

SSC GRADUATE LEVEL TIER-I EXAM (MORNING SHIFT) , 21-04-2013 – PREVIOUS YEAR PAPER

GENERAL AWARENESS

1. Indira Gandhi Prize for Peace, Disarmament and Development – 2012 was awarded to :

- (1) Sunita Williams
- (2) Chanda Kochhar
- (3) Ellen Johnson Sirleaf
- (4) Tereza Fajksova

Solution:3

2. In dicots the pollen-grains possess :

- (1) two germ pores
- (2) three germ pores
- (3) four germ pores
- (4) one germ pore

Solution:2

3. Acceptable "Noise Pollution Level" in India range between:

- (1) 16 – 35 dec
- (2) 40 – 45 dec
- (3) 70 – 100 dec
- (4) 10.- 15 dec

Solution:2

4. Externality theory is the basic theory of the following branch of Economics:

- (1) Environomics
- (2) Fiscal Economics
- (3) International Economics
- (4) Macro Economics

Solution:1

5. Multi-purpose river valley projects are the "New temples of modern India".
The above statement is made by :

- (1) Motilal Nehru
- (2) Mahatma Gandhi
- (3) Rajiv Gandhi
- (4) Jawaharlal Nehru

Solution:4

6. What type of information system would be recognised by digital circuits ?

- (1) Binary system
- (2) Both hexadecimal and binary system
- (3) Only Roman system
- (4) Hexadecimal system

Solution:1

7. Who was not a politician ?

- (1) I.K. Gujral
- (2) S.L. Bahuguna
- (3) J. Jayalalitha
- (4) H.N. Bahuguna

Solution:2

8. Who gave the title of "Mahamana" to Madan Mohan Malviya ?

- (1) Dada Bhai Naurozi
- (2) Gopal Krishna Gokhale
- (3) Mahatma Gandhi
- (4) Bal Gangadhar Tilak

Solution:3

9. First Hindu-American to enter in the US House of Representative as senator is :

- (1) Sunita Williams
- (2) Jyoti Sengupta
- (3) Ami Hera
- (4) Tulsi Gabbard

Solution:4

10. Pick out the correct match:

- (1) Fleshy foods – Calcium and Protein
- (2) Fish – Starch and Vitamin
- (3) Milk – Fibre and Minerals
- (4) Egg yolk – Protein and Fat

Solution:4

11. Who was the Viceroy at the time of Quit India Movement ?

- (1) Lord Mountbatten
- (2) Lord Wavell
- (3) Lord Lin Lithgow
- (4) Lord Irwin

Solution:3

12. Expand the term IPCC

- (1) International Panel of Climate Control
- (2) Interim Panel of Climate Change
- (3) Intergovernmental Panel on Climate Change
- (4) International Pollution Control Council

Solution:3

13. Who described the Government of India Act, 1935 as a new charter of bondage ?

- (1) Mahatma Gandhi
- (2) Rajendra Prasad
- (3) Pt. Jawaharlal Nehru
- (4) B.R. Ambedkar

Solution:3

14. Endosulfan spray on cashew crop resulted in the pollution to the tune of tragedy in :

- (1) Kerala
- (2) Andhra Pradesh
- (3) Karnataka
- (4) Tamil Nadu

Solution:1

15. "Functional Finance" is associated with :

- (1) Adolph Wogner
- (2) Adam Smith
- (3) Adams
- (4) Abba 'P' Lerner

Solution:4

16. 'Farad' is the unit of :

- (1) Capacitance
- (2) Inductance
- (3) Resistance

(4) Conductance

Solution:1

17. Which of the following is an impact printer ?

- (1) Ink-jet printer
- (2) Bubble jet printer.
- (3) Laser printer
- (4) Daisy wheel printer

Solution:4

18. The percentage of nitrogen present in ammonium sulphate is :

- (1) 27%
- (2) 25%
- (3) 30.5%
- (4) 18%

Solution:1

19. Identify the odd term amongst the following group :

- (1) Optical fibre
- (2) Twisted pair wire
- (3) Microwaves
- (4) Coaxial cable

Solution:3

20. Who was the other Congress leader who joined with Motilal Nehru to start the Swaraj Party in 1923 ?

- (1) B.G. Tilak
- (2) Chittaranjan Das
- (3) M.K. Gandhi
- (4) G.K. Gokhale

Solution:2

21. In which part of the Indian Constitution, the fundamental duties are enshrined ?

- (1) IV A
- (2) IV B
- (3) V
- (4) IV

Solution:1

22. Who of the following enjoys the rank of Cabinet Minister in Union Cabinet ?

- (1) Judge of Supreme Court
- (2) Secretary to Government of India
- (3) Political Advisor to PM
- (4) Deputy Chairman of Planning Commission

Solution:4

23. India and Japan inked two agreements during November 2012 to enable Tokyo to import from India :

- (1) Rare earth minerals
- (2) Basmati type rice
- (3) Rubber based products
- (4) Leather goods

Solution:1

24. Aung San Sun Kyi is a native to:

- (1) China
- (2) Myanmar
- (3) Arunachal Pradesh
- (4) Tibet

Solution:2

25. DPT vaccine is administered to prevent diseases like:

- (1) Diphtheria, Pertussis and Tetanus
- (2) Dengue, Pertussis and Typhoid
- (3) Dengue, Polio and Tetanus
- (4) Diphtheria, Pertussis and Typhoid

Solution:1

26. The WISE Prize-2012, also known as the "Nobel Prize for Education" was conferred by the WISE Summit in Doha on :

- (1) Dr. Madhav Chavan
- (2) Dr. Yash Pal
- (3) Dr. M.S. Swaminathan
- (4) Dr. APJ Abdul Kalam

Solution:1

27. Diamonds are priced higher than water because :

- (1) they are sold by selected firms with monopolistic powers.
- (2) their marginal utility to buyers is higher than that of water.
- (3) their total utility to buyers is higher than that of water.

(4) consumers do not buy them at lower prices.

Solution:2

28. Ethanol containing 5% water is known as :

- (1) Dilute alcohol
- (2) Power alcohol
- (3) Rectified spirit
- (4) Absolute alcohol

Solution:3

29. Of the following land uses, which is restricted to Special Economic Zones ?

- (1) Educational Institutions
- (2) Free trade Centres
- (3) Marketing Centres
- (4) Information Technology Companies

Solution:2

30. The eastward continuation of the Brazil current is called:

- (1) South Atlantic drift
- (2) Counter Equatorial drift
- (3) West Atlantic drift
- (4) North Atlantic drift

Solution:1

31. The most powerful woman in business in India as rated by the "Fortune" for the year 2012 is :

- (1) Prabha Pararneswaran
- (2) Debjani Ghosh
- (3) Anjali Bansal
- (4) Chanda Kochhar

Solution:4

32. Communication satellites are used to :

- (1) receive communication signal only
- (2) receive and yedirect communication signal
- (3) provide information of natural resources only
- (4) transmit communication signal only

Solution:2

33. What is the first sermon of Buddha called as ?

- (1) Brahmajalasutta
- (2) Dhammachakkapabattanasutta
- (3) Kachchayanagottasutta
- (4) Mahaparinirvansutta

Solution:2

34. Where are the Todas found ?

- (1) Tamil Nadu
- (2) Rajasthan
- (3) Arunachal Pradesh
- (4) Madhya Pradesh

Solution:1

35. The "One Straw Revolution" was written by :

- (1) Richael Carlson
- (2) M.S. Swaminathan
- (3) Norman Borlaug
- (4) Masanobu Fukuoka

Solution:4

36. Who wrote the book "Why Socialism" ?

- (1) Mahatma Gandhi
- (2) Acharya Narendra Dev
- (3) M.N. Roy
- (4) Jayaprakash Narayan

Solution:4

37. Hypothermia occurs due to loss of excessive heat from body due to sudden low body temperature in:

- (1) Frogs
- (2) Human beings
- (3) Lizards
- (4) Snakes

Solution:2

38. The disease that has been eradicated from the world is:

- (1) Leprosy
- (2) Poliomyelitis
- (3) Chicken pox
- (4) Small pox

Solution:4

39. The vacancy of the office of the President must be filled within :

- (1) 6 months
- (2) 12 months
- (3) 1 month
- (4) 3 months

Solution:1

40. Non Resident Indians (NRI) Day is marked on:

- (1) January 9
- (2) January 17
- (3) January 19
- (4) January 7

Solution:1

41. Blood is a:

- (1) connective tissue
- (2) epithelial tissue
- (3) muscular tissue
- (4) reproductive tissue

Solution:1

42. The natural disaster in which carbon-di-oxide suddenly erupts from a deep lake water is known as

- (1) Lacustrine
- (2) Fluvial
- (3) Glacial
- (4) Limnic

Solution:4

43. Steel is more elastic than rubber because it :

- (1) requires larger deforming force
- (2) is never deformed
- (3) is deformed very easily
- (4) is harder than rubber

Solution:3

44. The hormone used as an oral contraceptive is :

- (1) Cortisone

- (2) Progesterone
- (3) Testosterone
- (4) Aldosterone

Solution:2

45. Transboundary pollution (or) Acid rain is caused by :

- (1) Carbon monoxide
- (2) Carbon dioxide
- (3) Hydrocarbon
- (4) Nitrogen oxide and sulphur dioxide

Solution:4

46. Stains of rust on clothes can be removed by :

- (1) Oxalic acid
- (2) Petrol
- (3) Alcohol
- (4) H_2O_2

Solution:1

47. From which of the following banks did Madan Mohan Malaviya take loans for financing "The Hindustan Times" ?

- (1) Punjab National Bank
- (2) Bank of Maharashtra
- (3) Bank of Baroda
- (4) State Bank of India

Solution:1

48. Which of the following is an endemic species ?

- (1) Horn bill
- (2) Indian Rhino
- (3) Pink head duck
- (4) Nicobar pigeon

Solution:1

49. Blood group was discovered by :

- (1) William Harvey
- (2) Landsteiner
- (3) Pavlov
- (4) Alexander Fleming

Solution:2

50. "Whether I earned your vote or not, I have listened to you, have learned from you. You have made me a better President", as said by:
- (1) Barack Obama
 - (2) George Bush
 - (3) APJ Abdul Kalam
 - (4) Pranab Mukherjee

Solution:1



ENGLISH COMPREHENSION

Directions (1-5) : 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 your answer. If a sentence is free from error, then your answer is (4) i.e. No error.

1. My sister asked me/(1) that how long (2)/ I would stay there. (3)/ No Error. (4)

Solution:2

2. The teacher. as well as the students, (1) have gone on an excursion (2)/ to Ooty during their summer vacation. (3)/ No Error. (4)

Solution:2

3. The US (1)/ don't want (2)/India in the Security Council. (3) / No Error. (4)

Solution:1

4. The cruel lady made (1)/her step daughter to do (2)/ all the household chores. (3)/ No Error. (4)

Solution:2

5. You can eat (1)/as much as you like (2)/at the newly lunch bar. (3)/ No Error. (4)

Solution:3

Directions (6-10) : In the following questions, sentences are given with blanks to be filled with an appropriate word(s). Four alternatives are suggested for each question. Choose the correct alternative out of the four.

6.the people looked well enough, but when one looked more closely one saw that their faces were filled with despair.

- (1) At first looking
- (2) At first observation
- (3) On first sight
- (4) At first sight

Solution:4

7. He was assured by his friendsevery type of help, in an emergency.

- (1) by
- (2) of
- (3) with
- (4) about

Solution:2

8. The work..... , he left his office.

- (1) having completed
- (2) having been completed
- (3) on being finished
- (4) having been over

Solution:2

9. Our monthly expenditure..... by five hundred rupees when we decided to buy milk from the milkman.

- (1) shot up
- (2) got up
- (3) lifted up
- (4) grew up

Solution:1

10. He was not a man..... intelligence.

- (1) lacking of
- (2) devoid of
- (3) absent of
- (4) empty of

Solution:2

Directions (11-13): In the following questions, out of the four alternatives, choose the one which best expresses the meaning of the given word.

11. Students are asked to **collate** for an important programme by the principal.

- (1) describe
- (2) narrate
- (3) prescribe
- (4) assemble

Solution:4

12. **Advocate**

- (1) pronounce
- (2) support
- (3) determine
- (4) predict

Solution:2

13. Preamble

- (1) mediation
- (2) conclusion
- (3) introduction
- (4) definition

Solution:3

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

14. Wary

- (1) conscientious
- (2) daring
- (3) thrifty
- (4) rash

Solution:4

15. Ambiguous

- (1) plain
- (2) clear
- (3) simple
- (4) easy

Solution:2

16. Accolade

- (1) blame
- (2) reticent
- (3) decorate
- (4) permeate

Solution:1

Directions (17-21) : In the following questions, four alternatives are given for the Idiom/ Phrase printed in **bold**. Choose the alternative which best expresses the meaning of the Idiom/Phrase.

17. To play second fiddle.

- (1) to reduce the importance of one's senior
- (2) take a subordinate role
- (3) to do back seat driving
- (4) to be happy, cheerful and healthy

Solution:2

18. Mary broke a dining-room window and had to **face the music** when her father got home.
- (1) listen carefully
 - (2) ask a lot of questions
 - (3) listen to music
 - (4) accept the punishment

Solution:4

19. Villagers always call **a spade a spade**.
- (1) to speak in a straightforward manner
 - (2) to call someone a spade
 - (3) to speak ill about someone
 - (4) to speak about spades

Solution:1

20. I am out of my wits and therefore cannot find a way to solve the problem immediately.
- (1) greatly confused
 - (2) helpless without power
 - (3) totally ignorant
 - (4) not intelligent enough

Solution:1

21. Why are you jumping down my throat ? I wasn't even in the house when it happened.
- (1) making a joke
 - (2) scolding me
 - (3) forcing me to cat
 - (4) running away

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. He may have grown taller **when I last saw him**.
- (1) from when I last saw him
 - (2) since I last saw him
 - (3) before I last saw him
 - (4) No improvement

Solution:2

23. While crossing the highway, a five year **old** child was knocked out by a passing car.
- (1) away
 - (2) up
 - (3) down
 - (4) No improvement

Solution:3

24. We are **looking forward to see** you tomorrow.
- (1) looking forward towards seeing
 - (2) looking forward for seeing
 - (3) looking forward to seeing
 - (4) No improvement

Solution:3

25. The clients **are waiting** outside since morning and will continue to wait until you meet them.
- (1) have waited
 - (2) have been waiting
 - (3) were waiting
 - (4) No improvement

Solution:2

26. The workers **are hell bent at getting** what is due to them.
- (1) hell bent on getting
 - (2) hell bent for getting
 - (3) hell bent upon getting
 - (4) No improvement

Solution:1

27. During his long discourse, he did not **touch** that point.
- (1) touch upon
 - (2) touch in
 - (3) touch of
 - (4) No improvement

Solution:1

28. They could not tell me **why did he not eat** his lunch.
- (1) why not had he eaten

- (2) why he did not eat
- (3) why had he not eaten
- (4) No improvement

Solution:2

29. He **who will bid the highest** will get the product.

- (1) who bids the highest
- (2) who the highest bids
- (3) who would bid the highest
- (4) No improvement

Solution:1

30. If he **had** time he will call you.

- (1) would have
- (2) would have had
- (3) has
- (4) No improvement

Solution:3

31. John **had fold** me that he hasn't done it yet.

- (1) told
- (2) tells
- (3) was telling
- (4) No improvement

Solution:2

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

32. A general pardon granted by the Government to political offenders

- (1) Excuse
- (2) Honesty
- (3) Amnesty
- (4) Pardon

Solution:3

33. One who hates women

- (1) Misogamist
- (2) Ambivert
- (3) Misanthrope
- (4) Misogynist

Solution:4

34. One who cannot be corrected

- (1) Incurable
- (2) Hardened
- (3) Invulnerable
- (4) Incurable

Solution:1

35. A school boy who cuts classes frequently is a

- (1) Sycophant
- (2) truant
- (3) Martinet
- (4) Defeatist

Solution:2

36. Detailed plan of a journey

- (1) Travel kit
- (2) Schedule
- (3) Itinerary
- (4) Travelogue

Solution:3

37. Stealing of ideas or writings of someone else

- (1) scepticism
- (2) mesmerism
- (3) plagiarism
- (4) autism

Solution:3

38. A person who consumes human flesh

- (1) Javage
- (2) Captor
- (3) Carnivore
- (4) Cannibal

Solution:4

Directions (39-40) : 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.

39. The laboratories arewith high-tech electronic gadgets.
- (1) equipped
 - (2) equiuped
 - (3) equepped
 - (4) equipped

Solution:4

40. Software companies have ushered in..... culture along with advanced technology.
- (1) foreegn
 - (2) forigen
 - (3) foreign
 - (4) foriegn

Solution:3

Directions (191-200) : In the following questions, you have two passages with 5 questions in each passage. Read the passages carefully and choose the best answer to each question out of the four alternatives.

PASSAGE -1

(Q.Nos. 41 to 45)

The World Health Organisation is briefly called W.H.O. It is a specialised agency of the United Nations and was established in 1948.

International health workers can be seen working in all kinds of surroundings: in deserts, jungles, mountains, coconut groves, and rice fields. They help the sick to attain health and the healthy to maintain their health.

This global health team assists the local health workers in stopping the spread of what are called communicable diseases, like cholera. These diseases can spread from one country to another and so can be a threat to world health.

W.H.O. assists different national health authorities not only in controlling diseases but also in preventing them altogether. Total prevention of diseases is possible in a number of ways. Everyone knows how people, particularly children, are vaccinated against one disease or another. Similarly, most people are familiar with the spraying of houses with poisonous substances which kill disease-carrying insects.

41. "It is a **specialised** agency of the United Nations and was established in 1948." Here specialised means :
- (1) expert
 - (2) extraordinary
 - (3) uncommon
 - (4) made suitable for a particular purpose

Solution:1

42. "Total prevention of diseases is possible in a number of ways". The author has given illustrations of :
- (1) only two such ways
 - (2) only one such way
 - (3) more than two such ways
 - (4) none of these ways

Solution:1

43. "International health workers can be seen working in all kinds of surroundings : in deserts, jungles, mountains, coconut groves, and rice fields". Here International means:
- (1) drawn from all countries of the world
 - (2) believing in cooperation among nations
 - (3) belonging to an organisation which has something to do with different nations.
 - (4) belonging to the whole world

Solution:3

44. "W.H.O. assists different national health authorities not only in controlling diseases but also in preventing them, altogether". The above sentence implies that:
- (1) W.H.O. assists more in preventing diseases than in controlling them.
 - (2) W.H.O. assists in controlling diseases only if they have not been prevented.
 - (3) W.H.O. assists both in controlling diseases and in preventing them.
 - (4) W.H.O. assists many others in addition to the national health authorities

Solution:3

45. "They help the sick to attain health and the healthy to maintain their health". Here they stands for :
- (1) rice fields
 - (2) international health workers
 - (3) jungles
 - (4) deserts

Solution:2

PASSAGE-II

(Q. Nos. 46 to 50)

Why don't I have a telephone? Not because I pretend to be wise or pose as unusual. There are two chief reasons; because I don't really like the telephone, and because I find I can still work and play, eat, breathe, and sleep without it. Why don't I like the telephone? Because I think it is a pest and time waster. It may create unnecessary suspense and anxiety, as when you wait for an expected call,

that doesn't come; or irritating delay, as when you keep ringing a number that is always engaged. As for speaking in a public telephone booth, it seems to me really horrible. You would not use it unless you were in a hurry, and because you are in a hurry, you will find other people waiting before you. When you do get into the booth, you are half suffocated by the stale, unventilated air, flavoured with cheap face-powder and chain smoking; and by the time you have begun your conversation your back is chilled by the cold looks of somebody who is moving about restlessly to take your place.

If you have a telephone in your house, you will admit that it tends to ring when you least want it to ring: when you are asleep, or in the middle of a meal or a conversation, or when you are just going out, or when you are in your bath. Are you strong minded enough to ignore it, to say to yourself. "Ah well, it will be all the same in hundred years time". You are not. You think there may be some important news or message for you. Have you never rushed dripping from the bath, of chewing from the table, or dazed from bed, only to be told that you are a wrong number? You were told the truth. In my opinion all telephone numbers are wrong numbers. If of course, your telephone rings and you decide not to answer it, then you will have to listen to an idiotic bell ringing and ringing in what is supposed to be the privacy of your own home. You might as well buy a bicycle bell and ring it yourself.

46. The author does not have a telephone because

- (1) he poses as unusual
- (2) he would prefer to do something else
- (3) he thinks that it can create unnecessary suspense and anxiety.
- (4) he pretends to be wise

Solution:3

47. '.....your back is chilled by the cold looks of somebody' means:

- (1) you feel cold at the back
- (2) you feel uneasy because the person next in the queue looks at you restlessly
- (3) people are very cold
- (4) others look at you angrily

Solution:2

48. 'All telephone numbers are wrong numbers', because:

- (1) the author always gets wrong calls
- (2) whenever he tries it always goes wrong.
- (3) he doesn't give much importance to telephone and telephone numbers.
- (4) none of the statements given above.

Solution:4

49. 'Ah well, it will be all the same in hundred years time'. This sentence means :
- (1) Things have not changed for the past 100 years.
 - (2) Things will remain the same for 100 years to come.
 - (3) One should be strong minded.
 - (4) Nothing is going to change even if you don't answer the telephone bell.

Solution:4

50. He hates speaking in a public telephone booth because:
- (1) he is suffocated by the stale, unventilated air, flavoured with cheap face powder and chain-smoking.
 - (2) others look at him angrily
 - (3) the other side may not know your number
 - (4) it is costlier

Solution:1



QUANTITATIVE APTITUDE

1. A person distributes his pens among four friends A, B, C, D in the ratio $1/3 : 1/4 : 1/5 : 1/6$. What is the minimum number of pens that the person should have?
- (1) 57
(2) 65
(3) 75
(4) 45

Solution:1

(1) A : B : C

$$= \frac{1}{3} : \frac{1}{4} : \frac{1}{5} : \frac{1}{6}$$

$$= \frac{1}{3} \times 60 : \frac{1}{4} \times 60 : \frac{1}{5} \times 60 : \frac{1}{6} \times 60$$

[LCM of 3, 4, 5 & 6 = 60]

$$= 20 : 15 : 12 : 10$$

∴ Minimum number of pens

$$= 20 + 15 + 12 + 10 = 57$$

2. If $x \neq 0$, $y \neq 0$ and $z \neq 0$ and

$$\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = \frac{1}{xy} + \frac{1}{yz} + \frac{1}{zx},$$

then the relation among x, y, z is

- (1) $x + y + z = 0$
(2) $x + y = z$

(3) $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$

- (4) $x = y = z$

Solution:4

(4) If $x = y = z$, then

$$\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} = \frac{3}{x^2}$$

and

$$\frac{1}{xy} + \frac{1}{yz} + \frac{1}{zx}$$

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

3. If $a \sin \theta + b \cos \theta = c$ then the value of $a \cos \theta - b \sin \theta$ is :

(1) $\pm \sqrt{-a^2 + b^2 + c^2}$

(2) $\pm \sqrt{a^2 + b^2 - c^2}$

(3) $\pm \sqrt{a^2 - b^2 - c^2}$

(4) $\pm \sqrt{a^2 - b^2 + c^2}$

Solution:2

(2) $a \sin \theta + b \cos \theta = c \dots(i)$

$a \cos \theta - b \sin \theta = x \dots(ii)$

Squaring both the equations and adding,

$$a^2 \sin^2 \theta + b^2 \cos^2 \theta + 2 ab \sin \theta \cdot \cos \theta + a^2 \cos^2 \theta + b^2 \sin^2 \theta - 2ab \sin \theta \cdot \cos \theta = c^2 + x^2$$

$$\Rightarrow a^2 \sin^2 \theta + a^2 \cos^2 \theta + b^2 \cos^2 \theta + b^2 \sin^2 \theta = c^2 + x^2$$

$$\Rightarrow a^2 (\sin^2 \theta + \cos^2 \theta) + b^2 (\cos^2 \theta + \sin^2 \theta) = c^2 + x^2$$

$$\Rightarrow a^2 + b^2 = c^2 + x^2$$

$$\Rightarrow x^2 = a^2 + b^2 - c^2$$

$$\Rightarrow x = \pm \sqrt{a^2 + b^2 - c^2}$$

4. If $x = a \sec \theta \cos \Phi$, $y = b \sec \theta \sin \Phi$, $z = c \tan \theta$, then, the value of

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} \text{ is :}$$

- (1) 1
(2) 4
(3) 9
(4) 0

Solution:1

$$(1) \quad x = a \sec \theta \cdot \cos \phi; \quad y = b \sec \theta \cdot \sin \phi, \quad z = c \tan \theta$$

$$\therefore \frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2}$$

$$= \sec^2 \theta \cdot \cos^2 \phi + \sec^2 \theta \cdot \sin^2 \phi - \tan^2 \theta$$

$$= \sec^2 \theta (\cos^2 \phi + \sin^2 \phi) - \tan^2 \theta$$

$$= \sec^2 \theta - \tan^2 \theta = 1$$

5. Mohan gets 3 marks for each correct sum and loses 2 marks for each wrong sum. He attempts 30 sums and obtains 40 marks. The number of sums solved correctly is :

- (1) 15
(2) 20
(3) 25
(4) 10

Solution:2

(2) If the number of correct sums be x , then,

$$x \times 3 - (30 - x) \times 2 = 40$$

$$\Rightarrow 3x - 60 + 2x = 40$$

$$\Rightarrow 5x = 60 + 40 = 100$$

$$\Rightarrow x = 20$$

6. If $\frac{\sec \theta + \tan \theta}{\sec \theta - \tan \theta} = \frac{5}{3}$,

then $\sin \theta$ is equal to :

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

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

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

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

Solution:

$$(1) \frac{\sec \theta + \tan \theta}{\sec \theta - \tan \theta} = \frac{5}{3}$$

$$\Rightarrow 5 \sec \theta - 5 \tan \theta$$

$$= 3 \sec \theta + 3 \tan \theta$$

$$\Rightarrow 2 \sec \theta = 8 \tan \theta$$

$$\Rightarrow \frac{\tan \theta}{\sec \theta} = \frac{2}{8} = \frac{1}{4}$$

$$\Rightarrow \frac{\sin \theta}{\cos \theta} \times \cos \theta = \frac{1}{4}$$

$$\Rightarrow \sin \theta = \frac{1}{4}$$

7. The marked price of a watch was 720. A man bought the same for 550.80 after getting two successive discounts, the 1st being 10%. What was the 2nd discount ?

(1) 14%

(2) 15%

(3) 18%

(4) 12%

Solution:2**(2) Price after first discount**

$$= \frac{720 \times 90}{100} = \text{Rs. } 648$$

It the second discount be $x\%$,
then

$$\frac{648 \times x}{100} = 648 - 550.80$$

$$= 97.2$$

$$\Rightarrow x = \frac{97.2 \times 100}{648} = 15\%$$

8. Two pipes, P and Q can fill a cistern in 12 and 15 minutes respectively. If both are opened together and at the end of 3 minutes, the first is closed, how much longer will the cistern take to fill?

(1) 5 minutes

(2) $8\frac{1}{2}$ minutes(3) $8\frac{1}{4}$ minutes(4) $8\frac{3}{4}$ minutes**Solution:3**

(3) Part of the cistern filled by both pipes in 3 minutes

$$= 3 \left(\frac{1}{12} + \frac{1}{15} \right)$$

$$= 3 \left(\frac{5+4}{60} \right) = \frac{3 \times 9}{60} = \frac{9}{20}$$

Remaining part

$$= 1 - \frac{9}{20} = \frac{11}{20}$$

∴ Time taken by pipe Q in fill-

ing $\frac{11}{20}$ part

$$= \frac{11}{20} \times 15 = \frac{33}{4} \text{ minutes}$$

$$= 8 \frac{1}{4} \text{ minutes}$$

9. The average age of 14 girls and their teacher's age is 15 years. If the teacher's age is excluded, the average reduces by 1. What is the teacher's age?

- (1) 32 years
- (2) 30 years
- (3) 29 years
- (4) 35 years

Solution:3

(3) Teacher's age

$$= 15 \times 15 - 14 \times 14$$

$$= 225 - 196 = 29 \text{ years}$$

10. The square root of $33 - 4\sqrt{35}$ is :

$$(1) \pm(2\sqrt{7} + \sqrt{5})$$

$$(2) \pm(\sqrt{7} + 2\sqrt{5})$$

$$(3) \pm(\sqrt{7} - 2\sqrt{5})$$

$$(4) \pm(2\sqrt{7} - \sqrt{5})$$

Solution:4

$$(4) 33 - 4\sqrt{35}$$

$$= 33 - 2 \times 2\sqrt{5 \times 7}$$

$$= 33 - 2 \times 2\sqrt{7} \times \sqrt{5}$$

$$= 28 + 5 - 2 \times 2\sqrt{7} \times \sqrt{5}$$

$$= (2\sqrt{7})^2 + (\sqrt{5})^2 - 2 \times 2\sqrt{7} \times \sqrt{5}$$

$$= (2\sqrt{7} - \sqrt{5})^2$$

$$\therefore \sqrt{33 - 4\sqrt{35}}$$

$$= \sqrt{(2\sqrt{7} - \sqrt{5})^2}$$

$$= \pm(2\sqrt{7} - \sqrt{5})$$

11. The cost of manufacture of an article was 900. The trader wants to gain 25% after giving a discount of 10%. The marked price should be :

$$(1) 1250$$

$$(2) 1200$$

$$(3) 1000$$

$$(4) 1500$$

Solution:1

(1) If the marked price be Rs. x , then

$$\frac{x \times 90}{100} = \frac{900 \times 125}{100} = 1125$$

$$\Rightarrow x = \frac{1125 \times 100}{90} = \text{Rs. } 1250$$

12. Three sides of a triangular field are of length 15 m, 20 m and 25 m long respectively. Find the cost of sowing seeds in the field at the rate of 5 rupees per sq.m.

- (1) 300
(2) 600
(3) 750
(4) 150

Solution:3

$$(3) 15^2 + 20^2 = 25^2$$

\therefore The triangular field is right angled.

\therefore Area of the field

$$= \frac{1}{2} \times 15 \times 20$$

$$= 150 \text{ sq. metre}$$

\therefore Cost of sowing seeds

$$= 150 \times 5 = \text{Rs. } 750$$

13. If $a^2 + 1 = a$, then the value of $a^{12} a^6 + 1$ is :

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

Solution:4

$$\begin{aligned}
 (4) \quad a^2 + 1 &= a \\
 \Rightarrow a^2 - a + 1 &= 0 \\
 \Rightarrow (a + 1)(a^2 - a + 1) &= 0 \\
 \Rightarrow a^3 + 1 &= 0 \\
 \Rightarrow a^3 &= -1 \\
 \therefore a^{12} + a^6 + 1 \\
 &= (a^3)^4 + (a^3)^2 + 1 \\
 &= 1 + 1 + 1 = 3
 \end{aligned}$$

14. A, B, C and D purchase a gift worth 60. A pays $\frac{1}{2}$ of what others are paying, B pays $\frac{1}{3}$ rd of what others are paying and C pays $\frac{1}{4}$ th of what others are paying. What is the amount paid by D?
- (1) 16
 (2) 13
 (3) 14
 (4) 15

Solution:2

$$\begin{aligned}
 (2) \quad A + B + C + D &= 60 \\
 A &= \frac{B + C + D}{2} \\
 \Rightarrow 3A &= 60 \Rightarrow A = \text{Rs. } 20 \\
 B &= \frac{A + C + D}{3} \\
 \Rightarrow 4B &= 60 \Rightarrow B = \text{Rs. } 15 \\
 C &= \frac{A + B + D}{4} \\
 \Rightarrow 5C &= 60 \Rightarrow C = \text{Rs. } 12 \\
 D &= 60 - (20 + 15 + 12) \\
 &= \text{Rs. } 13
 \end{aligned}$$

15. If $a * b = a + b + \frac{a}{b}$, then the value of $12 * 4$ is :
- (1) 20

(2) 21

(3) 43

(4) 19

Solution:4

$$(4) a * b = a + b + \frac{a}{b}$$

$$\therefore 12 * 4 = 12 + 4 + \frac{12}{4}$$

$$= 16 + 3 = 19$$

16. If the median drawn on the base of a triangle is half its base, the triangle will be:

(1) right-angled

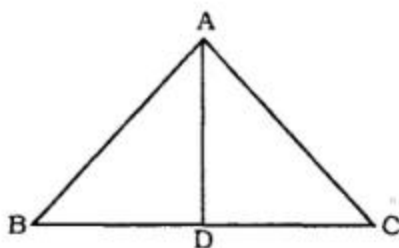
(2) acute-angled

(3) obtuse-angled

(4) equilateral

Solution:1

(1)



$$BD = DC = AD$$

$$\angle BAD = \angle DBA$$

$$\angle CAD = \angle DAC$$

$$\angle ADB = \angle ADC = 90^\circ$$

$$\angle BAC = \text{right angled}$$

17. Taking any three of the line segments out of segments of length 2 cm, 3 cm, 5 cm and 6 cm, the number of triangles that can be formed is :

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

Solution:2

(2) The sum of two sides of a triangle is greater than the third side.

(3, 5, 6) and (2, 5, 6)

18. If $x^2 + y^2 + z^2 = 2(x - y - z) - 3$, then the value of $2x - 3y + 4z$ is [Assume that x, y, z are all real numbers] :

- (1) 9
- (2) 1
- (3) 3
- (4) 0

Solution:2

$$\begin{aligned}
 (2) \quad & x^2 + y^2 + z^2 \\
 &= 2x - 2y - 2z - 3 \\
 \Rightarrow & x^2 + y^2 + z^2 - 2x + 2y + 2z + 1 \\
 &+ 1 + 1 = 0 \\
 \Rightarrow & (x^2 - 2x + 1) + (y^2 + 2y + 1) + \\
 & (z^2 + 2z + 1) = 0 \\
 \Rightarrow & (x - 1)^2 + (y + 1)^2 + (z + 1)^2 = \\
 & 0 \\
 \therefore & x - 1 = 0 \Rightarrow x = 1 \\
 & y + 1 = 0 \Rightarrow y = -1 \\
 & z + 1 = 0 \Rightarrow z = -1 \\
 \therefore & 2x - 3y + 4z = 2 + 3 - 4 = 1
 \end{aligned}$$

19. A swimmer swims from a point A against a current for 5 minutes and then swims backwards in favour of the current for next 5 minutes and comes to the point B. If $AB = 100$ metres, the speed of the current (in km per hour) is :

- (1) 0.4

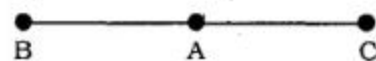
(2) 0.2

(3) 1

(4) 0.6

Solution:4

(4)



The distance covered upstream

$$= AC = d$$

$$AB = 100$$

$$BC = 100 + d$$

Rate upstream

$$= (x - y) \text{ m/minute}$$

Rate downstream

$$= (x + y) \text{ m/minute}$$

$$\therefore \frac{d}{x - y} = 5$$

$$\Rightarrow d = 5(x - y) \dots(i)$$

Again,

$$\frac{100 + d}{x + y} = 5$$

$$\Rightarrow \frac{100 + 5(x - y)}{x + y} = 5$$

$$\Rightarrow 100 + 5x - 5y = 5x + 5y$$

$$\Rightarrow 10y = 100$$

$$\Rightarrow y = 10 \text{ m/minute}$$

$$= \frac{10}{1000} \times 60 \text{ kmph}$$

$$= 0.6 \text{ kmph}$$

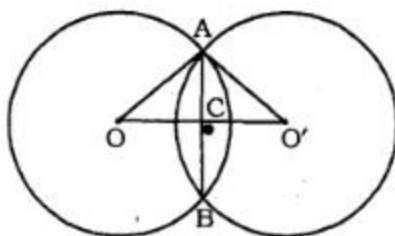
20. Two circles of same radius 5 cm, intersect each other at A and B. If AB = 8 cm, then the distance between the centres is :

(1) 6 cm

(2) 8 cm

(3) 10 cm

(4) 4 cm

Solution:1**(1)**

$$AC = 4 \text{ cm}$$

$$OA = 5 \text{ cm}$$

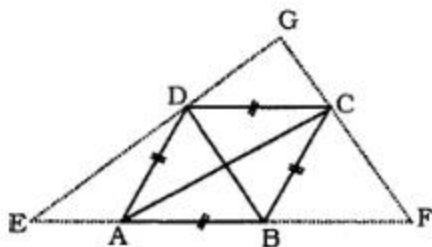
$$OC = \sqrt{5^2 - 4^2} = 3 \text{ cm}$$

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

21. ABCD is a rhombus. AB is produced to F and BA is produced to E such that AB = AE = BF. Then :

(1) $ED > CF$ (2) $ED \perp CF$ (3) $ED^2 + CF^2 = EF^2$ (4) $ED \parallel CF$ **Solution:2**

(2) We know that diagonals of a rhombus are perpendicular bisector of each other.



$$\therefore OA = OC; OB = OD$$

$$\angle AOD = \angle COD = 90^\circ$$

$$\angle AOB = \angle COB = 90^\circ$$

In $\triangle BDE$, $OA \parallel DE$

$$\Rightarrow OC \parallel DG$$

In $\triangle CFA$,

$$OB \parallel CF$$

$$\Rightarrow OD \parallel GC$$

In quadrilateral $DOCG$

$$OC \parallel DG \text{ and}$$

$$\Rightarrow OD \parallel GC$$

$\therefore DOCG$ is a parallelogram.

$$\therefore \angle DGC = \angle DOC$$

$$\Rightarrow \angle DGC = 90^\circ$$

22. The radius of the circumcircle of a right angled triangle is 15 cm and the radius of its inscribed circle is 6 cm. Find the sides of the triangle.

(1) 30, 40, 41

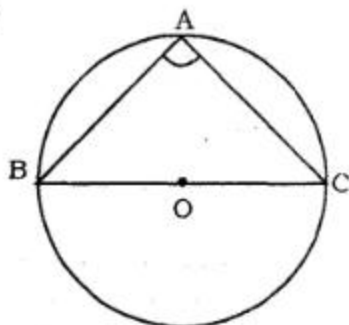
(2) 18, 24, 30

(3) 30, 24, 25

(4) 24, 36, 20

Solution:2

• (2)



$$18^2 + 24^2 = 30^2$$

∴ Sides = 18, 24, 30

23. Find the maximum number of trees which can be planted, 20 metres apart, on the two sides of a straight road 1760 metres long

- (1) 180
(2) 178
(3) 174
(4) 176

Solution:2

(2) Number of trees on each side of the road

$$= \frac{1760}{20} + 1 = 88 + 1 = 89$$

∴ Required answer

$$= 89 \times 2 = 178$$

24. A contractor undertook to finish a certain work in 124 days and employed 120 men. After 64 days, he found that he had already done $\frac{2}{3}$ of the work.

How many men can be discharged now so that the work may finish in time ?

- (1) 48
(2) 56
(3) 40

(4) 50

Solution:2**(2) Remaining work**

$$= 1 - \frac{9}{3} = \frac{1}{3};$$

$$\text{Remaining days} = 124 - 64 \\ = 60$$

$$\therefore \frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

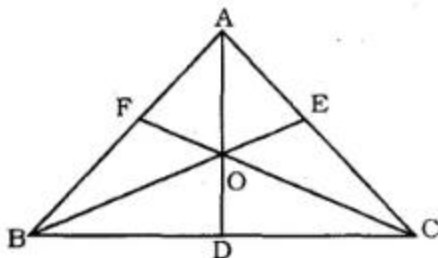
$$\Rightarrow \frac{120 \times 64}{\frac{2}{3}} = \frac{M_2 \times 60}{\frac{1}{3}}$$

$$\Rightarrow M_2 = \frac{120 \times 64}{2 \times 60} = 64$$

$$\therefore \text{Required answer} \\ = 120 - 64 = 56 \text{ men}$$

25. If the lengths of the sides of a triangle are in the ratio 4 : 5 : 6 and the inradius of the triangle is 3 cm, then the altitude of the triangle corresponding to the largest side as base is :
- (1) 7.5 cm
 - (2) 6 cm
 - (3) 10cm
 - (4) 8 cm

Solution:1**(1)**



$$AB = 4x ; BC = 5x , CA = 6x$$

$$\Delta OBA + \Delta BOC + \Delta AOC$$

$$= \Delta ABC$$

$$\Rightarrow \therefore \frac{1}{2} \times 4x \times 3 + \frac{1}{2} \times 5x \times 3$$

$$+ \frac{1}{2} \times 6x \times 3 = \frac{1}{2} \times 6x \times h$$

$$\Rightarrow 6x + \frac{15x}{2} + 9x = 3xh$$

$$\Rightarrow 12 + 15 + 18 = 6h$$

$$\Rightarrow 45 = 6h$$

$$\Rightarrow h = \frac{15}{2} = 7.5 \text{ cm}$$

26. Each of the two circles of same radius a passes through the centre of the other; If the circles cut each other at the points A and B and O, O' be their centres, area of the quadrilateral AOBO' is :

(1) $\frac{\sqrt{3}}{2}a^2$

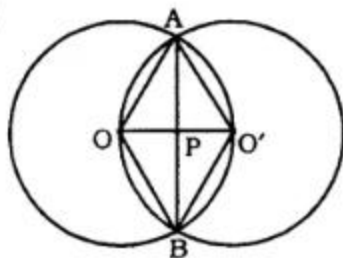
(2) a^2

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

(4) $\frac{1}{2}a^2$

Solution:1

. (1)



$$OO' = a$$

$$OA = a$$

$$OP = \frac{a}{2}$$

$$\therefore AP = \sqrt{a^2 - \frac{a^2}{4}} = \frac{\sqrt{3}a}{2}$$

$$\therefore AB = \sqrt{3}a$$

$$\text{Area of } OAO'B = \frac{1}{2} d_1 d_2$$

$$= \frac{1}{2} \times a \times \sqrt{3} \times a = \frac{\sqrt{3}}{2} a^2$$

27. The arithmetic mean of the scores of a group of students in a test was 52. The brightest 20% of them secured a mean score of 80 and the duller 25%, a mean score of 31. The mean score of remaining 55% is :

- (1) 50%
- (2) 51.4% approx.
- (3) 54.6% approx.
- (4) 45%

Solution:2

(2) There were 100 students.

$$\therefore 20 \times 80 + 25 \times 31 + 55 \times x \\ = 52 \times 100$$

$$\Rightarrow 1600 + 775 + 55x = 5200$$

$$\Rightarrow 55x = 5200 - 2375 = 2825$$

$$\Rightarrow x = \frac{2825}{55} = 51.4 \text{ (approx.)}$$

28. In a $\triangle ABC$ $\angle A : \angle B : \angle C = 2 : 3 : 4$. A line CD drawn \parallel to AB , then the $\angle ACD$ is :

(1) 40°

(2) 60°

(3) 80°

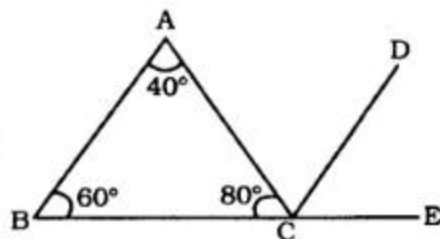
(4) 20°

Solution:2

$$(2) 3x + 3x + 4x = 180^\circ$$

$$\Rightarrow 9x = 180^\circ \Rightarrow x = 20^\circ$$

\therefore Angles of triangle are 40° , 60° and 80°



$AB \parallel CD$

$$\angle DCE = \angle ABC = 60^\circ$$

$$\therefore \angle ACB + \angle ACD + \angle DCE \\ = 180^\circ$$

$$\angle ACD = 180^\circ - 120^\circ = 60^\circ$$

29. The curved surface area and the total surface area of a cylinder are in the ratio 1 :

2. If the total surface area of the right cylinder is 616 cm^2 , then its volume is :

(1) 1232 cm^3

(2) 1848 cm^3

(3) 1632 cm^3

(4) 1078 cm^3