

# SSC GRADUATE LEVEL TIER-I EXAM (2ND SITTING), 21-04-2013 – PREVIOUS YEAR PAPER

## GENERAL AWARENESS

1. The principle of maximum social advantage is the basic principle of
- (1) Micro Economics
  - (2) Macro Economics
  - (3) Fiscal Economics
  - (4) Environmental Economics

**Solution:3**

2. Which Five Year Plan is not correct among the following ?
- (1) First 1951-56
  - (2) Second 1956-61
  - (3) Third 1961-66
  - (4) Fourth 1966-71

**Solution:4**

3. The ordinary and maximum tolerance limit of sound by human being is
- (1) 50 db to 70 db (decibel)
  - (2) 60 db to 80 db (decibel)
  - (3) 65 db to 75 db (decibel)
  - (4) 70 db to 85 db (decibel)

**Solution:2**

4. An economic theory is a/an
- (1) Axton
  - (2) Proposition
  - (3) Hypothesis
  - (4) Tested hypothesis

**Solution:2**

5. Indian Special Economic Rules amendment came in the year
- (1) 2000
  - (2) 2002

(3) 2004

(4) 2006

**Solution:4**

6. Provisions of citizenship in Indian Constitution, became applicable in

(1) 1950

(2) 1949

(3) 1951

(4) 1952

**Solution:1**

7. Who gave the title of "Sardar" to Ballabh Bhai Patel ?

(1) Mahatma Gandhi

(2) Vinoba Bhave

(3) Women of Bardoli

(4) Peasants of Gujrat

**Solution:1**

8. According to Marx, the source of value is

(1) Capital

(2) Land

(3) Labour

(4) None of the above

**Solution:3**

9. The National Emergency in India declared by the President of India due to the external aggression or armed revolt through

(1) Article-352

(2) Article-356

(3) Article-360

(4) Article-368

**Solution:1**

10. The Community Development Programme was launched in the year

(1) 1950

(2) 1952

(3) 1951

(4) 1953

**Solution:2**

11. What Satyagraha was held at Nagpur in 1923?

- (1) Salt Satyagraha
- (2) Individual Satyagraha
- (3) Ryots Satyagraha
- (4) Flag Satyagraha

**Solution:4**

12. Which one of the following is not a sect of Buddhism ?

- (1) Mahayana
- (2) Hinayana
- (3) Digambar
- (4) Theravad

**Solution:3**

13. Who was the viceroy when Delhi became the capital of British India ?

- (1) Lord Curzon
- (2) Lord Minto
- (3) Lord Hardinge
- (4) Lord Waveli

**Solution:3**

14. Who established the Indian Civil Liberties Union in 1936 ?

- (1) Subhash Chandra Bose
- (2) Bal Gangadhar Tilak
- (3) Jawahar Lal Nehru
- (4) Rajendra Prasad

**Solution:3**

15. Which of the following was established first ?

- (1) Banaras Hindu University
- (2) University of Bombay
- (3) Aligarh Muslim University
- (4) University of Allahabad

**Solution:2**

16. "Yosemite" is a

- (1) River
- (2) Peak
- (3) Waterfall
- (4) Dam

**Solution:3**

17. The first Indian Satellite Aryabhata was launched in

- (1) 1972
- (2) 1975
- (3) 1977
- (4) 1979

**Solution:2**

18. Where is the shore based steel plant located?

- (1) Tuticorin
- (2) Salem
- (3) Vishakhapatnam
- (4) Mangalore

**Solution:3**

19. Which two of the following are connected by the North South corridor ?

- (1) Srinagar and Kanyakumari
- (2) Mumbai and Chennai
- (3) Amritsar and Kolkata
- (4) Hyderabad and Bhopal

**Solution:1**

20. The pollutants which move downward with percolating ground water are called

- (1) Leachates
- (2) Pollutates
- (3) Earthites
- (4) Percolates

**Solution:1**

21. Lungs are located in the

- (1) abdominal cavity
- (2) pericardial cavity
- (3) peritoneal cavity
- (4) pleural cavity

**Solution:4**

22. Which one of the following is the ideal food for newborn babies ?

- (1) Water
- (2) Sugar

(3) Honey

(4) Milk

**Solution:4**

23. Transcription means the synthesis of

(1) Lipids

(2) Protein

(3) DNA

(4) RNA

**Solution:3**

24. Hydrochloric acid is secreted by the cells lining the

(1) Oral cavity

(2) Stomach

(3) Ileum

(4) Colon

**Solution:2**

25. Emulsification is

(1) breaking fats into small globules

(2) digestion of fats

(3) absorption of fats

(4) storage of fats

**Solution:1**

26. Taxonomy is a science that deals with

(1) Morphology

(2) Anatomy

(3) Classification

(4) Economic uses

**Solution:3**

27. Which one of the following is responsible for the working of Newton's colour disc experiment ?

(1) Formation of pure spectra

(2) Formation of impure spectra

(3) Persistence of vision

(4) Principle of complementary colour

**Solution:3**

28. The dimension  $MLT^{-2}$  corresponds to

- (1) force
- (2) work done
- (3) acceleration
- (4) velocity

**Solution:1**

29. Who is the founder of quantum theory of radiation ?

- (1) Einstein
- (2) Bohr
- (3) Plank
- (4) S. N. Bose

**Solution:3**

30. Fiber optics cable used in communication, works on the principle of

- (1) regular reflection of light
- (2) diffuse reflection of light
- (3) refraction of light
- (4) total internal reflection of light

**Solution:4**

31. Which was the first electronic computer constructed at the Moore School of Engineering ?

- (1) EO VAC
- (2) ONIVAC
- (3) ENIAC
- (4) EDSAC

**Solution:3**

32. Which among the following standard protocols is the most widely used by the Internet ?

- (1) HTIP
- (2) TCP/IP
- (3) SMTP
- (4) SLIP

**Solution:2**

33. The outer skin most of the crustaceans are made up of a carbohydrate. This carbohydrate is

- (1) cellulose



- (2) galactose
- (3) chitin
- (4) starch

**Solution:3**

34. Rutherford's scattering experiment proved the presence of

- (1) atoms in all matter
- (2) electrons in atoms
- (3) neutrons in atoms
- (4) nucleus in atoms

**Solution:4**

35. When a metal is heated in a flame, the electrons absorb energy and jump to higher energy state. On coming back to the lower energy state, they emit light, which we can observe in

- (1) Raman spectra
- (2) Absorption spectra
- (3) Emission spectra
- (4) Fluorescence

**Solution:3**

36. Blood pressure may be increased by the excessive secretion of

- (1) Thyroxine
- (2) Testosterone
- (3) Estradiol
- (4) Estrol

**Solution:1**

37. The concept of "Green House Gases" was postulated by

- (1) Joseph Fourier
- (2) Abdul Kalam
- (3) M. S. Swaminathan
- (4) Michael Carlson

**Solution:1**

38. "Bhopal gas tragedy" 1984 is related to

- (1) Aluminium Phosphide
- (2) Methyl bromide
- (3) Methyl isocyanate
- (4) Carbon dioxide

**Solution:3**

39. The Particulate Matter (PM-10) exhaled from the polluted atmosphere is often filtered out during the process of
- (1) Coughing
  - (2) Sneezing
  - (3) A and B
  - (4) Urination

**Solution:2**

40. Sarus crane is the state bird of
- (1) Rajasthan
  - (2) Uttar Pradesh
  - (3) Madhya Pradesh
  - (4) West Bengal

**Solution:2**

41. The Tongarilo volcano erupted on November 21, 2012 is in
- (1) Australia
  - (2) Indonesia
  - (3) Papua New Guinea
  - (4) New Zealand

**Solution:4**

42. The Daocheng Yading Airport is located in
- (1) Thailand
  - (2) Philippines
  - (3) China
  - (4) Tibet

**Solution:4**

43. BCCI named the "Indian Cricketer of the year 2011-12" to honour
- (1) Sunil Gavaskar
  - (2) VVS Laxman
  - (3) Virat Kohli
  - (4) Yuvaraj

**Solution:3**

44. "Martyr's Day" is marked on
- (1) January 1



- (2) January 15
- (3) January 30
- (4) January 9

**Solution:3**

45. Who won the World Carrom Championship 2012 ?

- (1) Rashmi Kumari
- (2) Mirabai Chanu
- (3) Nishantha Fernando
- (4) Nuthaki Priyanka

**Solution:3**

46. The animal who can consume more salt among the following is

- (1) Sheep
- (2) Camel
- (3) Donkey
- (4) Dog

**Solution:2**

47. Which of the following is only domestic Airport ?

- (1) Dabolin Airport, Goa
- (2) Srinagar Airport
- (3) Devi Ahilyabai Holkar Airport
- (4) None of the above

**Solution:4**

48. Tick the correct option with regards to the contribution towards GDP (Gross Domestic Product) from Agriculture

- (1) During 1950-51 (GDP 51-88%) and 2011-12 (GDP 1401%)
- (2) During 1950-51 (GDP 11 - 00%) and 2011-12 (GDP 25%)
- (3) During 1990-91 (GDP 29-53%) and 2011-12 (GDP 6677%)
- (4) During 1980-81 (GDP 35-69%) and 2011-12 (GDP 20-69%)

**Solution:1**

49. Second India-Africa Forum Summit-2011 was held in

- (1) Eretrea
- (2) Ethiopia
- (3) Sudan
- (4) Nigeria

**Solution:2**

50. Where did Aurangzeb die ?

- (1) Pune
- (2) Aurangabad
- (3) Ahmad Naser
- (4) Mumbai

**Solution:3**



## ENGLISH COMPREHENSION

**Directions (1-5) :** In the following questions, some of the sentences have errors and some have none. Find out which part of a sentence has an error. The number of that part is your answer. If there is no error, your answer is (4) i.e., No error.

1. In India (1)/ working woman lead a life of dual responsibilities(2)/if they are married and have a family. (3)/No error (4).

**Solution:2**

2. Greatly to our surprise (1)/ we find the ringleader (2)/was lame. (3)/ No error (4).

**Solution:1**

3. They have (1)/ played a game (2)/ last week. (3)/ No error (4).

**Solution:1**

4. The teacher made the boys (1)/ to do the sum (2) / all over again. (3)/ No error (4).

**Solution:2**

5. Many overseas students (1)/ attend colleges (2)/ in the Great Britain. (3)/ No error (4).

**Solution:3**

**Directions (6-10) :** In the following questions, each sentence is given with blank to be filled in with an appropriate and suitable word(s). Four alternatives are suggested for each question. Choose the correct alternative out of the four alternatives.

6. Student-parking should be.....; students should not be charged to buy parking stickers.

- (1) fined
- (2) free
- (3) costly
- (4) cheap

**Solution:2**

7. If you have roses growing in your garden, you can make a lovely..... of flowers at home.
- (1) bouquet

- (2) buquette
- (3) bouquet
- (4) bouquet

**Solution:4**

8. The..... of the middle school is a woman of..... .

- (1) Principles, Principal
- (2) Principals, Principal
- (3) Principal, Principle
- (4) Principle, Principals

**Solution:3**

9. With the changing times, most of the students have become business, like they are ..... and want to take only those courses which they find rewarding.

- (1) idealistic
- (2) pragmatic
- (3) enthusiastic
- (4) partial

**Solution:2**

10. 1. John's at..... institute studying French.

2. They're building..... school at the end of our street.

3. Do they live in ..... United Kingdom or somewhere else ?

- (1) a, the, an
- (2) the, a, an
- (3) an, a, the
- (4) the, an, a

**Solution:3**

**Directions (161-163) :** In the following questions, out of the four alternatives, choose the one which best expresses the meaning of the given word.

11. Parsimony

- (1) expenditure
- (2) bankruptcy
- (3) bribery
- (4) miserliness

**Solution:4**

12. Tribulation

- (1) palpitation

- (2) suffering
- (3) weakness
- (4) stimulation

**Solution:2**

13. The Prime Minister goes on the ramparts of the Red Fort to hoist the National flag.

- (1) roinpway
- (2) staircase
- (3) parapet
- (4) scaffold

**Solution:3**

**Directions (14-16) :** In the following questions, choose the word opposite in meaning to the given word.

14. Lunacy

- (1) sanity
- (2) stupidity
- (3) sensibility
- (4) insanity

**Solution:1**

15. Obtuse

- (1) sharp-witted
- (2) transparent
- (3) timid
- (4) blunt

**Solution:1**

16. Irr dvertently

- (1) secretly
- (2) accidentally
- (3) completely
- (4) deliberately

**Solution:4**

**Directions (17-21) :** 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.

17. What **egged you** on to become a social worker ?

- (1) urged



- (2) dampened
- (3) hindered
- (4) discouraged

**Solution:1**

18. Many politicians in India are **not fit to hold a candle** to Mahatma Gandhi.

- (1) superior
- (2) equal
- (3) inferior
- (4) indifferent

**Solution:3**

19. She must be **paying through the nose** for the face left.

- (1) paying less than necessary
- (2) paying too much
- (3) paying the right amount
- (4) paying reluctantly

**Solution:2**

20. He is **putting the cart before the horse** by purchasing furniture before buying a house.

- (1) doing a thing in the wrong way
- (2) doing a thing in the right way
- (3) committing a great crime
- (4) doing things meticulously

**Solution:1**

21. **Casting pearls before swine.**

- (1) speaking nice words and convincing them
- (2) offering good things to undeserving people
- (3) uplifting the needy for their welfare
- (4) doing worthwhile things to unknown people

**Solution:2**

**Directions (22-31) :** In the following questions, a sentence/ part of the sentence is printed in **bold**. Below are given alternatives to the bold sentence/part of the sentence at (1), (2) and (3) which may improve the sentence. Choose the correct alternative. In case no improvement is needed, your answer is (4).

22. It became clear that the strangers were heading **into** a serious disaster.

- (1) along



- (2) towards
- (3) on
- (4) No improvement

**Solution:2**

23. Twenty kms **are not a great distance** in these days of fast moving vehicles.

- (1) is not a great distance
- (2) are not too great a distance
- (3) aren't proving a great distance
- (4) No improvement

**Solution:1**

24. **I adapted** a new method to solve the problem.

- (1) I have been adopted
- (2) I adopted
- (3) I was adapted
- (4) No improvement

**Solution:2**

25. Hoping not to be disturbed, I sat down in my easy chair to read the book, **I won as a prize**.

- (1) I had won as a prize
- (2) I have won as prize
- (3) I had to win as a prize
- (4) No improvement

**Solution:1**

26. If you are living near a market place you should be ready to **bear** the disturbances caused by traffic.

- (1) to bear upon
- (2) to bear with
- (3) to bear away
- (4) No improvement

**Solution:2**

27. The more they earn, **more they spend** on luxury items.

- (1) more they should spend
- (2) the more they spend
- (3) the more they ought to spend
- (4) No improvement

**Solution:2**

28. You have come here with a view **to insult** me.

- (1) to insulting me
- (2) of insulting me
- (3) for insulting me
- (4) No improvement

**Solution:1**

29. A little rail-road engine **was employed by a station yard** for doing small pieces of work.

- (1) was made by a station yard
- (2) was used at the station yard
- (3) was employed at the station Yard
- (4) No improvement

**Solution:3**

30. **From an aesthetic point of view, the painting did not appeal to me.**

- (1) From the viewpoint of aesthetics, the painting did not appeal to me
- (2) The painting had no aesthetic appeal to me
- (3) From an aesthetic point of view, the painting had a little appeal to me
- (4) No improvement

**Solution:4**

31. **The child tossed in bed burning with fever.**

- (1) The child in bed, burning with fever tossed
- (2) The child burning with fever, tossed in bed
- (3) The child burning in bed tossed with fever
- (4) No improvement

**Solution:2**

**Directions (32-38) :** In the following question, out of the four alternatives, choose the one which can be substituted for the given words/sentence.

32. An apartment building in which each apartment is owned separately by the people living in it, but also containing shared areas.

- (1) condominium
- (2) multiplex
- (3) duplex
- (4) caravan

**Solution:1**

33. A group of three powerful people.

- (1) trio
- (2) tritium
- (3) trivet
- (4) triumvirate

**Solution:4**

34. Operation of the body after death.

- (1) post-mortem
- (2) obituary
- (3) homage
- (4) mortuary

**Solution:1**

35. Not allowing the passage of light.

- (1) oblique
- (2) opaque
- (3) optique
- (4) opulant

**Solution:2**

36. Science regarding principles of classification.

- (1) taxidermy
- (2) taxonomy
- (3) toxicology
- (4) classicology

**Solution:2**

37. A political leader appealing to popular desires and prejudices.

- (1) dictator
- (2) tyrant
- (3) popularist
- (4) demagogue

**Solution:4**

38. Enclosed in a small closed space.

- (1) closophobia
- (2) clusterophobia
- (3) claustrophobia
- (4) liftophobia

**Solution:3**

**Directions (189-190) :** 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 as your answer.

39. (1) conivance  
(2) connivance  
(3) connivance  
(4) conivence

**Solution:3**

40. (1) maintenncance  
(2) manteinance  
(3) maintenance  
(4) mentenance

**Solution:3**

**Directions (41-50) :** In the following questions, you have a passage with 10 questions. Read the passage carefully and choose the best answer to each question out of the four alternatives.

**PASSAGE****CYBER BOGEYS**

The cyber -world is ultimately ungovernable. This is alarming as well as convenient; sometimes, convenient because alarming. Some Indian politicians use this to great advantage. When there is an obvious failure in governance during a crisis they deflect attention from their own incompetence towards the ungovernable. So, having failed to prevent nervous citizens from fleeing their cities of work by assuring them of proper protection, some national leaders are now busy trying to prove to one another, and to panic-prone Indians, that a mischievous neighbour has been using the Internet and social networking sites to spread dangerous rumours. And the Centre's automatic reaction is to start blocking these sites and begin elaborate and potentially endless negotiations with Google, Twitter and Facebook about access to information. If this is the official idea of prompt action at a time of crisis among communities, then Indians have more reason to fear their protectors than the nebulous mischief-makers of the cyber -world. Wasting time gathering proof, blocking vaguely suspicious websites, hurling accusations across the border and worrying about bilateral relations are ways of keeping busy with inessentials because one does not quite know what to do about the essentials of a difficult situation. Besides, only a fifth of the 245 websites blocked by the Centre mention the people of the Northeast or the violence in Assam. And if a few morphed images and spurious texts can unsettle an entire



nation, then there is something deeply wrong with the nation and with how it is being governed. This is what its leaders should be addressing immediately, rather than making a wrongheaded display of their powers of censorship.

It is just as absurd, and part of the same syndrome to try to ban Twitter accounts that parody despatches from the Prime Minister's Office. To describe such forms of humour and dissent as "misrepresenting" the PMO — as if Twitterers would take these parodies for genuine despatches from the PMO makes the PMO look more ridiculous than its parodists manage to. With the precedent for such action set recently by the chief minister of West Bengal, this is yet another proof that what Bengal thinks to

day India will think tomorrow. Using the cyber -world for flexing the wrong muscles is essentially not funny. It might even prove to be quite dangerously distracting.

41. According to the passage, the cyber-world is

- (1) beyond the imagination of people
- (2) outside the purview of common people
- (3) not to be governed
- (4) ungovernable

**Solution:4**

42. The author is of the opinion that

- (1) the centre should start negotiations with Google, Twitter and Facebook
- (2) the centre should help the citizens evacuate their city
- (3) the centre should not block the sites
- (4) the centre should arrest the guilty

**Solution:3**

43. Which of the following is closest to the meaning of 'nebulous'?

- (1) confused
- (2) vague
- (3) iridescent
- (4) glowing

**Solution:2**

44. The author's seriousness regarding the situation can best be described in the following sentences. Pick the odd one out.

- (1) Our leaders should display their powers of censorship when needed
- (2) If this is the official idea of prompt action at a time of crisis among communities, then Indians have more reason to fear their protectors than the nebulous mischief-maker of the cyberworld

- (3) The politicians deflect attention from their own incompetence  
 (4) If a few morphed images and spurious texts can unsettle an entire nation, then there is something deeply wrong with the nation

**Solution:1**

45. The word 'spurious' means

- (1) genuine  
 (2) authentic  
 (3) substantial  
 (4) fake

**Solution:4**

46. The author warns us against

- (1) not playing false with the citizens  
 (2) dangers inherent in the cyber-world  
 (3) not using the cyber-world judiciously  
 (4) not protecting the citizens from dangerous politicians

**Solution:1**

47. 'Parody means

- (1) twist  
 (2) jeopardize  
 (3) ridicule  
 (4) imitate

**Solution:4**

48. What is the opposite of 'wrong headed' ?

- (1) silly  
 (2) sane  
 (3) insane  
 (4) insensible

**Solution:2**

49. The passage suggests different ways of keeping the public busy with 'inessentials'. Pick the odd one out.

- (1) By blocking websites which are vaguely suspicious  
 (2) By blaming neighbouring countries across the border  
 (3) By turning the attention of the people to violence in Assam  
 (4) By getting involved in a discourse on bilateral relations

**Solution:3**



50. The following is a list of statements made by the author of the above passage. Pick the odd one out.
- (1) It is absurd to ban Twitter accounts that parody despatches from the Prime Minister's Office
  - (2) 'Twitterers take these parodies for genuine despatches from the PMO
  - (3) To describe such forms of humour as 'misrepresenting' the PMO makes the PMO look more ridiculous
  - (4) The precedent for such action was set recently by the chief minister of West Bengal

**Solution:2**



## QUANTITATIVE APTITUDE

1. The difference of a number consisting of two digits from the number formed by interchanging the digits is always divisible by
- (1) 10
  - (2) 9
  - (3) 11
  - (4) 6

**Solution:2**

(2) Let the number be  $10x + y$   
where  $y < x$ .

Number obtained by interchanging the digits =  $10y + x$

$$\therefore \text{Difference} = 10x + y - 10y - x \\ = 9x - 9y = 9(x - y)$$

Hence, the difference is always exactly divisible by 9.

2. The number 323 has
- (1) three prime factors
  - (2) five prime factors
  - (3) two prime factors
  - (4) no prime factor

**Solution:3**

$$(3) 323 = 17 \times 19$$

3. A tyre has 2 punctures. The first puncture alone would have made the tyre flat in 9 minutes and the second alone would have done it in 6 minutes. If air leaks out at a constant rate, how long does it take both the punctures together to make it flat ?

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

(2)  $3\frac{1}{2}$  minutes

(3)  $3\frac{3}{5}$  minutes

(4)  $4\frac{1}{4}$  minutes

**Solution:3**

(3) Part of the tyre flattened  
by both the punctures in 1  
minute

$$= \frac{1}{9} + \frac{1}{6} = \frac{2+3}{18} = \frac{5}{18}$$

∴ Required time

$$= \frac{18}{5} = 3\frac{3}{5} \text{ minutes}$$

4. If 8 men or 12 boys can do a piece of work in 16 days, the number of days required to complete the work by 20 men and 6 boys is

(1)  $5\frac{1}{3}$

(2)  $6\frac{1}{3}$

(3)  $8\frac{1}{3}$

(4)  $7\frac{1}{3}$

**Solution:1**

$$(1) \therefore 8 \text{ men} \equiv 12 \text{ boys}$$

$$\therefore 4 \text{ men} \equiv 6 \text{ boys}$$

$$\therefore 20 \text{ men} \equiv 30 \text{ boys}$$

$$\therefore 20 \text{ men} + 6 \text{ boys} = 36 \text{ boys}$$

$$\therefore M_1 D_1 = M_2 D_2$$

$$\Rightarrow 12 \times 16 = 36 \times D_2$$

$$\Rightarrow D_2 = \frac{12 \times 16}{36} = \frac{16}{3} = 5\frac{1}{3} \text{ days}$$

5. A and B together can do a piece of work in 12 days which B and C together can do in 16 days. After A has been working at it for 5 days and B for 7 days, C finishes it in 13 days. In how many days B could finish the work ?

(1) 48 days

(2) 24 days

(3) 16 days

(4) 12 days

**Solution:1**

(1) Let the work done by each one of A, B and C per day be  $x$ ,  $y$ , and  $z$  respectively.

$$\therefore x + y = \frac{1}{12}$$

$$\Rightarrow x = \frac{1}{12} - y \quad \dots\dots(i)$$

$$y + z = \frac{1}{16} \Rightarrow z = \frac{1}{16} - y \quad \dots(ii)$$

Again,  $5x + 7y + 13z = 1$

$$\Rightarrow 5\left(\frac{1}{12} - y\right) + 7y + 13\left(\frac{1}{16} - y\right) = 1$$

$$\Rightarrow \frac{5}{12} - 5y + 7y + \frac{13}{16} - 13y = 1$$

$$\Rightarrow 11y = \frac{5}{12} + \frac{13}{16} - 1$$

$$= \frac{20 + 39 - 48}{48} = \frac{11}{48}$$

$$\Rightarrow y = \frac{1}{48}$$

$\therefore$  B alone will complete the work in 48 days.

6. Three circles of radius  $a$ ,  $b$ ,  $c$  touch each other externally. The area of the triangle formed by joining their centres is

(1)  $\sqrt{(a+b+c)abc}$

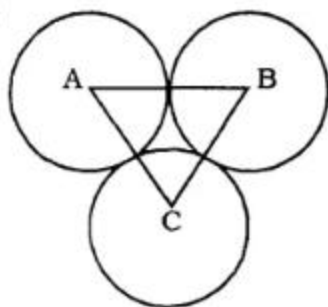
(2)  $(a+b+c)\sqrt{ab+bc+ca}$

(3)  $ab+bc+ca$

(4) None of the above

**Solution:**1

(1)



$$x = AB = a + b$$

$$y = BC = b + c$$

$$z = CA = a + c$$

$$\therefore s = \frac{AB + BC + CA}{2} = a + b + c$$

$$\therefore \text{Area of } \Delta ABC$$

$$= \sqrt{s(s-x)(s-y)(s-z)}$$

$$= \sqrt{(a+b+c)abc}$$

7. If a metallic cone of radius 30 cm and height 45 cm is melted and recast into metallic spheres of radius 5 cm, find the number of spheres.

(1) 81

(2) 41

(3) 80

(4) 40

**Solution:1**



(1) Volume of metallic cone

$$= \frac{1}{3} \pi r^2 h$$

$$= \frac{1}{3} \pi \times 30 \times 30 \times 45 \text{ cu.cm.}$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi R^3$$

$$= \frac{4}{3} \pi \times 5 \times 5 \times 5 \text{ cu. cm.}$$

$\therefore$  Required number of spheres

$$= \frac{\frac{1}{3} \pi \times 30 \times 30 \times 45}{\frac{4}{3} \pi \times 5 \times 5 \times 5}$$

$$= 81$$

8. Chords AB and CD of a circle intersect at E and are perpendicular to each other. Segments AE, EB and ED are of lengths 2 cm, 6 cm and 3 cm respectively. Then the length of the diameter of the circle in cm is

(1)  $\sqrt{65}$

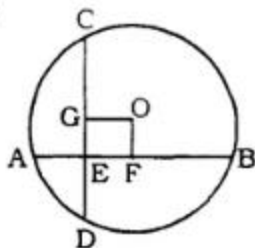
(2)  $\frac{1}{2} \sqrt{65}$

(3) 65

(4)  $\frac{65}{2}$

**Solution:1**

(1)



$$AE = 2 \text{ cm}$$

$$EB = 6 \text{ cm}$$

$$ED = 3 \text{ cm}$$

$$\therefore AE \times EB = DE \times EC$$

$$\Rightarrow EC = \frac{2 \times 6}{3} = 4 \text{ cm}$$

Diameter

$$= \sqrt{7^2 + 4^2} = \sqrt{49 + 16}$$

$$= \sqrt{65} \text{ cm}$$

9. For every set of 19 kites sold, a vendor gives 1 kite extra, free of cost. In order to give a discount of 10%, the number of extra kites he should give in a sale of 27 kites to the nearest integer is

- (1) 3
- (2) 6
- (3) 7
- (4) 8

**Solution:1**

(1) Kites of Rs. 20 are available for Rs. 19.

Hence, discount = 5%

If one gets kites of Rs. 20 for Rs. 18, discount = 10%

$\therefore$  Required answer

$$= \frac{2}{20} \times 27 \approx 3$$

10. A ruby stone was bought for Rs. 1600 at Jaipur. A sum of Rs. 2400 was spent on making a ring with the ruby stone. It was advertised for sale at Bombay for Rs. 7800. If a discount of 10% was given, then the % profit made was

- (1) 55%
- (2) 68.5%
- (3) 75.5%
- (4) 80%

**Solution:3**

$$\begin{aligned} \text{(3) Actual C.P.} &= 1600 + 2400 \\ &= \text{Rs. } 4000 \end{aligned}$$

$$\text{S.P.} = \frac{7800 \times 90}{100} = \text{Rs. } 7020$$

$\therefore$  Gain per cent

$$= \frac{7020 - 4000}{4000} \times 100 = 75.5\%$$

11. A shopkeeper buys an article for Rs. 450. He marks it at 20% above the cost price. Find the percentage discount given by him if he sells the article for Rs. 496.80.

- (1) 8%
- (2) 9%
- (3) 10%
- (4) 12%

**Solution:1**

$$(1) \text{ Marked price} = \frac{450 \times 120}{100}$$

$$= \text{Rs. } 540$$

$$\text{S.P.} = \text{Rs. } 496.80$$

$$\text{Discount} = 540 - 496.80$$

$$= \text{Rs. } 43.20$$

If discount per cent be  $x$ , then

$$\frac{540 \times x}{100} = 43.20$$

$$\Rightarrow x = \frac{43.20 \times 100}{540} = 8\%$$

12. The area of a circle is proportional to the square of its radius. A small circle of radius 3 cm is drawn within a larger circle of radius 5 cm. Find the ratio of the area of the annular zone to the area of the larger circle. (Area of the annular zone is the difference between the area of the larger circle and that of the smaller circle).

(1) 9 : 16

(8) 9 : 25

(3) 16 : 25

(4) 16 : 27

**Solution:**

(3)



$$\text{Area of circle} = k r^2$$

$$\text{Area of shaded region}$$

$$= k (5^2 - 3^2) = 16\pi \text{ sq. units}$$

$$\text{Area of larger circle} = k \times 5^2$$

$$= 25\pi \text{ sq. units}$$

$$\therefore \text{ Required ratio} = 16 : 25$$

13. A man invested  $\frac{1}{3}$  of his capital at 7%,  $\frac{1}{4}$  at 8% and the remainder at 10%. If his annual income is Rs. 561, the capital is
- (1) Rs. 5400
  - (2) Rs. 6000
  - (3) Rs. 6600
  - (4) Rs. 7200

**Solution:3**

(3) Let the total capital be Rs.

$x$ ,

$$\therefore \frac{x}{3} \times \frac{7}{100} + \frac{x}{4} \times \frac{8}{100} + \left(x - \frac{x}{3} - \frac{x}{4}\right) \times \frac{10}{100} = 561$$

$$\Rightarrow \frac{7x}{3} + 2x + \frac{50x}{12} = 56100$$

$$\Rightarrow \frac{28x + 24x + 50x}{12} = 56100$$

$$\Rightarrow 102x = 56100 \times 12$$

$$\Rightarrow x = \frac{56100 \times 12}{102} = \text{Rs. } 6600$$

14. The average age of Ram and his two children is 17 years and the average age of Ram's wife and the same children is 16 years. If the age of Ram is 33 years, the age of his wife is (in years):
- (1) 31
  - (2) 32
  - (3) 35
  - (4) 30

**Solution:4**

$$\begin{aligned}
 & \therefore (4) \text{ Ram} + \text{two children} = 51 \\
 & \text{years} \\
 & \text{His wife} + \text{two children} \\
 & = 48 \text{ years} \\
 & \therefore \text{Ram} - \text{wife} = 3 \text{ years} \\
 & \Rightarrow 33 - \text{wife} = 3 \text{ years} \\
 & \therefore \text{Wife} = 33 - 3 = 30 \text{ years}
 \end{aligned}$$

15. A man's pension on retirement from service is equal to half the average salary during last 3 years of his service. His salary from 1-1-1983 is Rs. 380 per month with increment of Rs. 40 due on 1-10-83, 1-10-84 and 1-10-85, If he retires on 1-1-86, what pension does he draw ?
- (1) Rs. 205
  - (2) Rs. 215
  - (3) Rs. 225
  - (4) Rs. 230

**Solution:2**

$$\begin{aligned}
 & (2) \text{ Total salary of 3 years} \\
 & = \text{Rs. } (380 \times 9 + 420 \times 12 + \\
 & 460 \times 12 + 500 \times 3) \\
 & = \text{Rs. } (3420 + 5040 + 5520 + \\
 & 1500) \\
 & = \text{Rs. } 15480
 \end{aligned}$$

**Average monthly salary**

$$= \frac{15480}{36} = \text{Rs. } 430$$

**$\therefore$  Amount of pension**

$$= \frac{430}{2} = \text{Rs. } 215$$



16. A person bought 76 cows and sold 20 cows at 15% profit, 40 cows at 19% profit and remaining 16 cows at 25% profit and got a profit of Rs. 6570 as a whole. The cost price of each cow is
- (1) Rs. 450
  - (2) Rs. 425
  - (3) Rs. 420
  - (4) Rs. 400

**Solution:**

(1) If the C.P. of each cow be Rs.  $x$ , then

$$20 \times \frac{15x}{100} + \frac{40 \times 19x}{100} + \frac{16 \times 25x}{100}$$

$$= 6570$$

$$\Rightarrow 300x + 760x + 400x$$

$$= 6570 \times 100$$

$$\Rightarrow 1460x = 6570 \times 100$$

$$\Rightarrow x = \frac{6570 \times 100}{1460} = \text{Rs. } 450$$

17. One side of a square is increased by 30%. To maintain the same area, the other side will have to be decreased by

(1)  $23\frac{1}{13}\%$

(2)  $76\frac{12}{13}\%$

(3) 30%

(4) 15%

**Solution:**

(1) If the required percentage be  $x$ , then

$$30 - x - \frac{30x}{100} = 0$$

$$\Rightarrow 300 - 10x - 3x = 0$$

$$\left( \begin{array}{c} \text{Percentage} \\ \text{Effect} \\ = \left( x + y + \frac{xy}{100} \right) \% \end{array} \right)$$

$$\Rightarrow 13x = 300$$

$$\Rightarrow x = \frac{300}{13} = 23\frac{1}{13} \%$$

18. Ram travelled 1200 km by air which formed  $\frac{2}{5}$  of his trip. He travelled one-third of the trip by car and the rest by train. The distance (in km) travelled by train was
- (1) 480
  - (2) 800
  - (3) 1600
  - (4) 1800

**Solution:2**

.(2) Total distance of trip

$$= \frac{1200 \times 5}{2}$$

$$= 3000 \text{ km}$$

Part of journey covered by train

$$= 1 - \frac{2}{5} - \frac{1}{3} = \frac{15 - 6 - 5}{15} = \frac{4}{15}$$

∴ Distance covered by train

$$= 3000 \times \frac{4}{15} = 800 \text{ km}$$

19. A policeman goes after a thief who has 100 metres start, if the policeman runs a kilometre in 8 min, and the thief a km in 10 min, the distance covered by thief before he is over-powered is
- (1) 350 m
  - (2) 400 m
  - (3) 320 m
  - (4) 420 m

**Solution:2**

**1. (2) Relative speed**

$$= \frac{1000}{8} - \frac{1000}{10}$$

$$\frac{5000 - 4000}{40} = \frac{1000}{40} \text{ m/minute}$$

∴ Required time

$$= \frac{100}{\frac{1000}{40}} = \frac{4000}{1000} = 4 \text{ m/minutes}$$

∴ Distance covered by the thief

$$= \frac{1000}{10} \times 4 = 400 \text{ metre.}$$

20. A man borrows Rs. 21000 at 10% compound interest. How much he has to pay equally at the end of each year, to settle his loan in two years ?

- (1) Rs. 12000
- (2) Rs. 12100
- (3) Rs. 12200
- (4) Rs. 12300

**Solution:2**

(2) If each instalment be Rs.  $x$ , then

Present worth of first instalment

$$= \frac{x}{1 + \frac{10}{100}} = \frac{10x}{11}$$

Present worth of second instalment

$$= \frac{x}{\left(1 + \frac{10}{100}\right)^2} = \frac{100}{121}x$$

$$\therefore \frac{10}{11}x + \frac{100}{121}x = 21000$$

$$\Rightarrow \frac{110x + 100x}{121} = 21000$$

$$\Rightarrow 210x = 21000 \times 121$$

$$\Rightarrow x = \frac{21000 \times 121}{210}$$

$$= \text{Rs. } 12100$$

21. If  $\frac{4 + 3\sqrt{3}}{\sqrt{7} + 4\sqrt{3}} = A + \sqrt{B}$ , then

(1) -13

(2)  $2\sqrt{13}$

(3) 13

(4)  $3\sqrt{3} - \sqrt{7}$

**Solution:**3



$$\therefore (3) \sqrt{7+4\sqrt{3}} = \sqrt{7+2 \times 2 \times \sqrt{3}}$$

$$= \sqrt{4+3+2 \times 2 \times \sqrt{3}}$$

$$= \sqrt{(2+\sqrt{3})^2} = 2+\sqrt{3}$$

$$\therefore \frac{4+3\sqrt{3}}{2\sqrt{3}} = A + \sqrt{B}$$

$$\Rightarrow \frac{(4+3\sqrt{3})(2-\sqrt{3})}{(2+\sqrt{3})(2-\sqrt{3})} = A + \sqrt{B}$$

$$\Rightarrow \frac{8-4\sqrt{3}+6\sqrt{3}-9}{4-3} = A + \sqrt{B}$$

$$\Rightarrow 2\sqrt{3}-1 = A + \sqrt{B}$$

$$\Rightarrow A = -1 \text{ and } \sqrt{B} = 2\sqrt{3}$$

$$\Rightarrow B = 2\sqrt{3} \times 2\sqrt{3} = 12$$

$$\therefore B-A = 12+1 = 13$$

If the expression  $x^2 + x + 1$  is written in the form

22.  $\left(x + \frac{1}{2}\right)^2 + q^2$ , then the possible values of  $q$  are

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

$$(2) \pm \frac{\sqrt{3}}{2}$$

$$(3) \pm \frac{2}{\sqrt{3}}$$

$$(4) \pm \frac{1}{2}$$

**Solution:2**

$$(2) \quad x^2 + x + 1$$

$$= x^2 + 2 \cdot x \cdot \frac{1}{2} + \frac{1}{4} + \frac{3}{4}$$

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

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

$$= \left(x + \frac{1}{2}\right)^2 + q^2$$

$$\Rightarrow q = \pm \frac{\sqrt{3}}{2}$$

If  $a^2 - 4a - 1 = 0$ , then value

23. of  $a^2 + \frac{1}{a^2} + 3a - \frac{3}{a}$  is

(1) 25

(2) 30

(3) 35

(4) 40

**Solution:2**

$$(2) a^2 - 4a - 1 = 0$$

$$\Rightarrow a^2 - 1 = 4a$$

On dividing by  $a$ , we have

$$a - \frac{1}{a} = 4$$

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

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

$$= 16 + 2 + 3(4) = 30$$

If  $x = \sqrt[3]{a + \sqrt{a^2 + b^3}} +$

24.  $\sqrt[3]{a - \sqrt{a^2 + b^3}}$ , then  $x^3 + 3bx$  is equal to

(1) 0

(2) a

(3) 2a

(4) 1

**Solution:3**

$$\cdot (3) \quad x = \sqrt[3]{a + \sqrt{a^2 + b^3}} +$$

$$\sqrt[3]{a - \sqrt{a^2 + b^3}}$$

Cubing both sides,

$$x^3 = \left( \sqrt[3]{a + \sqrt{a^2 + b^3}} \right)^3 -$$

$$\left( \sqrt[3]{a - \sqrt{a^2 + b^3}} \right)^3$$

$$+ 3 \left( \sqrt[3]{a + \sqrt{a^2 + b^3}} \right)$$

$$\left( \sqrt[3]{a - \sqrt{a^2 + b^3}} \right) \left( \sqrt[3]{a + \sqrt{a^2 + b^3}} + \sqrt[3]{a - \sqrt{a^2 + b^3}} \right)$$

$$= a + \sqrt{a^2 + b^3} + a - \sqrt{a^2 + b^3}$$

$$+ 3 \left( \frac{a + \sqrt{a^2 + b^3}}{a - \sqrt{a^2 + b^3}} \times \frac{a + \sqrt{a^2 + b^3}}{a + \sqrt{a^2 + b^3}} \right)$$

$$= 2a + 3(a^2 - a^2 - b^3)^{\frac{1}{3}} x$$

$$= 2a + (-3bx)$$

$$\therefore x^3 + 3bx = 2a$$

25. If  $x^2 - y^2 = 80$  and  $x - y = 8$ , then the average of  $x$  and  $y$  is

(1) 2

(2) 3

(3) 4

(4) 5

**Solution:** 4