{14}{3}$$
$$= 4\frac{2}{3}$$

S98. Ans.(a)
Sol.

$$\cos 135° = \frac{(5\sqrt{2})^2 + MN^2 - 169}{2 \times 5\sqrt{2} \times MN}$$



.

$$\frac{-1}{\sqrt{2}} = \frac{50 + MN^2 - 169}{2 \times 5\sqrt{2} \times MN}$$
$$-10MN = MN^2 = 119$$
$$MN^2 + 10MN - 119$$
$$MN^2 + 10MN - 119 = 0$$
$$MN = 7 \text{ cm}$$

S99. Ans.(c)
Sol.

$$\frac{PS}{PQ} = \frac{PT}{PR}$$
$$\Delta PST \sim PQR$$
$$\angle PST = 96°$$
$$\angle PRD = 96 - 34 = 62°$$
$$\angle QPR = 180 - (96 + 62°)$$
$$= 22°$$

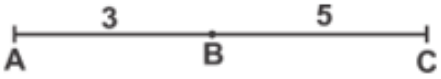
S100. Ans.(c)
Sol.

$$\left(\frac{\tan^8\theta}{\sec^2\theta} + \frac{\cot^8\theta}{\text{cosec}^2\theta} + 2\sin\theta\cos\theta\right) \div (1 + \text{cosec}^2\theta + \tan$$
$$= \frac{(\sin^2\theta + \cos^2\theta)}{\sin\theta\cos\theta} \times \cos^2\theta\sin^2\theta$$
$$= \sin\theta\cos\theta$$

S101. Ans.(b)
Sol.

$$x + y = 65$$
$$xy = 26 \times 26$$
$$\frac{1}{x} + \frac{1}{y} = \frac{x+y}{xy}$$
$$= \frac{65}{26 \times 26} = \frac{5}{52}$$

S102. Ans.(b)
Sol.



$$\frac{8a}{\frac{3a}{x} + \frac{5a}{50}} = 40$$
$$\frac{1}{5} = \frac{3}{x} + \frac{1}{10}$$
$$\frac{1}{10} = \frac{3}{x}$$
$$x = 30$$
$$\frac{x-10}{x+1} = \frac{20}{31}$$

S103. Ans.(c)
Sol.

	AB	BC	AC	
	$\frac{80}{3}$	48	30	240
E →	9	5	8	

$$\text{Eff of A+B+C} = \frac{9+5+8}{2} = 11$$
$$\text{E of A} = 11 - 5 = 6$$
$$\text{T in 60\% of work} = \frac{240}{6} \times 60\% = 24$$

S104. Ans.(b)
Sol.

$$\text{B}, \frac{(n-2)}{n} \times 180 = \frac{900}{7}$$
$$7n - 14 = 5n$$
$$n = 7$$
$$A = (n-2) \times 180 = 1260$$
$$n = 9$$
$$9 + 7 = 16$$

S105. Ans.(b)
Sol.

$$1\left(\begin{matrix}5 : 4\\ 6 : 5\end{matrix}\right.$$
$$1 \_ 8$$
Present age = A = 48, B = 40
After 7 years = 88+14 = 102

S106. Ans.(a)
Sol.

L.S.A= $80\times32 = 2560\ cm^2$

Volume $= \frac{1}{2} \times 16 \times 30 \times 32$

$= 7680\ cm^3$

S107. Ans.(b)
Sol.

$12x + y = 8, 2x + 3y + 10 = 0$

After solving equation intersection point P(1,-4)

option B satisfied the value of x & y

S108. Ans.(c)
Sol.

$$\frac{\frac{20}{7}\times\frac{21}{5}\times\frac{3}{2}\times\frac{46}{9}}{\frac{3}{4}\times\frac{8}{3}\times\frac{1}{2}\times4}$$

$\frac{2\times46}{4} = 23$

S109. Ans.(a)
Sol.

$(433)^{24} - (377)^{38} + (166)^{59}$

$X = 3^4 - 7^2 + 6^2$

= 1-9+6

= 8

S110. Ans.(a)
Sol.

$7\sin^2\theta + 4\cos^2\theta = 5$

$\sin\theta = \frac{1}{\sqrt{3}} = \frac{P}{h}, b = \sqrt{2}$

$$= \frac{\sqrt{3}\times\frac{\sqrt{3}}{\sqrt{2}}+\frac{1}{\sqrt{2}}}{\sqrt{2}\times\sqrt{2}-\sqrt{3}\times\frac{\sqrt{2}}{\sqrt{3}}}$$

$= \frac{4}{\sqrt{2}(2-\sqrt{2})} = 2(1+\sqrt{2})$

S111. Ans.(c)
Sol.

$4 \times \frac{22}{7} \times r^2 = \frac{22176}{100}$

$r^2 = \frac{252\times7}{100}$

$r = \frac{7\times3}{5}$

$V = \frac{4}{3} \times \frac{22}{7} \times \frac{21}{5} \times \frac{21}{5} \times \frac{21}{5}$

= 310.5 (approx.)

S112. Ans.(a)
Sol.

$2x^2 + 5x + 1 = 0$

$x + \frac{1}{2x} = \frac{-5}{2}$

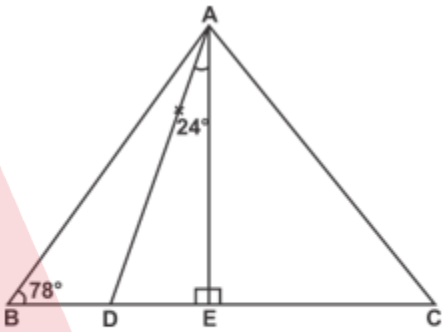
$x^2 + \frac{1}{4x^2} + 1 = \frac{25}{4}$

$x^2 + \frac{1}{4x^2} - 1 = \frac{25}{4} - 2$

$(x - \frac{1}{2x})^2 = \frac{17}{4}$

$x - \frac{1}{2x} = \frac{\sqrt{17}}{2}$

S113. Ans.(a)
Sol.



$\frac{\angle ABC - \angle ACB}{2} = \angle DAE$

$78 - \angle ACB = 2 \times 24$

$\angle ACB = 30°$

S114. Ans.(c)
Sol.

$(1+\cot^2\theta)(1+\tan^2\theta) \times (\sin\theta - \operatorname{cosec}\theta)(\cos\theta - \sec\theta)$

$\left(\frac{1}{\sin^2\theta}\right) \times \left(\frac{1}{\cos^2\theta}\right)\left(\frac{\sin^2\theta - 1}{\sin\theta}\right)\left(\frac{\cos^2\theta - 1}{\cos\theta}\right)$

$= \frac{1}{\sin^2\theta} \times \frac{1}{\cos^2\theta} \times \frac{\cos^2\theta}{\sin\theta} \times \frac{\sin^2\theta}{\cos\theta}$

$\frac{1}{\sin\theta\times\cos\theta}$

$= \operatorname{cosec}\theta \times \sec\theta$

S115. Ans.(c)
Sol.

$19.404 = \frac{2}{3} \times \frac{22}{7} \times r^3$

$r = 2.1$

Total surface area of hemisphere $= 3\pi r^2$

$= 41.58\ cm^2$

S116. Ans.(b)
Sol.

$$\frac{(1+\sec\theta\,\mathrm{cosec}\theta)^2(\sec\theta-\tan\theta)^2(1+\sin\theta)}{(\sin\theta+\sec\theta)^2(\cos\theta+\mathrm{cosec}\theta)^2}$$

$$\Rightarrow \frac{\left(\frac{\sin\theta.\cos\theta+1}{\sin\theta.\cos\theta}\right)^2\left(\frac{1-\sin\theta}{\cos\theta}\right)^2(1+\sin\theta)}{\left(\frac{\sin\theta\cos\theta+1}{\cos\theta}\right)^2+\left(\frac{\cos\theta.\sin\theta+1}{\sin\theta}\right)^2}$$

$$\Rightarrow \frac{\left(\frac{\sin\theta.\cos\theta+1}{\sin\theta\cos\theta}\right)^2\left(\frac{1-\sin\theta}{\cos\theta}\right)^2(1+\sin\theta)}{(\sin\theta\cos\theta+1)^2\left[\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}\right]}$$

$$\Rightarrow \frac{\frac{1}{\sin^2\theta\cos^2\theta}\times\frac{(1-\sin\theta)(1-\sin\theta)(1+\sin\theta)}{(1+\sin\theta)(1-\sin\theta)}}{\frac{1}{\sin^2\theta co^2\theta}}$$

$\Rightarrow 1-\sin\theta$

S117. Ans.(c)
Sol.

	x		y
A	5	:	2 ×4
B	3	:	4 ×5

A	20	:	8
B	15	:	20
C	35	:	28

$$\%\text{ of } x=\frac{5}{9}\times 100=55\frac{5}{9}$$

S118. Ans.(c)
Sol.

75462A97B6
A=5,1
B=3,7
Put $\sqrt{8\times5-4\times3}$
$=\sqrt{40+2}=\sqrt{28}$

S119. Ans.(c)
Sol.

$$\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)}\times\frac{\sqrt{\sec^2\theta+\mathrm{cosec}^2\theta}}{\tan\theta+\cot\theta}$$

$$=\frac{1+\cos\theta-(1-\cos^2\theta)}{\sin\theta(1+\cos\theta)}\times\frac{\sqrt{\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}}}{\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}}$$

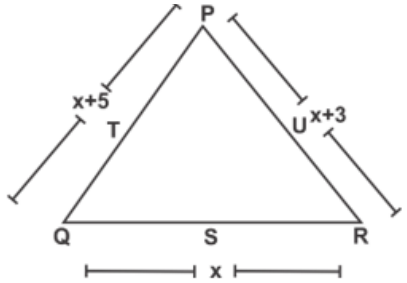
$$\Rightarrow\frac{\cos\theta(1+\cos\theta)}{\sin\theta(1+\cos\theta)}\times\frac{\frac{1}{\sin\theta.\cos\theta}}{\frac{1}{\sin\theta.\cos\theta}}$$

$\Rightarrow \cot\theta$

S120. Ans.(c)
Sol.

$a^3+b^3=(a+b)^3-3ab(a+b)$
$=(8)^3-3\times10(8)$
$=512-240$
$=272$

S121. Ans.(c)
Sol.



$3x+8=32$
$x=8$
$PR=8+3=11$

S122. Ans.(c)
Sol.

$$x=\frac{\frac{23}{4}\div\frac{3}{7}\times\frac{63}{4}+\frac{72}{35}\div\frac{36}{25}}{\frac{3}{4}\div\frac{21}{4}+\frac{28}{5}\div\frac{49}{15}}$$

$$\Rightarrow\frac{-1+\frac{10}{7}}{\frac{1}{7}+\frac{12}{7}}$$

$$\Rightarrow\frac{\frac{3}{7}}{\frac{13}{7}}=\frac{3}{13}$$

ATQ,
$\frac{3}{13}+y=\frac{7}{13}$
$y=\frac{4}{13}$

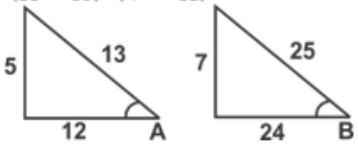
S123. Ans.(c)
Sol.

$\frac{1}{4-\sqrt{15}}-\frac{1}{\sqrt{15}-\sqrt{14}}+\frac{1}{\sqrt{14}-\sqrt{13}}-\frac{1}{\sqrt{13}-\sqrt{12}}+\frac{1}{\sqrt{12}-\sqrt{11}}-\frac{1}{\sqrt{11}-\sqrt{10}}+\frac{+1}{\sqrt{10}-3}-\frac{1}{3-\sqrt{8}}$
$=4+\sqrt{15}-\sqrt{15}-\sqrt{14}+\sqrt{14}+\sqrt{13}-\sqrt{13}-\sqrt{12}+\sqrt{12}+\sqrt{11}-\sqrt{11}-\sqrt{10}+\sqrt{10}+3-3-\sqrt{8}$
$=4-2\sqrt{2}$

S124. Ans.(a)
Sol.

(secA cosB)(cosecB tanA)

$$\left(\frac{13}{12}\times\frac{24}{25}\right)\left(\frac{25}{7}\times\frac{5}{12}\right)$$



$$\Rightarrow\frac{26}{25}\times\frac{125}{7\times12}$$

$$=\frac{65}{42}$$

S125. Ans.(a)

Sol.

ATQ,

LCM + HCF = 512

LCM − HCF = 496

LCM = 504, HCF = 8

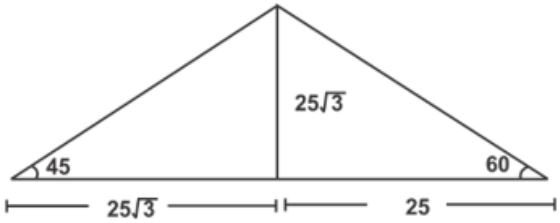
LCM×HCF = 1st number × 2nd number

504×8 = 72×2nd number

56 = 2nd number

S126. Ans.(c)

Sol.



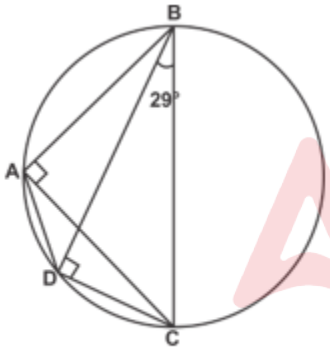
Sum = $25 + 25\sqrt{3}$

$= 25(\sqrt{3}+1)$

= 68.3

S127. Ans.(b)

Sol.



$\angle DCB = 90 - 29 = 61°$

$\angle BAD = 180 - 61 = 119°$

S128. Ans.(c)

Sol.

$\frac{x}{z} = \frac{9k}{16k}$

$y = \frac{9}{16} - \frac{1}{16}$

$y = \frac{1}{2}$

$x + y + z = \frac{27}{12}$

$x + z = \frac{9}{4} - \frac{1}{2}$

$= \frac{7}{4}$

S129. Ans.(a)

Sol.

$x^2 - \sqrt{7}x + 1 = 0$

Divide by x

$x + \frac{1}{x} = \sqrt{7}$

$x^5 + \frac{1}{x^5} = \left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right) - \left(x + \frac{1}{x}\right)$

$\Rightarrow 5 \times 4\sqrt{7} - \sqrt{7}$

$= 19\sqrt{7}$

S130. Ans.(b)

Sol.

$$\frac{4\times\tan^2 30+\sin^2 30.\cos^2 45+\sec^2 48-\cot^2 42}{\cos37.\sin53+\sin37.\cos53+\tan18.\tan72}$$

$$\Rightarrow \frac{4\times\frac{1}{3}+\frac{1}{4}\times\frac{1}{2}+1}{\sin^2 53°+\cos^2 53°+1}$$

$$\Rightarrow \frac{\frac{4}{3}+\frac{1}{8}+1}{2}$$

$$\Rightarrow \frac{32+3+24}{24\times2}$$

$$\Rightarrow \frac{59}{48}$$

S131. Ans.(c)

Sol.

ATQ

$3\times2\pi r^2 = 2\times2\pi rh$

$3\times2\times4\times4 = 2\times2\times4\times h$

$h = 6$

volume = $\pi r^2 h$

$= \pi \times 4 \times 4 \times 6$

$= 96\pi$

S132. Ans.(a)

Sol.

$$\frac{22\sqrt{2}}{4\sqrt{2}-\sqrt{3+\sqrt{5}}} = a + \sqrt{5}b$$

$$\Rightarrow \frac{22\sqrt{2}}{4\sqrt{2}-\sqrt{\frac{2(3+\sqrt{5}}{2}}} = a + \sqrt{5}b$$

$$\Rightarrow \frac{22\sqrt{2}}{4\sqrt{2}-\frac{\sqrt{6+2\sqrt{5}}}{\sqrt{2}}} = a + \sqrt{5}b$$

$$\Rightarrow \frac{44}{8-(\sqrt{5}+1)} = a + \sqrt{5}\,b$$

$$\Rightarrow \frac{44}{7-\sqrt{5}} = a + \sqrt{5}b$$

$$\Rightarrow \frac{44(7+\sqrt{5})}{49-5} = a + \sqrt{5}\,b$$

$7 + \sqrt{5} = a + \sqrt{5}\,b$

$a = 7, b = 1$

ab : a+b

7×1 : 7+1

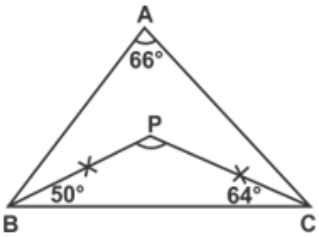
7 : 8

S133. Ans.(b)
Sol.

$A = \frac{25}{2}$ $B = 25$	2 1

Time to fill without leakage = $\frac{25}{3}$ = 8h 20 min
Real the taken = 8 hr 20 min + 1 hr 40 min
⇒ 10 hr
Efficiency (A+B+C)= $\frac{25}{10}$ = 2.5
A+B = 3
(leakage)C = -0.5
Time taken to empty 70% = $\frac{25}{0.5} \times \frac{7}{10}$ = 35 hr

S134. Ans.(b)
Sol.



$\angle BPC = 90° + \frac{66°}{2} = 123°$
$\angle BPC - \angle PCA = 123° - 32° = 91°$

S135. Ans.(a)
Sol.
$66\frac{2}{3}\% = \frac{2}{3}$

Income	:	expenditure	:	savings
8	:	5	:	3
or 80	:	50	:	30
+44%↓		↓+60%		↓
115.2		80		35.2

Increase 5.2 unit → 1040
50 unit → 10000

S136. Ans.(c)
Sol.

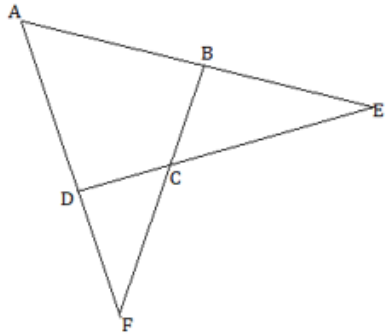
$$\frac{3(\cos^2 26 - \tan^2 64^0) + (\cot^2 42^0 - \sec^2 48^0)}{\cot(22-\theta) - cosec^2(62+\theta) - \tan(\theta+68) + \tan^2(28-\theta)}$$

Using $cosec\,(90-\theta) = sec\theta$
$cot\theta\,(90-\theta) = tan\theta$

$$= \frac{3(sec^2 64 - \tan^2 64) + (\tan^2 48 - sec^2 48)}{\tan(\theta+68^0) - sec^2(28-\theta) - \tan(\theta+68) + \tan^2(28-\theta)}$$

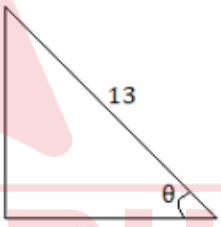
$$= \frac{3(1)+(-1)}{0-1} = -2$$

S137. Ans.(c)
Sol.
Let $\angle BFA = x^0$
$\angle DAB = \angle DCF = y\ (cyclic\ quad)$.



In ΔADE,
55+76+y = 180^0
In ΔDCF,
$76 = x + 49^0$
(Exterior = sum of opp. Interior)
$x = 27^0$

S138. Ans.(b)
Sol.
$cos\theta = \frac{12}{13}$



$$\Rightarrow \frac{sin\theta(1-sin\theta)}{tan\theta(1+cosec\theta)}$$
$$= \frac{\frac{5}{13}(1-\frac{5}{12})}{\frac{5}{12}(1+\frac{13}{5})}$$
$$= \frac{12}{13}\left(\frac{\frac{7}{12}}{\frac{18}{5}}\right)$$
$$= \frac{35}{18\times 13}$$
$$= \frac{35}{234}$$

S139. Ans.(a)
Sol.
$x + \frac{1}{x} = 3, \quad X^3 + \frac{1}{x^3} = 18$
$$\Rightarrow \frac{x^4+1/x^2}{x^2+5x+1}$$
$$= \frac{x^3+1/x^3}{x+\frac{1}{x}+5}$$
$$= \frac{18}{8}$$
= 9/4

S140. Ans.(a)
Sol.

$\frac{MP}{CP} \times \frac{7}{8} = \frac{23}{20}$
$\frac{MP}{CP} = \frac{46}{35} \rightarrow 385$
$46 \xrightarrow{\times 11} 506$
MP = 506
$SP = \frac{23}{20} \times 385$
SP = 442.75
SP+MP = 442.75+506
= 948.75

S141. Ans.(c)
Sol.

Daily wage of A+B $\rightarrow \frac{1800}{15} = Rs.1200$
Efficiency $\rightarrow A : B$
5 : 1
Daily wage of A $= \frac{5}{6} \times 1200 = Rs.1000$

S142. Ans.(a)
Sol.

$x = 32.5 \quad y = 34.6 \quad z = 30.9$
Using identity,
$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x+y+z)[(x-y)^2 + (y-z)^2 + (z-x)^2]$
$x^3 + y^3 + z^3 = \frac{1}{2}(98)[(2.1)^2 + (3.7)^2 + (1.6)^2]$
$= \frac{98}{2}(4.41 + 13.69 + 2.56)$
$\Rightarrow \frac{98}{2} \times 20.66 = 98 \times 10.33$
For value of K,
$0.98K = 98 \times 10.33$
K = 1033

S143. Ans.(a)
Sol.

$\frac{sec\theta - tan\theta}{sec\theta + tan\theta} = \frac{1}{7}$
Using C/D,
$\frac{Sec\theta}{tan\theta} = \frac{8}{6}$
$\frac{1}{sin\theta} = \frac{4}{3}$
Image
$\Rightarrow \frac{cosec\theta + \cot^2\theta}{cosec\theta - \cot^2\theta}$
$= \frac{\frac{4}{3}+\frac{7}{9}}{\frac{4}{3}-\frac{7}{9}}$
= 19/5

S144. Ans.(c)
Sol.

SI in 3 years = 6750 – 6000
= 750
SI in 1 year = 250
SI in 4 years = 1000
Principal = 6000-1000 = Rs. 5000

S145. Ans.(c)
Sol.

36	72	80	88
-16	-52	-60	-68
20	20	20	20

Least number = LCM (36, 72, 80, 88)-20
= 7920-20
7900
Sum of digits = 7+9+0+0 = 16

S146. Ans.(b)
Sol.

$(tan\theta + cot\theta)(sec\theta + tan\theta)(1 - sin\theta)$
$= \frac{1}{sin\theta.cos\theta} \times \frac{(1+sin\theta)}{cos\theta} \times (1 - sin\theta)$
$= \frac{(1-\sin^2\theta)}{sin\theta \cos^2\theta}$
$= \frac{1}{sin\theta}$
$= cosec\theta$

S147. Ans.(a)
Sol.

For same rate and time,
SI on Rs. 8400 = 11, 046-8400
= 2646
8400 → 2646
$10800 \rightarrow \frac{2646}{8400} \times 10800$
$= \frac{2646}{7} \times 9$
= Rs. 3402

S148. Ans.(a)
Sol.

$2 \times \frac{22}{7} \times \pi = 264$
$\pi = 42$
Volume $= \frac{22}{7} \times 42 \times 42 \times 50$
= 2, 77, 200 cm^3
= 277.2 litres (1L = 1000 cm^3)

S149. Ans.(a)
Sol.

$9 \div \left\{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{6} \div \left(\frac{3}{4}-\frac{1}{3}\right) of \frac{2}{9}\right\}$ is.

$\Rightarrow 9 \div \left\{\frac{13}{12}+\frac{1}{6} \div \frac{5}{12} of \frac{2}{9}\right\}$

$\Rightarrow 9 \div \left\{\frac{13}{12}+\frac{1}{6} \times \frac{54}{3}\right\}$

$\Rightarrow 9 \div \left(\frac{13}{12}+\frac{9}{5}\right)$

$\Rightarrow 9 \times \frac{60}{173}$

$= \frac{540}{173}$

S150. Ans.(c)
Sol.

Volume of well = Volume of embankment

$\pi r^2 h = \pi(R^2 - r^2)\, h$

$9 \times 6 = (r + R) \times (R - r)h \qquad \{R^2 - r^2 = (R + r)(r - r)\}$

54 = 8 x 2h

h = 27/8

$h = 3\frac{3}{8}$