

SSC GRADUATE LEVEL TIER-I (RE-EXAM-2013) , 20-07-2014 (FIRST SITTING) - PREVIOUS YEAR PAPER

GENERAL AWARENESS

1. Wildlife Protection Act was implemented in India in

- (1) 1972
- (2) 1986
- (3) 1964
- (4) 1956

Solution:1

2. Which one of the following is a Sedimentary Rock ?

- (1) Granite
- (2) Charnockite
- (3) Basalt
- (4) Arkose

Solution:4

3. Highly specialized form of agriculture in which crops like coffee, tea and rubber are cultivated refer to

- (1) multiple cropping
- (2) plantation agriculture
- (3) terrace farming
- (4) extensive farming

Solution:2

4. International Ozone Day is celebrated on

- (1) 5th September
- (2) 16th September
- (3) 11th September
- (4) 20th September

Solution:2

5. In India, there are many coal fields found in

- (1) Cauvery Valley
- (2) Krishna Valley

- (3) Ganga Valley
- (4) Damodar Valley

Solution:4

6. The newly hatched tadpole breaths through its

- (1) Lung
- (2) External gills
- (3) Internal gills
- (4) All of the above

Solution:2

7. Virus in Latin means

- (1) Sweet
- (2) Small
- (3) Fluid
- (4) Poison

Solution:4

8. The biological process in which both aerobes and anaerobes degrade organic matter is

- (1) Manuring
- (2) Composting
- (3) Digesting
- (4) Nitrifying

Solution:2

9. **Statement I :** Complex tissue is made up of more than one type of cells.

Statement II : Meristems are examples of permanent tissue.

- (1) Statement I is correct, but Statement II is incorrect.
- (2) Statement I is incorrect, but Statement II is correct.
- (3) Both statements I and II are correct.
- (4) Both statements I and II are incorrect.

Solution:1

10. The cuticle is absent in

- (1) Leaf
- (2) Stem
- (3) Root
- (4) Fruit

Solution:3

11. Intercalary meristems are found in

- (1) Node
- (2) Lateral bud
- (3) Terminal bud
- (4) Inter node

Solution:4

12. Super conductors are substances that

- (1) offer minimum resistance to flow of electric current
- (2) conduct electricity at low temperature
- (3) conduct electricity at high temperature
- (4) offer high resistance to the flow of electric current

Solution:1

13. A thin oil film on a water surface appears coloured because of

- (1) reflection
- (2) interference
- (3) diffraction
- (4) polarization

Solution:2

14. A tachometer is a device used to measure

- (1) gravitational pull
- (2) speed of rotation
- (3) surface tension
- (4) dispersive power

Solution:2

15. When cathode rays strike a target of high atomic weight, they give rise to

- (1) a -rays
- (2) β and γ rays
- (3) X-rays
- (4) positive rays

Solution:3

16. Different computers are connected to a LAN by a cable and a

- (1) modem
- (2) interface card
- (3) special wires
- (4) telephone lines

Solution:2

17. Which one of the following was the top exporter company of software in 2001 in India ?
- (1) Infosys
 - (2) TCS
 - (3) Sun
 - (4) Wipro

Solution:2

18. The major use of sulphur is in the manufacture of
- (1) H_2SO_4
 - (2) H_2S
 - (3) SO_2
 - (4) Fungicide

Solution:1

19. Atoms of different elements have
- (1) same atomic number and same electronic configuration
 - (2) different atomic number and same electronic configuration
 - (3) different atomic number and different number of valence electrons
 - (4) same number of electrons and neutrons

Solution:3

20. Which of the following pairs is correctly matched ?
- (1) Vitamin-A : Scurvy
 - (2) Vitamin-B : Rickets
 - (3) Vitamin-C : Nightblindness
 - (4) Vitamin-E : Reproduction

Solution:4

21. Organic compounds are
- (1) Covalent compounds
 - (2) Ionic compounds
 - (3) Co-ordination compounds
 - (4) Interstitial compounds

Solution:1

22. Major pesticidal properties are present in
- (1) Jatropha

- (2) Castor
- (3) Pongamia
- (4) Jamun

Solution:

23. The 'Greenhouse effect' is mainly due to increase in atmospheric

- (1) Ozone
- (2) Nitrogen
- (3) Sulphur dioxide
- (4) Carbon dioxide

Solution:4

24. Which of the following is not dealt under Section 3(3) of the Environment (Protection) Act, 1986 ?

- (1) The Biodiversity Authority
- (2) The Coastal Zone Management Authority
- (3) Authority set-up to monitor the State of Notified Ecologically Sensitive Areas
- (4) Protection of Plant Varieties and Farmers Right Authority

Solution:4

25. Which of the following statements is true ?

- (1) Animals worry about raising their family
- (2) Animals make several feeding trips in a day
- (3) Animals often behave sensibly
- (4) Animals do not know meaning of brotherhood

Solution:2

26. Green blocks are referred to

- (1) Green cover
- (2) Green Ministry
- (3) Bio-bricks
- (4) Pro-biotic curd

Solution:3

27. India celebrated its "Polio free status" during the month of

- (1) December 2013
- (2) January 2013
- (3) January 2010
- (4) February 2014

Solution:4

28. Telangana State is the bifurcation of

- (1) Tamil Nadu
- (2) Andhra Pradesh
- (3) Seemandhra
- (4) Odisha and Tamil Nadu

Solution:2

29. Which of the following is not correct ?

- (1) CISF – Central Industrial Security Force
- (2) BSF – Border Security Force
- (3) UNDP – United Nation's Development Project
- (4) SIT- Special Investigation Team

Solution:3

30. A book entitled "The Hindus : An Alternative History" is written by

- (1) Shobha De
- (2) B.R. Ambedkar
- (3) Wendy Doniger
- (4) Salman Rushdie

Solution:3

31. The father of Economics is

- (1) Marshall
- (2) Adam Smith
- (3) J.M. Keynes
- (4) Karl Marx

Solution:2

32. Which country awards Nobel Prize ?

- (1) France
- (2) Sweden
- (3) Switzerland
- (4) U.S.A.

Solution:2

33. The first nuclear explosion in India was conducted at

- (1) Pokhran
- (2) Bombay
- (3) Nellie
- (4) Sriharikota

Solution:1

34. Jawahar Rozgar Yojana was introduced in

- (1) Fifth Five Year Plan
- (2) Sixth Five Year Plan
- (3) Seventh Five Year Plan
- (4) Eighth Five Year Plan

Solution:3

35. The sweetmeat is referred to

- (1) Camel meat
- (2) Goat meat
- (3) Feta cheese
- (4) Petha of Agra

Solution:4

36. Capital market deals with

- (1) Short term fund
- (2) Long term fund
- (3) Cash
- (4) Both long and short term funds

Solution:2

37. The new Agricultural Strategy in India was introduced in

- (1) 1956
- (2) 1966
- (3) 1976
- (4) 1986

Solution:2

38. The sale of branded articles is common in a situation of

- (1) excess capacity
- (2) monopolistic competition
- (3) monopoly
- (4) pure competition

Solution:2

39. Production refers to

- (1) destruction of utility
- (2) creation of utilities

- (3) exchange value
- (4) use of a product

Solution:2

40. The law of diminishing returns applies to

- (1) All sectors
- (2) Industrial sector
- (3) Agricultural sector
- (4) Service sector

Solution:1

41. Bureaucracy literally means a system of government by

- (1) Elected representative
- (2) Nominated representative
- (3) Officials
- (4) Group of landlords

Solution:3

42. A federal government is in the shape of

- (1) Command by the Centre
- (2) Appeal from the States
- (3) Agreement between the Centre and the States
- (4) Single Party Rule

Solution:3

43. Parliamentary or Presidential Government can be distinguished mainly by

- (1) its federal nature
- (2) the rigidity of the Constitution
- (3) the employer-employee relations
- (4) the legislative-executive relations

Solution:4

44. The phrase "equality before law" used in Article-14 of Indian Constitution has been borrowed from

- (1) U.S.A.
- (2) Germany
- (3) Britain
- (4) Greece

Solution:3

45. Who said, 'The State exists because crime exists in society, otherwise there would be no need of a State' ?
- (1) Herbert Spencer
 - (2) J.S. Mill
 - (3) John Locke
 - (4) Tocqueville

Solution:1

46. The Quit India Resolution (1942) proposed the starting of a non-violent mass struggle on the widest possible scale. Who gave the mantra "Do or Die" for this struggle ?
- (1) Mahatma Gandhi
 - (2) Subhash Chandra Bose
 - (3) Jawaharlal Nehru
 - (4) Sardar Vallabhbhai Patel

Solution:1

47. Napoleon got finally overthrown in the Battle of Waterloo in the year
- (1) 1814
 - (2) 1813
 - (3) 1815
 - (4) 1816

Solution:3

48. Who was the first Woman President of Indian National Congress ?
- (1) Sarojini Naidu
 - (2) Sucheta Kripalani
 - (3) Rajkumari Arnrith Kaur
 - (4) Annie Besant

Solution:4

49. The famous Sun Temple at Konark was built by
- (1) Prataparudra
 - (2) Anantavarman
 - (3) Narasimha-I
 - (4) Narasimha-II

Solution:3

50. Ashok spread Buddhism all over India and Ceylon by
- (1) Teaching the Triratnas

- (2) Sending the Dharma Mahamatras
- (3) Waging wars
- (4) Becoming a Buddhist Monk

Solution:2



ENGLISH COMPREHENSION

Directions (1-3) : In the following questions, choose the word opposite in meaning to the given word.

1. Barbarous
 - (1) Ancient
 - (2) Civilized
 - (3) Gentle
 - (4) Savage

Solution:2

2. Heighten
 - (1) Widen
 - (2) Decrease
 - (3) Strengthen
 - (4) Dissolve

Solution:2

3. Dubious
 - (1) Shady
 - (2) Delirious
 - (3) Laconic
 - (4) Certain

Solution:4

Directions (4-8) : In the following questions, four alternatives are given for the Idiom/Phrase printed in bold in the sentence. Choose the alternative which best expresses the meaning of the Idiom/Phrase.

4. To be a successful lawyer, one must know how to **dot one's is and corss one's t's**.
 - (1) complete one task at a time
 - (2) write great letters
 - (3) deal with paperwork
 - (4) be detailed and exact

Solution:4

5. When Ramu lost the money, he was **down in the dumps**.
 - (1) accusing others of stealing
 - (2) searching everywhere (check spelling)

- (3) sad and depressed
- (4) very angry at himself

Solution:3

6. He **turned up his nose at my offer..**

- (1) was taken aback by my offer
- (2) found it hard to believe my offer
- (3) treated my offer with contempt
- (4) could not accept my offer

Solution:3

7. There are no **hard and fast** rules that cannot be relaxed on such an occasion.

- (1) that is difficult to solve
- (2) that can be altered
- (3) that is very quick
- (4) that cannot be altered

Solution:4

8. Her father **strained every nerve** to enable her to get settled in life.

- (1) worked very hard
- (2) spent a huge amount
- (3) tried all tricks
- (4) bribed several persons

Solution:1

Directions (9-18) : In the following questions, a sentence/a part of the sentence is printed in bold letters. Below are given alternatives to that bold part at (1), (2), (3) which may improve the sentence. Choose the correct alternative. In case no improvement is needed your answer is (4).

9. The speaker got confused, and started to **contradict himself.**

- (1) oppose himself
- (2) argue against
- (3) reject
- (4) No improvement

Solution:4

10. The number of people going abroad for vacations is **ever increasing** every year.

- (1) ever increasing
- (2) increasing
- (3) shooting

(4) No improvement

Solution:2

11. Looking at the pictures of his old home made him **nostalgic**.

(1) romantic

(2) historical

(3) philosophic

(4) No improvement

Solution:4

12. I met him **in the way**.

(1) on the way

(2) at the way

(3) during the way

(4) No improvement

Solution:1

13. **I shall appreciate if** you kindly accept my proposal.

(1) I would appreciate if

(2) I shall appreciate it if

(3) I would have appreciate if

(4) No improvement

Solution:2

14. Rajesh is **not very-well** these days.

(1) in poverty

(2) unwell

(3) indifferent

(4) No improvement

Solution:2

15. Nothing about the accident **has come to her knowledge**.

(1) was learnt by her

(2) has been known by her

(3) is known to her

(4) No improvement

Solution:3

16. Will you **let me borrow some money** in this hour of need ?

(1) lend me some rupees

- (2) let me borrow a few rupees
- (3) lend me some money
- (4) No improvement

Solution:3

17. The autumn **season** of Parliam^{ent} will begin on Monday.

- (1) session
- (2) cession
- (3) mission
- (4) No improvement

Solution:1

18. The boy said that **he has read** the book.

- (1) he has already read
- (2) he had read
- (3) he has finished to read
- (4) No improvement

Solution:2

Directions (19-25) : In the following questions, out of the four alternatives, choose the one which can be substituted for the given words/sentences.

19. A state where no law and order exists

- (1) Monarchy
- (2) Mobocracy
- (3) Anarchy
- (4) Democracy

Solution:3

20. He is my **partner in crime**.

- (1) Friend
- (2) Accomplice
- (3) Neighbour
- (4) Companion

Solution:2

21. Her speech **could not be heard** by those sitting in the last few rows.

- (1) Imperceptible
- (2) Indelible
- (3) Inaudible
- (4) Ineffable

Solution:3

22. A short trip or excursion

- (1) Rambler
- (2) Jaunt
- (3) Detour
- (4) Stroller

Solution:2

23. Motive or incitement to action

- (1) Remark
- (2) Contract
- (3) Proposition
- (4) Incentive

Solution:4

24. Science or practice of map drawing

- (1) Chirography
- (2) Xerography
- (3) Cartography
- (4) Pictography

Solution:3

25. A speaker's platform

- (1) Stage
- (2) Stand
- (3) Pulpit
- (4) Podium

Solution:4

Directions (26-27) : In the following questions, four words are given in each question, out of which only one word is correctly spelt. Find the correctly spelt word.

26. (1) Conoiseeur
(2) Conoisieur
(3) Connoisseur
(4) Cannoisseur

Solution:3

27. (1) Miscellaneous

- (2) Miscellaneous
- (3) Misscellaneous
- (4) Miscelleneous

Solution:1

Directions (28-37) : In the following questions, you have two brief passages with 5 questions following each passage. Read the passages carefully and choose the best answer to each question out of the four alternatives.

Passage I (Q. Nos. 28 to 32)

Opera refers to a dramatic art form, originating in Europe, in which the emotional content is conveyed to the audience as much through music, both vocal and instrumental, as it is through the lyrics. By contrast, in musical theatre an actor's dramatic performance is primary, and the music plays a lesser role. The drama in opera is presented using the primary elements of theatre such as scenery, costumes and acting. However, the words of the opera, or libretto, are sung rather than spoken. The singers are accompanied by a musical ensemble ranging from a small instrumental ensemble to a full symphonic orchestra.

28. It is pointed out in the passage that opera
- (1) has developed under the influence of musical theatre
 - (2) is a drama that is not dependent on music.
 - (3) is not a high-budget production.
 - (4) is originated in Europe.

Solution:4

29. We can understand from the passage that
- (1) audiences are captivated more by the lyrics than by the music.
 - (2) in opera lyrics are as important as the music.
 - (3) orchestras in operas do not vary in size.
 - (4) musical theatre relies, above all, on music.

Solution:2

30. it is stated in the passage that
- (1) acting and costumes are secondary to music in musical theatre.
 - (2) many people find musical theatre more captivating than opera.
 - (3) music in musical theatre is not as important as it is in opera.
 - (4) an opera requires a huge orchestra as well as a large choir.

Solution:3

31. A libretto is
- (1) the main character who is the liberator at the climax of the scene.

- (2) the words of the opera.
- (3) a musical composition which is played in a slow leisurely manner.
- (4) the sequence of well controlled, graceful movements performed as a display of skill.

Solution:2

32. The word "conveyed" also means

- (1) transmit
- (2) tote
- (3) keep
- (4) dissuade

Solution:1

Passage II (Q. Nos. 33 to 37)

These days we hear a lot about science, but scientists, the men and women who do the work and make the discoveries, seem distant and strange to us. Science often appears to be very difficult and sometimes even magical. It is difficult of course, but we are wrong if we believe that we cannot understand it. The chief thing about the scientific method is that we get the answers to questions by making tests. The man, to take an example, who finds his bicycle tyre is flat will pump some air into it. Suppose one hour later the tyre is flat again, if the man is wise, he will first test the valve in water. If he finds air is escaping from it he will put in a new piece of valve-rubber and then pump up the tyre. All should then be well again. This man is using a simple form of scientific method.

If the man was very 'unscientific' he might say to himself that an evil spirit had caused the tyre to go flat.

33. What do people talk a lot about these days ?

- (1) science
- (2) magic
- (3) men and women
- (4) work

Solution:1

34. What is the common man's attitude towards scientists ?

- (1) They are wrong.
- (2) They seem distant and strange.
- (3) They are wise.
- (4) They are difficult.

Solution:2

35. If we use the scientific method how do we get answers to questions ?
- (1) By believing
 - (2) By example
 - (3) By making tests
 - (4) By methods

Solution:3

36. If a man does not use the scientific approach, what will he attribute the flat tyre to ?
- (1) An evil spirit
 - (2) The rubber valve
 - (3) The bicycle
 - (4) Magic

Solution:1

37. The antonym of believe is
- (1) reveal
 - (2) disbelieve
 - (3) agree
 - (4) deny

Solution:2

Directions (38-42) : In the following questions, some parts of the sentences have errors and some are correct. Find out which part of a sentence has an error. The number of that part is the answer. If a sentence is free from error, then your answer is (4) i.e. No error.

38. They dreamed of a society (1)/ where everyone (2)/ were equal. (3)/ No error (4)

Solution:3

39. on Senegal (1)/ it is considered impolite (2)/ if you do not share your food. (3)/ No error (4)

Solution:1

40. We discussed about, the problem thoroughly (1)/on the eve of the examination (2)/ that I found it very easy to work it out. (3)/ No error (4)

Solution:1

41. The wise father told him (1)/ that the mangoes had gone bad as they were (2)/ in contact with the one rotten mango. (3)/ No error (4)

Solution:3

42. The box of eggs (1)/ are lying (2)/ on the table. (3)/ No error (4)

Solution:2

Directions (43-47) : In the following questions, sentences are given with blanks to be filled in with an appropriate word(s). Four alternatives are suggested for each question. Choose the correct alternative out of the four.

43. James Wattthe steam engine.

- (1) invented
- (2) discovered
- (3) founded
- (4) find

Solution:1

44. After saying that Beverly made too many mistakes, Bob added insult to injury by saying

- (1) they were small mistakes
- (2) she worked very slowly
- (3) her work was excellent
- (4) work at a remarkable pace

Solution:2

45. Losing that job was a blessing in disguise because she

- (1) get a much better job
- (2) lost her house
- (3) unemployed for years
- (4) was able to shop

Solution:1

46. All teachers agree that Paresh is the..... intelligent boy in his class.

- (1) more
- (2) most
- (3) very
- (4) only

Solution:2

47. The State is home to several destinations ofbeauty.

- (1) paralleled
- (2) unparalleled
- (3) inequal
- (4) equal

Solution:2

Directions (48-50) : In the following questions, out of the four alternatives, choose the one which best expresses the meaning of the given word.

48. Tepid

- (1) Hot
- (2) Warm
- (3) Cold
- (4) Boiling

Solution:2

49. Canny

- (1) Obstinate
- (2) Proud
- (3) Stout
- (4) Clever

Solution:4

50. Humane

- (1) Sympathetic
- (2) Spirit
- (3) Straight
- (4) Source

Solution:1

QUANTITATIVE APTITUDE

1. In what ratio must 25% of alcohol be mixed with 50% of alcohol to get a mixture of 40% strength alcohol ?

- (1) 1 : 2
(2) 2 : 1
(3) 2 : 3
(4) 3 : 2

Solution: 3

(3)

$$\begin{array}{ccc}
 \text{Alcohol I} & & \text{Alcohol II} \\
 \frac{1}{4} & & \frac{1}{2} \\
 & \swarrow \quad \searrow & \\
 & \text{Mean value} & \\
 & \frac{2}{5} & \\
 \swarrow & & \searrow \\
 \frac{1}{2} - \frac{2}{5} = \frac{5-4}{10} & & \frac{2}{5} - \frac{1}{4} = \frac{8-5}{20} \\
 = \frac{1}{10} & & = \frac{3}{20}
 \end{array}$$

$$\begin{aligned}
 \therefore \text{Required ratio} &= \frac{1}{10} : \frac{3}{20} \\
 &= 2 : 3
 \end{aligned}$$

2. Find two mean proportionals between 2 and 54.

- (1) 6 and 18
(2) 6 and 12
(3) 12 and 18
(4) 6 and 9

Solution:1

$$(1) \frac{2}{x} = \frac{y}{54}$$

$$\Rightarrow xy = 2 \times 54 = 6 \times 18$$

3. A man had 7 children. When their average age was 12 years, a child aged 6 years died. The average age of remaining six children is
- (1) 13 years
 - (2) 10 years
 - (3) 11 years
 - (4) 14 years

Solution:1

(1) Total age of remaining 6 children = $12 \times 7 - 6$
 $= 84 - 6 = 78$ years

\therefore Their average age = $\frac{78}{6}$
 $= 13$ years

4. The average marks obtained by 22 candidates in an examination are 45. The average marks of the first 10 candidates are 55 and those of the last eleven are 40. The number of marks obtained by the eleventh candidate is
- (1) 45
 - (2) 0
 - (3) 50
 - (4) 47.5

Solution:2

(2) Marks obtained by eleventh candidate
 $= 22 \times 45 - (10 \times 55 + 11 \times 40)$
 $= 990 - (550 + 440)$
 $= 990 - 990 = 0$

5. A shop-keeper sold a sewing machine for 1,080 at a loss of 10%. At what price should he have sold it so as to gain 10% on it ?
- (1) 1,069
 - (2) 1,200

(3) 1,230

(4) 1,320

Solution:4

(4) Cost price of sewing ma-

$$\text{chine} = 1080 \times \frac{100}{90}$$

$$= \text{Rs. } 1200$$

 \therefore S.P. for a profit of 10%

$$= \frac{1200 \times 110}{100} = \text{Rs. } 1320$$

6. A man invested 27,000 in 12 1/2% stock at 108, then his yield percentage is

(1) $18\frac{3}{4}\%$ (2) $11\frac{31}{54}\%$

(3) 15%

(4) $8\frac{1}{2}\%$ **Solution:2**

(2) Value of Rs. 100 stock

$$= \text{Rs. } 108$$

 \therefore Income on investing Rs. 108

$$= \text{Rs. } \frac{25}{2}$$

 \therefore Income on investment of Rs.
27000

$$= \text{Rs. } \left(\frac{25}{2 \times 108} \times 27000 \right)$$

$$= \text{Rs. } 3125$$

 \therefore Gain per cent

$$= \frac{3125}{27000} \times 100$$

$$= \frac{625}{54} = 11\frac{31}{54}\%$$

7. Santa and Julie start walking from the same place in the opposite directions. If Julie walks at a speed of 2.5 km/hr and Santa at a speed of 2 km/hr, in how much time will they be 18 km apart ?

- (1) 4.0 hrs
(2) 4.5 hrs
(3) 5.0 hrs
(4) 4.8 hrs

Solution:1

(1) Relative speed

$$= \left(\frac{5}{2} + 2 \right) \text{ kmph} = \frac{9}{2} \text{ kmph}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Relative speed}} = \frac{18}{\frac{9}{2}}$$

$$= \frac{18 \times 2}{9} = 4 \text{ hours}$$

8. Two trains 125 metres and 115 metres in length, are running towards each other on parallel lines, one at the rate of 33 km/hr and the other at 39 km/hr. How much time (in seconds) will they take to pass each other from the moment they meet ?

- (1) 8
(2) 10
(3) 12
(4) 15

Solution:3

$$\begin{aligned}
 & \text{(3) Relative speed} \\
 &= (33 + 39) \text{ kmph} \\
 &= 72 \text{ kmph} \\
 &= \left(\frac{72 \times 5}{18} \right) \text{ m/sec.} \\
 &= 20 \text{ m./sec.} \\
 &\therefore \text{ Time taken in crossing} \\
 &\quad \frac{\text{Length of both trains}}{\text{Relative speed}} \\
 &= \frac{125 + 115}{20} = \frac{240}{20} \\
 &= 12 \text{ seconds}
 \end{aligned}$$

9. A sum of money at compound interest will amount to 650 at the end of the first year and 676 at the end of the second year. The amount of money is
- (1) 1,300
 - (2) 650
 - (3) 1,250
 - (4) 625

Solution:4

(4) Principal = Rs. P (let)

Rate = R% per annum

$$\therefore A = P \left(1 + \frac{R}{100} \right)^T$$

$$\Rightarrow 650 = P \left(1 + \frac{R}{100} \right)$$

$$\Rightarrow \frac{650}{P} = \left(1 + \frac{R}{100} \right) \dots(i)$$

$$\text{Again, } 676 = P \left(1 + \frac{R}{100} \right)^2$$

$$\Rightarrow 676 = P \left(\frac{650}{P} \right)^2$$

$$= \frac{P \times 650 \times 650}{P^2}$$

$$\Rightarrow P = \frac{650 \times 650}{676} = \text{Rs. } 625$$

10. The simplest form of the expression

$$\frac{p^2 - p}{2p^3 + 6p^2} + \frac{p^2 - 1}{p^2 + 3p} + \frac{p^2}{p + 1} \text{ is}$$

(1) $2p^2$

(2) $\frac{1}{2p^2}$

(3) $p + 3$

(4) $\frac{1}{p + 3}$

Solution:2

.(2) Expression

$$\begin{aligned}
 &= \frac{p^2 - p}{2p^3 + 6p^2} + \frac{p^2 - 1}{p^2 + 3p} + \frac{p^2}{p + 1} \\
 &= \frac{p(p-1)}{2p^2(p+3)} + \frac{(p+1)(p-1)}{p(p+3)} + \frac{p^2}{p+1} \\
 &= \frac{p(p-1)}{2p^2(p+3)} \times \frac{p(p+3)}{(p+1)(p-1)} \times \frac{(p+1)}{p^2} \\
 &= \frac{1}{2p^2}
 \end{aligned}$$

11. If $a+b+c=4\sqrt{3}$ and $a^2 + b^2 + c^2 = 16$, then the ratio $a : b : c$ is

- (1) 1 : 1 : 1
- (2) $1 : \sqrt{2} : \sqrt{3}$
- (3) 1 : 2 : 3
- (4) None of these

Solution:1

$$(1) (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

$$\Rightarrow (4\sqrt{3})^2 = 16 + 2(ab + bc + ca)$$

$$\Rightarrow 48 = 16 + 2(ab + bc + ca)$$

$$\Rightarrow 2(ab + bc + ca) = 48 - 16 = 32$$

$$\Rightarrow ab + bc + ca = 16$$

$$\therefore a = b = c = \frac{4\sqrt{3}}{3} = \frac{4}{\sqrt{3}}$$

$$\therefore a : b : c = 1 : 1 : 1$$

If $x + \frac{1}{x} = 2$, then the value of

12.

$$\left(x^2 + \frac{1}{x^2}\right) \left(x^3 + \frac{1}{x^3}\right) \text{ is}$$

(1) 20

(2) 4

(3) 8

(4) 16

Solution:2

$$(2) x + \frac{1}{x} = 2$$

On squaring both sides,

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

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

$$\text{Again, } x + \frac{1}{x} = 2$$

On cubing both sides,

$$\left(x + \frac{1}{x}\right)^3 = 8$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3\left(x + \frac{1}{x}\right) = 8$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times 2 = 8$$

$$\Rightarrow x^3 + \frac{1}{x^3} = 8 - 6 = 2$$

$$\therefore \left(x^2 + \frac{1}{x^2}\right) \left(x^3 + \frac{1}{x^3}\right)$$

$$= 2 \times 2 = 4$$

13. If a, b, c be all positive integers, then the least positive value of $a^3 + b^3 + c^3 - 3abc$ is

- (1) 1
- (2) 2
- (3) 4
- (4) 3

Solution:3

(3) $a^3 + b^3 + c^3 - 3abc$ will be minimum if $a = b = 1, c = 2$

\therefore Least value $= 1 + 1 + 8 - 3 \times 1 \times 1 \times 2 = 10 - 6 = 4$

If $a + b = 1, c + d = 1$ and

14. $a - b = \frac{d}{c}$, then the value of $c^2 - d^2$ is

- (1) $\frac{a}{b}$
- (2) $\frac{b}{a}$
- (3) 1
- (4) -1

Solution:2

$$(2) \frac{d}{c} = a - b$$

$$\Rightarrow \frac{c}{d} = \frac{1}{a-b} = \frac{a+b}{a-b}$$

$$\Rightarrow \frac{c+d}{c-d} = \frac{a+b+a-b}{a+b-a+b} = \frac{a}{b}$$

(By componendo and dividendo)

$$\Rightarrow \frac{1}{c-d} = \frac{a}{b}$$

$$\Rightarrow (c-d) = \frac{b}{a}$$

$$\Rightarrow c^2 - d^2 = (c+d)(c-d) = \frac{b}{a}$$

15. When $f(x) = 12x^3 - 13x^2 - 5x + 7$ is divided by $(3x + 2)$, then the remainder is

(1) 2

(2) 0

(3) -1

(4) 1

Solution:4

• (4) By remainder theorem,

$$\text{Remainder} = f\left(-\frac{2}{3}\right)$$

$$\therefore f(x) = 12x^3 - 13x^2 - 5x + 7$$

$$\therefore f\left(-\frac{2}{3}\right) = 12\left(-\frac{2}{3}\right)^3 - 13\left(-\frac{2}{3}\right)^2$$

$$- 5\left(-\frac{2}{3}\right) + 7$$

$$= -\frac{12 \times 8}{27} - \frac{13 \times 4}{9} + \frac{10}{3} + 7$$

$$= -\frac{32}{9} - \frac{52}{9} + \frac{10}{3} + 7$$

$$= \frac{-32 - 52 + 30 + 63}{9}$$

$$= \frac{9}{9} = 1$$

Second Method

$$3x + 2 \mid 12x^3 - 13x^2 - 5x + 7(4x^2 - 7x + 3)$$

$$\underline{12x^3 \pm 8x^2}$$

$$- 21x^2 - 5x$$

$$\underline{+ 21x^2 \pm 14x}$$

$$9x + 7$$

$$\underline{9x \pm 6}$$

$$1$$

16. If $x = 3t$, $y = \frac{1}{2}(t + 1)$, then the value of t for which $x = 2y$ is

(1) 1

(2) $\frac{1}{2}$

(3) -1

(4) $\frac{2}{3}$

Solution: 2

$$(2) x = 2y$$

$$\Rightarrow 3t = 2 \times \frac{1}{2} (t + 1)$$

$$\Rightarrow 3t = t + 1 \Rightarrow 3t - t = 1$$

$$\Rightarrow 2t = 1 \Rightarrow t = \frac{1}{2}$$

17. If $x^2 + \frac{1}{5}x + a^2$ is a perfect square, then a is

(1) $\frac{1}{100}$

(2) $\pm \frac{1}{10}$

(3) $\frac{1}{10}$

(4) 10

Solution:3

$$(3) x^2 + \frac{1}{5}x + a^2$$

$$= x^2 + 2x \cdot \frac{1}{10} + \left(\frac{1}{10}\right)^2 - \left(\frac{1}{10}\right)^2 + a^2$$

$$\therefore a^2 - \left(\frac{1}{10}\right)^2 = 0 \Rightarrow a^2 = \left(\frac{1}{10}\right)^2$$

$$\Rightarrow a = \frac{1}{10}$$

18. In a cyclic quadrilateral ABCD $m\angle A + m\angle B + m\angle C + m\angle D = ?$

(1) 90°

(2) 360°

(3) 180°

(4) 120°

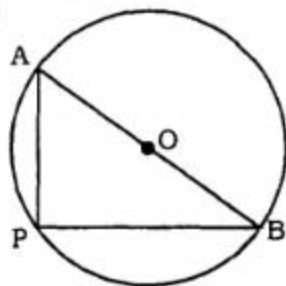
Solution:2

(2) The sum of opposite angles of a concyclic quadrilateral is 180° .

19. In a right angled triangle, the circumcentre of the triangle lies
- (1) inside the triangle
 - (2) outside the triangle
 - (3) on midpoint of the hypotenuse
 - (4) on one vertex

Solution:3

(3)



$$\angle APB = 90^\circ$$

AB = Diameter = hypotenuse
of ΔAPB

The angle of a semi-circle is a
right angle.

20. If two angles of a triangle are 21° and 38° , then the triangle is
- (1) Right-angled triangle
 - (2) Acute-angled triangle
 - (3) Obtuse-angled triangle
 - (4) Isosceles triangle

Solution:3

(3) Third angle of triangle
 $= 180^\circ - (21^\circ + 38^\circ)$
 $= 180^\circ - 59^\circ = 121^\circ > 90^\circ$
 i.e., obtuse angle

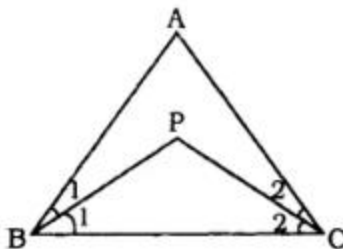
21. Angle between the internal bisectors of two angles of a triangle $\angle B$ and $\angle C$ is 120° ,

then $\angle A$ is

- (1) 20°
- (2) 30°
- (3) 60°
- (4) 90°

Solution:3

(3)



$$\angle BPC = 120^\circ$$

$$\therefore \angle PBC + \angle PCB = 180^\circ - 120^\circ = 60^\circ$$

$$\therefore \angle ABC + \angle ACB = 2 \times 60^\circ = 120^\circ$$

$$\therefore \angle BAC = 180^\circ - 120^\circ = 60^\circ$$

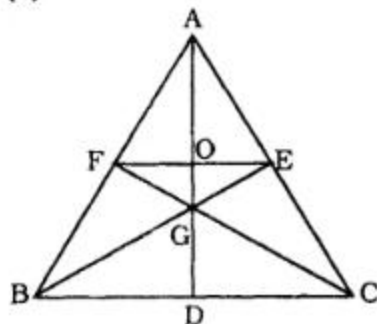
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22. BE and CF are two medians of $\triangle ABC$ and G the centroid. FE cuts AG at O. If $OG = 2$ cm, then the length of AO is

- (1) 2 cm
- (2) 4 cm
- (3) 6 cm
- (4) 8 cm

Solution:3

(3)



$$OG = \frac{1}{3} AO$$

$$\Rightarrow AO = 3 \times OG$$

$$= 3 \times 2 = 6 \text{ cm}$$

23. Let ABC be an equilateral triangle and AX, BY, CZ be the altitudes. Then the right statement out of the four given responses is

- (1) $AX = BY = CZ$
- (2) $AX \neq BY = CZ$
- (3) $AX = BY \neq CZ$
- (4) $AX \neq BY \neq CZ$

Solution:1

(1) In an equilateral ΔABC ,

$$\angle A = \angle B = \angle C = 60^\circ$$

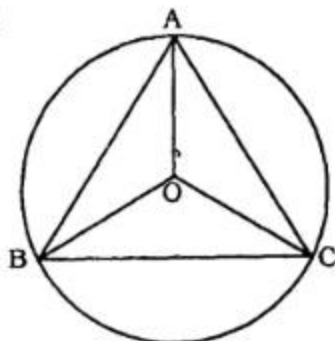
$$AB = BC = CA$$

24. O is the circumcentre of ΔABC , given $\angle BAC = 85^\circ$ and $\angle BCA = 55^\circ$, find $\angle OAC$.

- (1) 40°
- (2) 50°
- (3) 60°
- (4) 80°

Solution:2

(2)



$$\angle BAC = 85^\circ$$

$$\therefore \angle BOC = 2 \times 85^\circ = 170^\circ$$

$$\angle BCA = 55^\circ$$

$$\therefore \angle AOB = 2 \times 55^\circ = 110^\circ$$

$$\begin{aligned} \therefore \angle AOC &= 360^\circ - 170^\circ - 110^\circ \\ &= 360^\circ - 280^\circ = 80^\circ \end{aligned}$$

$$\therefore \angle OAC = \angle OCA = \frac{1}{2}(180^\circ - 80^\circ)$$

$$= \frac{1}{2} \times 100 = 50^\circ$$

25. The angles of a triangle are in the ratio 2 : 3 : 7. The measure of the smallest angle is

(1) 30°

(2) 60°

(3) 45°

(4) 90°

Solution:1

(1) The smallest angle

$$= \frac{2}{(2+3+7)} \times 180^\circ$$

$$= \frac{2}{12} \times 180^\circ = 30^\circ$$

26. If $x \sin 60^\circ \cdot \tan 30^\circ = \sec 60^\circ \cdot \cot 45^\circ$, then the value of x is

- (1) 2
- (2) $2\sqrt{3}$
- (3) 4
- (4) $4\sqrt{3}$

Solution:3

$$(3) x \cdot \sin 60^\circ \cdot \tan 30^\circ \\ = \sec 60^\circ \cdot \cot 45^\circ$$

$$\Rightarrow x \times \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{3}} = 2 \times 1$$

$$\Rightarrow x = 2 \times 2 = 4$$

27. If $\theta = 60^\circ$, then

$$\frac{1}{2} \sqrt{1 + \sin \theta} + \frac{1}{2} \sqrt{1 - \sin \theta}$$

is equal to

- (1) $\cot \frac{\theta}{2}$
- (2) $\sec \frac{\theta}{2}$
- (3) $\sin \frac{\theta}{2}$
- (4) $\cos \frac{\theta}{2}$

Solution:4

$$\begin{aligned}
 (4) & \frac{1}{2}\sqrt{1+\sin\theta} + \frac{1}{2}\sqrt{1-\sin\theta} \\
 &= \frac{1}{2}(\sqrt{1+\sin 60^\circ} + \sqrt{1-\sin 60^\circ}) \\
 &= \frac{1}{2}\left(\sqrt{1+\frac{\sqrt{3}}{2}} + \sqrt{1-\frac{\sqrt{3}}{2}}\right) \\
 &= \frac{1}{2\sqrt{2}}(\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}) \\
 &= \frac{1}{2\sqrt{2}} \times \frac{1}{2}(\sqrt{4+2\sqrt{3}} + \sqrt{4-2\sqrt{3}}) \\
 &= \frac{1}{4}\left(\sqrt{(\sqrt{3}+1)^2} + \sqrt{(\sqrt{3}-1)^2}\right) \\
 &= \frac{1}{4}(\sqrt{3}+1+\sqrt{3}-1) \\
 &= \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2} = \cos 30^\circ \\
 &= \cos \frac{\theta}{2}
 \end{aligned}$$

28. Given that $1^2 + 2^2 + 3^2 + \dots + 10^2 = 385$, the value of $2^2 + 4^2 + 6^2 + \dots + 20^2 =$

- (1) 770
- (2) 1540
- (3) 1155
- (4) $(385)^2$

Solution:2

$$\begin{aligned}
 (2) & 1^2 + 2^2 + 3^2 + \dots + 10^2 = 385 \\
 \therefore & 2^2 + 4^2 + 6^2 + \dots + 20^2 \\
 &= 2^2 (1^2 + 2^2 + 3^2 + \dots + 10^2) \\
 &= 4 \times 385 = 1540
 \end{aligned}$$

29. The value of

$$5\frac{1}{3} + 1\frac{2}{9} \times \frac{1}{4} \left(10 + \frac{3}{1 - \frac{1}{5}} \right) \text{ is}$$

(1) 15

(2) $\frac{67}{25}$

(3) $\frac{128}{11}$

(4) $\frac{128}{99}$

Solution:1

(1) Expression

$$= \frac{16}{3} + \frac{11}{9} \times \frac{1}{4} \left(10 + \frac{3}{\frac{5-1}{5}} \right)$$

$$= \frac{16}{3} \times \frac{9}{11} \times \frac{1}{4} \left(10 + \frac{15}{4} \right)$$

$$= \frac{16}{3} \times \frac{9}{11} \times \frac{1}{4} \left(\frac{40+15}{4} \right)$$

$$= \frac{16}{3} \times \frac{9}{11} \times \frac{1}{4} \times \frac{55}{4} = 15$$

30. A and B together can dig a trench in 12 days, which A alone can dig in 28 days; B alone can dig it in

(1) 20 days

(2) 21 days

(3) 22 days

(4) 23 days

Solution:2

∴ (2) B's 1 day's work = (A + B)'s
1 day's work - A's 1 day's work

$$= \frac{1}{12} - \frac{1}{28} = \frac{7-3}{84}$$

$$= \frac{4}{84} = \frac{1}{21}$$

∴ Required time = 21 days

31. A pipe can fill a cistern in 9 hours. Due to a leak in its bottom, the cistern fills up in 10 hours. If the cistern is full, in how much time will it be emptied by the leak ?

- (1) 70 hours
(2) 80 hours
(3) 90 hours
(4) 100 hours

Solution:3

(3) Part of the tank emptied by

$$\text{the leak in 1 hour} = \frac{1}{9} - \frac{1}{10}$$

$$= \frac{10-9}{90} = \frac{1}{90}$$

∴ Required time = 90 hours

32. A skilled, a half skilled and an unskilled labourer work for 7, 8 and 10 days respectively and they together get 369 for their work. If the ratio of their each day's work is $1/3 : 1/4 : 1/6$, then how much does the trained labourer get (in rupees) ?

- (1) 164
(2) 102.50
(3) 201.50
(4) 143.50

Solution:4