

SSC GRADUATE LEVEL TIER – I EXAM, 19-10-2014 (FIRST SITTING) – PREVIOUS YEAR PAPER

GENERAL AWARENESS

1. There are no politics devoid of religion' is stated by

- (1) Nehru
- (2) Gandhi
- (3) Vinoba Bhave
- (4) Jaya Prakash Narayan

Solution : 2

2. In which Rock Edict Ashoka mentions about the casualities of Kalinga War and declares the renunciation of war ?

- (1) Maski Edict
- (2) Rock Edict XIII
- (3) Rock Edict XI
- (4) Rock Edict X

Solution : 2

3. Akbar held his religious discussion in

- (1) Jodhabai's Palace
- (2) Panch Mahal
- (3) Ibadat Khana
- (4) Buland Darwaza

Solution : 3

4. Who succeeded Guru Nanak ?

- (1) Guru Angad
- (2) Guru Ramdas
- (3) Guru Arjan
- (4) Guru Hargobind

Solution : 1

5. The Earliest Settlements of Aryan tribes were at

- (1) Uttar Pradesh

- (2) Bengal
- (3) Sapta Sindhu
- (4) Delhi

Solution : 3

6. Who said, "Adolf Hitler is Germany and Germany is Adolf Hitler. He who pledges himself to Hitler pledges himself to Germany" ?

- (1) R. Hess
- (2) Mussolini
- (3) Hitler
- (4) Communist International

Solution : 1

7. Who speaks of Cabinet system as the steering wheel of the ship of state" ?

- (1) Lowell
- (2) Muir
- (3) Marriot
- (4) Bagehot

Solution : 2

8. Who has called the Prime Minister Primus inter pares (first among equals) ?

- (1) Morely
- (2) Harcourt
- (3) Laski
- (4) Lowell

Solution : 1

9. What is farming along with animal husbandry called ?

- (1) Mixed farming
- (2) Mixed agriculture
- (3) Dairy farming
- (4) Truck farming

Solution : 1

10. Hydraulic Action is a type of erosion caused by

- (1) Running water
- (2) Wind
- (3) Glacier
- (4) None of these

Solution : 1

11. Which of the following is the newest geological era ?
- (1) Permian
 - (2) Triassic
 - (3) Cretaceous
 - (4) Jurassic

Solution : 3

12. The plant from which cocoa and chocolate are obtained is a
- (1) herb
 - (2) shrub
 - (3) small tree
 - (4) very big tree

Solution : 2

13. The biggest single-celled organism is
- (1) Yeast
 - (2) Acetabularia
 - (3) Acetobacter
 - (4) Amoeba

Solution : 4

14. Crescograph was invented by
- (1) S.N. Bose
 - (2) P.C. Roy
 - (3) J.C. Bose
 - (4) P.C. Mahalanobis

Solution : 3

15. Foramen Magnum is an aperture found in the
- (1) Ear
 - (2) Lung
 - (3) Girdle
 - (4) Skull

Solution : 4

16. Who betrayed Siraf-ud-Daula in the Battle of Plassey in 1757 ?
- (1) Hyder Ali
 - (2) Mir Qasim
 - (3) Mir Jaffar
 - (4) Nawab of Oudh

Solution : 3

17. 'Kelp' is

- (1) Sulphide mineral of iron
- (2) Partially decomposed vegetable matter
- (3) Sea weed rich in iodine content
- (4) An aluminium silicate mineral

Solution : 3

18. Spot the odd item in the following :

- (1) Basalt
- (2) Ruby
- (3) Emerald
- (4) Sapphire

Solution : 1

19. Light from the Sun reaches us in nearly

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

Solution : 1

20. Radar is used to

- (1) locate submerged submarines.
- (2) receive signal from radio receivers.
- (3) detect and locate distant objects.
- (4) locate geostationary satellites.

Solution : 3

21. Optical fibre works on the principle of

- (1) refraction
- (2) scattering
- (3) interference
- (4) total internal reflection

Solution : 4

22. Which application in Microsoft Office is feasible for preparing presentations ?

- (1) Microsoft Excel
- (2) Microsoft Word

(3) Microsoft Power Point

(4) Microsoft Publishers

Solution : 3

23. The language which was used to build Internet Pages in the beginning of Internet Technology is

(1) XML

(2) HTML

(3) DHTML

(4) ASP

Solution : 2

24. Name the branch of Zoology that deals with the scientific study of animal behaviour.

(1) Ecology

(2) Physiology

(3) Ethology

(4) Anatomy

Solution : 3

25. 'Barr body' is found in

(1) Sperm

(2) Sertoli cells

(3) Female somatic cells

(4) Male somatic cells

Solution : 3

26. The colours of stars depend on their

(1) temperature

(2) distance

(3) radius

(4) atmospheric pressure

Solution : 1

27. Which source has been particularly fruitful in finding novel anti-tumour agents such as bryostannins and dolostatin?

(1) Marine sources

(2) Animals

(3) Venoms and toxins

(4) Combinatorial chemistry

Solution : 1

28. The pollutant responsible for ozone holes is.....

- (1) CO₂
- (2) SO₂
- (3) CO
- (4) CFC

Solution : 4

29. One of the best solutions to get rid of non-biodegradable wastes is

- (1) Burning
- (2) Dumping
- (3) Burying
- (4) Recycling

Solution : 4

30. Vermicomposting is done by

- (1) Fungus
- (2) Bacteria
- (3) Worms
- (4) Animals

Solution : 3

31. If waste materials contaminate the source of drinking water, which of the following diseases will spread ?

- (1) Scurvy
- (2) Typhoid
- (3) Malaria
- (4) Anaemia

Solution : 2

32. India exports power to

- (1) Bangladesh
- (2) Myanmar
- (3) Pakistan
- (4) Bhutan

Solution : 1

33. The alkaloid naturally found in coffee, cocoa and cola nut is

- (1) Cocaine

- (2) Morphine
- (3) Tannin
- (4) Caffeine

Solution : 4

34. The metal used for making air-crafts and rockets is

- (1) Lead
- (2) Aluminium
- (3) Nickel
- (4) Copper

Solution : 3

35. The process of improving the quality of rubber by heating it with sulphur is called.

- (1) Vulcanization
- (2) Acceleration
- (3) Sulphonation
- (4) Galvanization

Solution : 1

36. Which State is the largest producer of pulses in India ?

- (1) Bihar
- (2) Rajasthan
- (3) Madhya Pradesh
- (4) Maharashtra

Solution : 3

37. In India, woman had never been a Chief Minister in the State of

- (1) Tamil Nadu
- (2) Rajasthan
- (3) Uttar Pradesh
- (4) Maharashtra

Solution : 4

38. Which of the following is not a noble gas ?

- (1) Hydrogen
- (2) Helium
- (3) Neon
- (4) Argon

Solution : 1

39. Sunda Trench is in
- (1) Indian Ocean
 - (2) Pacific Ocean
 - (3) Atlantic Ocean
 - (4) Gulf of Mexico

Solution : 1

40. Which of the following is an organic rock ?
- (1) Marble
 - (2) Coal
 - (3) Granite
 - (4) Slate

Solution : 2

41. Who among the following has written the famous book "Malgudi Days" ?
- (1) V.S. Naipaul
 - (2) Deepak Chopra
 - (3) Rabindranath Tagore
 - (4) R.K. Narayan

Solution : 4

42. British Crown assumed sovereignty over India from the East India Company in the year
- (1) 1857
 - (2) 1858
 - (3) 1859
 - (4) 1860

Solution : 2

43. Which vein brings clean blood from the lungs into the heart ?
- (1) Renal Vein
 - (2) Pulmonary Vein
 - (3) Vena Cava
 - (4) Hepatic Vein

Solution : 2

44. The first woman President of Indian National congress was
- (1) Kamala Devi Chattopadhyaya
 - (2) Sarojini Naidu
 - (3) Annie Besant

(4) Rajkumari Amrit Kaur

Solution : 3

45. Average propensity to consume is defined as
- (1) Aggregate consumption + Total population
 - (2) Aggregate income + Aggregate consumption
 - (3) Change in consumption + Change in income
 - (4) Aggregate consumption :- Aggregate income

Solution : 4

46. In short run, if a competitive firm incurs losses, it will
- (1) stop production.
 - (2) continue to produce as long as it can cover its variable costs.
 - (3) raise price of its product.
 - (4) go far advertising campaign.

Solution : 1

47. Which one of the following is the specific feature of the single member constituency system ?
- (1) The system is economical for representatives.
 - (2) Gerrymandering is not possible in this system.
 - (3) It secures a stable majority in the legislature.
 - (4) The candidate has to spend less on electioneering.

Solution : 3

48. Which of the following relations always holds true ?
- (1) $\text{Income} = \text{Consumption} + \text{Investment}$
 - (2) $\text{Income} = \text{Consumption} + \text{Saving}$
 - (3) $\text{Saving} = \text{Investment}$
 - (4) $\text{Income} = \text{Consumption} + \text{Saving} + \text{Investment}$

Solution : 2

49. The Keynesian consumption function shows a relation between
- (1) aggregate consumption and total population.
 - (2) aggregate consumption and general price level.
 - (3) aggregate consumption and aggregate income
 - (4) aggregate consumption and interest rate

Solution : 3

50. Over short period, when income rises, average propensity to consume usually

- (1) rises
- (2) falls
- (3) remains constant
- (4) fluctuates

Solution : 2



ENGLISH COMPREHENSION

Directions (1-5) : 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.

1. When she parted ,..... her parents, her eyes were full of tears.

- (1) from
- (2) away
- (3) off
- (4) with

Solution : 2

2. He went to oblige his superior.

- (1) on his way
- (2) out of his way
- (3) in his way
- (4) with his way

Solution : 2

3. During a period of protracted illness, the sick can become infirm,both the strength to work and many of the specific skills that were once possessed.

- (1) regaining
- (2) denying
- (3) pursuing
- (4) losing

Solution : 4

4. The members of the religious sect ostracized thewho had abandoned their faith.

- (1) coward
- (2) litigant
- (3) recreant
- (4) suppliant

Solution : 4

5. Would you mind the suitcase, Sir ?

- (1) open

- (2) opening
- (3) to open
- (4) opened

Solution : 2

Directions (6-8) : In the following questions, out of the four alternatives, choose the one which best expresses the meaning of the given word.

- Impervious
 - (1) Audacious
 - (2) Haphazard
 - (3) Impenetrable
 - (4) Illogical

Solution : 3

- Peruse
 - (1) Overuse
 - (2) Examine
 - (3) Abuse
 - (4) Defuse

Solution : 2

- Amicable
 - (1) Friendly
 - (2) Happy
 - (3) Perfect
 - (4) Joyous

Solution : 1

Directions (9-11) : In the following questions, choose the word opposite in meaning to the given word as your answer.

- Desecration
 - (1) Hopelessness
 - (2) Disbelief
 - (3) Veneration
 - (4) Manifestation

Solution : 3

- Yield
 - (1) Respond
 - (2) Survive
 - (3) Attack
 - (4) Resist

Solution : 4

- Particularly
 - (1) Elaborately
 - (2) Generally
 - (3) Comprehensively
 - (4) Entirely

Solution : 2

Directions (12-16) : 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.

- Indians are **going places** in the field of software technology.
 - (1) going abroad
 - (2) going to spaces
 - (3) talented and successful
 - (4) friendly and amicable

Solution : 3

- She is a person who **pulls no punches**.
 - (1) speaks politely
 - (2) speaks frankly
 - (3) speaks rudely
 - (4) speaks sweetly

Solution : 1

- For any group work to be successful, it is important that everyone is **on the same page**.
 - (1) present for the meeting
 - (2) registered for the work

(3) willing to pay the same fees

(4) thinks in a similar way

Solution : 4

- Our plan to go to London is **in the air**.

(1) undecided

(2) certain

(3) under consideration

(4) for approval

Solution : 2

- My efforts at pest control went in vain, I have to go **back to the drawing board**.

(1) plan it all over again

(2) take professional help

(3) spend some time researching abroad

(4) work at night

Solution : 1

Directions (17-26) : 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).

- This crime makes a man liable **for transportation till his life**.

(1) to transportation to life

(2) for transportation for life

(3) to transportation for life

(4) No improvement

Solution : 2

- I don't think many people will be able to attend the meeting tomorrow. I, **but for one**, have to be in Chennai.

(1) so for one

(2) rather for one

(3) for one

(4) No improvement

Solution : 3

- My visits to my family are **a few and far between**.
 - (1) few and a far between
 - (2) few and far between
 - (3) few or far between
 - (4) No improvement

Solution : 2

- Their friendship will not **last through long time**.
 - (1) last through a long time
 - (2) last through
 - (3) last long
 - (4) No improvement

Solution : 3

- All these articles are kept in a tin box to **prevent from spoiling of damp** in rainy season.
 - (1) prevent them from spoiling by damp
 - (2) prevent them being spoiled by damp
 - (3) prevent them from spoiling of damp
 - (4) No improvement

Solution : 1

- Your previous project **was only failed because you did not persevere yourself in it**.
 - (1) failed only because you did not persevere.
 - (2) failed only because you did not persevere for it.
 - (3) only failed because you did not persevere.
 - (4) No improvement

Solution : 2

- I **had more sympathy** with you. my friend.
 - (1) have a more sympathy
 - (2) have much sympathy
 - (3) had much sympathy
 - (4) No improvement

Solution : 2

- The bank manager was given a holiday and so he resolved to go **for hitch-hiking**.
 - (1) with hitch-hiking

- (2) for the hitch-hiking
- (3) hitch-hiking
- (4) No improvement

Solution : 4

- Our big iron gate **jingles** on its hinges as it is opened.

- (1) clangs
- (2) grates
- (3) bangs
- (4) No improvement

Solution : 2

- **Although other parts** the world 20 per cent of the farm area is owned by women, in India women own less than 7 per cent.

- (1) If in other parts of
- (2) However some parts of
- (3) While in other parts of
- (4) No improvement

Solution : 3

Directions (27-33) : In the following questions, out of the four alternatives, choose the one which can be substituted for the given words/sentences.

- Passing out of use

- (1) Adolescent
- (2) Reticent
- (3) Translucent
- (4) Obsolescent

Solution : 4

- A drink usually made from a mixture of one or more alcoholic drinks

- (1) Cocktail
- (2) Mocktail
- (3) Liquor
- (4) Bisque

Solution : 1

- Affecting or relating to cows

- (1) Feline
- (2) Bovine
- (3) Ovine
- (4) Vulpine

Solution : 2

- Something that might happen in the future

- (1) Contingency
- (2) Insurance
- (3) Emergency
- (4) Prophecy

Solution : 1

- A special fondness or liking for

- (1) Propensity
- (2) Inclination
- (3) Penchant
- (4) Preoccupation

Solution : 3

- Relating to kinship with the father

- (1) Patrilineal
- (2) Fratrilineal
- (3) Matrilineal
- (4) Familial

Solution : 1

- A part of a word that can be pronounced separately

- (1) Particle
- (2) Sibilant
- (3) Syllable
- (4) Letter

Solution : 3

Directions (34-35) : 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.

- (1) Accessible

- (2) Akcessible
- (3) Accesible
- (4) Accesible

Solution : 1

- (1) Camouflage
- (2) Camaflouge
- (3) Cemouflege
- (4) Cemouflage

Solution : 1

Directions (36-45) : 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

(Question Nos. 36 to 40)

The Critical Faculty is the most potent one in the human make-up. Its pervasiveness and force have not properly been recognized because like breathing, it is so much a part and parcel of human activity. The difference between a simpleton and an intelligent man, according to the man who is convinced that he is of the latter category, is that the former wholeheartedly accepts all things that he sees and hears while the latter never admits anything except after a most searching scrutiny. He imagines his intelligence to be a sieve of closely woven mesh through which nothing but the finest can pass.

The critical sense is essential for keeping social transactions in a warm state. Otherwise life would become very dull and goody-goody. The critical faculty is responsible for a lot of give and take in life. It increases our awareness of our surroundings; it sounds dignified no doubt, but it seems also to mean that we can watch someone else's back better than our own! We never know our own defects till they are pointed out to us, and even then we need not accept them. We always question the bonafides of the man who tells us unpleasant facts. On the surface it is all very well to say, 'I want an honest criticism; that will help me, not blind compliments.' I wish people would mean it.

- The negative side of the critical faculty is that
 - (1) it makes us critical of others.
 - (2) it makes us critical of ourselves.
 - (3) it sounds dignified but it is not actually so.
 - (4) it is a tool for creating classificatory division.

Solution : 1

- People who solicit others' opinions (about themselves) generally want
 - (1) effusive compliments
 - (2) honest criticism
 - (3) harsh facts
 - (4) precise feedback

Solution : 2

- The critical faculty is defined as the 'most potent one in human make-up' because
 - (1) it is all pervasive and powerful.
 - (2) it separates the simpleton from the intelligent man.
 - (3) it is a help in social transactions.
 - (4) All of the above

Solution : 4

- What, according to the writer, is the essential link between breathing and the critical faculty ?
 - (1) Both are required in social relations
 - (2) Both are exercised by human beings
 - (3) Both grow with age
 - (4) Both stop with death

Solution : 2

- The self-defined intelligent man defines himself on the basis of
 - (1) his obvious divergence from the simpleton.
 - (2) his superior intelligence as a whole.
 - (3) his possession of the critical faculty.
 - (4) his heightened awareness of his surroundings.

Solution : 1

PASSAGE – II

(Question Nos. 41 to 45)

International trade represents a significant share of Gross Domestic Product (GDP). While international trade has been present throughout much of history, its economic, social and political importance has been on the rise in recent centuries.

Industrialization, advances in technology, transportation, globalization, multinational corporations, and outsourcing are all having a major impact on the international trade system. Increasing international trade is crucial to the continuance of globalization.

International trade is, in principle, not different from domestic as the motivation and the behaviour of parties is across a border or not. The main difference is that international trade. Another difference between domestic and international trade is that factors of production such as capital and labour are typically more mobile within a country than across countries.

- Which of the following is one of the factors of production ?

- (1) Capital
- (2) Cost
- (3) Profit
- (4) Loss

Solution : 1

- What is the synonym of 'mobile' ?

- (1) Versatile
- (2) Moveable
- (3) Changeable
- (4) Transferable

Solution : 2

- Which one of the following has a major impact on international trade ?

- (1) Contribution to GDP
- (2) Industrialization
- (3) Outsourcing
- (4) Domestic trade

Solution : 2

- According to the author, increasing international trade

- (1) brings about speedy industrialization
- (2) uplifts technology and transportation
- (3) is crucial to the continuance of globalization
- (4) encourages multinational corporations

Solution : 3

- What is the main difference between international and domestic trade ?

- (1) One is more significant than the other
- (2) One is more costly than the other
- (3) One is more advanced than the other
- (4) One is more crucial than the other

Solution : 2

Directions (46-50) : 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.

- A chill wind blew (1)/ and icy fingers of death (2)/ crept up my spine. (3)/ No error (4).

Solution : 3

- Such rules (1)/ do not apply to (2)/ you and I. (3),/ No error (4).

Solution : 3

- The river (1)/ has overflown (2)/ its banks. (3)/ No error (4).

Solution : 2

- IIM Calcatta's MBA pr6- gramme (1)7 is regarded (2)/ as the finest in the country (3)/ No error (4).

Solution : 3

- One of the most (1)/ widely spread (2)/ bad habit is the use of tobacco. (3)/ No error (4).

Solution : 3

QUANTITATIVE APTITUDE

1. A plate was sold for Rs.6,300 after giving two successive discounts of $12\frac{1}{2}\%$ and 10%.

Find the marked price.

- (1) 7,300
(2) 7,700
(3) 8,000
(4) 7,250

Solution : 3

(3) Single equivalent discount for two successive discounts

$$= (x + y - \frac{xy}{100}) \%$$

$$= \left(\frac{25}{2} + 10 - \frac{25 \times 10}{200} \right) \%$$

$$= (12.5 + 10 - 1.25) \%$$

$$= 21.25 \%$$

If the marked price of the plate be Rs. x , then

$$= (100 - 21.25) \% \text{ of } x = 6300$$

$$\Rightarrow x \times \frac{78.75}{100} = 6300$$

$$\Rightarrow x = \frac{6300 \times 100}{78.75} = \text{Rs. } 8000$$

2. To attract more visitors, Zoo authority announces 20% discount on every ticket which costs 25 paise. For this reason, sale of ticket increases by 28%. Find the percentage of increase in the number of visitors.

- (1) 40%
(2) 50%
(3) 60%
(4) No change

Solution : 3

(3) Original number of visitors
 = 100
 Total revenue = 100×25
 = 2500 paise
 = Rs. 25
 Case II,

$$\text{Cost of each ticket} = \frac{25 \times 80}{100}$$

$$= 20 \text{ paise} = \text{Re. } 0.2$$

$$\text{Total revenue} = \frac{25 \times 128}{100}$$

$$= \text{Rs. } 32$$

If the number of visitors be x ,
 then

$$x \times 0.2 = 32$$

$$\Rightarrow x = \frac{32}{0.2} = \frac{320}{2} = 160$$

$$\therefore \text{Required percentage} = 60$$

3. Which of the following represents a correct proportion ?

- (1) $12 : 9 = 16 : 12$
- (2) $13 : 11 = 5 : 4$
- (3) $30 : 45 = 13 : 24$
- (4) $3 : 5 = 2 : 5$

Solution : 1

$$(1) \frac{12}{9} = \frac{16}{12}$$

$$\Rightarrow 12 \times 12 = 9 \times 16$$

$$\Rightarrow 144 = 144.$$

4. A sphere is cut into two hemispheres. One of them is used as bowl. It takes 8 bowlfuls of this to fill a conical vessel of height 12 cm and radius 6 cm. The radius of the sphere (in centimetre) will be

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

Solution : 1

(1) Volume of conical vessel

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

$$= \frac{1}{3} \times \pi \times 6 \times 6 \times 12$$

$$= 144 \pi \text{ cu. cm.}$$

If the radius of sphere be R cm,
then

$$8 \times \frac{2}{3} \pi R^3 = 144\pi$$

$$\Rightarrow R^3 = \frac{144 \times 3}{8 \times 2}$$

$$= 9 \times 3 = 3 \times 3 \times 3$$

$$\therefore R = \sqrt[3]{3 \times 3 \times 3} = 3 \text{ cm.}$$

5. The perimeters of a circle, a square and an equilateral triangle are same and their areas are C, S and T respectively. Which of the following statement is true ?

(1) $C = S = T$

(2) $C > S > T$

(3) $C < S < T$

(4) $S < C < T$

Solution : 2

(2) Radius of circle = x cm.

Side of square = y cm.

Side of equilateral triangle
= z cm.

Circumference of circle = Perimeter of square = Perimeter of equilateral triangle

$$\Rightarrow 2\pi x = 4y = 3z$$

$$\Rightarrow x = \frac{4y}{2\pi} = \frac{2y}{\pi}$$

$$z = \frac{4y}{3}$$

Area of circle 'C' = πx^2

$$= \pi \times \frac{4}{\pi^2} y^2 = \frac{4}{\pi} y^2 > y^2$$

Area of square 'S' = y^2

$$\text{Area of triangle 'T'} = \frac{\sqrt{3}}{4} z^2$$

$$= \frac{\sqrt{3}}{4} \times \frac{4 \times 4}{3 \times 3} y^2$$

$$= \frac{4}{3\sqrt{3}} y^2 < y^2$$

$$\therefore T < S < C$$

6. The list price of a shirt is 440 and a customer pays 396 for it. The discount rate is

- (1) 10%
- (2) 10 1/2 %
- (3) 20%
- (4) 12%

Solution :

$$\begin{aligned} \text{(1) Discount} &= 440 - 396 \\ &= \text{Rs. } 44 \end{aligned}$$

If the rate of discount be x %, then

$$\frac{440 \times x}{100} = 44$$

$$\Rightarrow x = \frac{44 \times 100}{440} = 10 \%$$

7. Nisha bought a number of oranges at 2 for a rupee and an equal number at 3 for a rupee. To make a profit of 20% she should sell a dozen for
- (1) 6
 - (2) 8
 - (3) 10
 - (4) 12

(4) Required percentage

$$= \frac{R}{100 + R} \times 100$$

Solution : $1 = \frac{50}{100 + 50} \times 100$

$$= \frac{50}{150} \times 100$$

$$= \frac{100}{3} = 33 \frac{1}{3} \%$$

8. If A's salary is 50% more than that of B, then B's salary is less than A's by
- (1) 33%
 - (2) $40 \frac{1}{3}\%$
 - (3) $45 \frac{1}{3}\%$
 - (4) $33 \frac{1}{3}\%$

Solution : 4

(4) Required percentage

$$= \frac{R}{100 + R} \times 100$$

$$= \frac{50}{100 + 50} \times 100$$

$$= \frac{50}{150} \times 100$$

$$= \frac{100}{3} = 33 \frac{1}{3} \%$$

9. A and B are 20 km apart. A can walk at an average speed of 4 km/hour and B at 6 km/hr. If they start walking towards each other at 7 a.m., when they will meet ?

- (1) 8.00 a.m.
- (2) 8.30 a.m.
- (3) 9.00 a.m.
- (4) 10.00 a.m.

Solution : 3

(3) If A and B meet after t hours, then

$$4t + 6t = 20$$

$$\Rightarrow 10t = 20$$

$$\Rightarrow t = \frac{20}{10}$$

$$= 2 \text{ hours.}$$

Hence, both will meet at 9 a.m.

10. A policeman starts to chase a thief. When the thief goes 10 steps the policeman moves 8 steps. 5 steps of the policeman is equal to 7 steps of the thief. The ratio of the speeds of the policeman and the thief is

- (1) 25 : 28
- (2) 25 : 26
- (3) 28 : 25
- (4) 56 : 25

Solution : 3

(3) 5 steps of policeman = 7 steps of thief

$$\therefore 8 \text{ steps of policeman} = \frac{7}{5} \times$$

$$8 = \frac{56}{5} \text{ steps of thief}$$

$$\therefore \text{Required ratio} = \frac{56}{5} : 10$$

$$= 56 : 50$$

$$= 28 : 25$$

11. In a Mathematics examination the numbers scored by 5 candidates are 5 successive odd integers. If their total marks is 185, the highest score is

- (1) 39
- (2) 43

(3) 41

(4) 37

Solution : 3

(3) Marks obtained by all five candidates = $x, x + 2, x + 4, x + 6$ and $x + 8$

$$\therefore x + x + 2 + x + 4 + x + 6 + x + 8 = 185$$

$$\Rightarrow 5x + 20 = 185$$

$$\Rightarrow 5x = 185 - 20 = 165$$

$$\Rightarrow x = \frac{165}{5} = 33$$

$$\therefore \text{Highest score} = x + 8 \\ = 33 + 8 = 41.$$

12. In two successive years, 80 and 60 students of a school appeared at the final examination of which 60% and 80% passed respectively. The average rate of students passed (in percent) is

(1) 68%

(2) $68\frac{4}{7}\%$

(3) 70%

(4) $72\frac{3}{7}\%$ **Solution :** 2

$$(2) \text{ Total examinees} = 80 + 60 \\ = 140$$

Total successful examinees

$$= \frac{80 \times 60}{100} + \frac{60 \times 80}{100}$$

$$= 48 + 48 = 96.$$

\therefore Required percent

$$= \frac{96}{140} \times 100 = \frac{480}{7} = 68\frac{4}{7}\%$$

13. What is the value of

$$\frac{(941 + 149)^2 + (941 - 149)^2}{(941 \times 941 + 149 \times 149)} ?$$

(1) 10

(2) 2

(3) 1

(4) 100

Solution : 2(2) Let $941 = a$ and $149 = b$ \therefore Expression

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

$$= \frac{2(a^2 + b^2)}{a^2 + b^2} = 2$$

14. If $x + \frac{1}{x} = 5$, then $x^6 + \frac{1}{x^6}$ is

(1) 12098

(2) 12048

(3) 14062

(4) 12092

Solution : 1

$$(1) x + \frac{1}{x} = 5$$

On cubing both sides,

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

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

$$= 125$$

$$\Rightarrow x^3 + \frac{1}{x^3} + 3 \times 5 = 125$$

$$\Rightarrow x^3 + \frac{1}{x^3} = 125 - 15 = 110$$

On squaring both sides,

$$x^6 + \frac{1}{x^6} + 2 \cdot x^3 \cdot \frac{1}{x^3}$$

$$= 12100$$

$$\Rightarrow x^6 + \frac{1}{x^6} = 12100 - 2$$

$$= 12098$$

15. If $5\sqrt{5} \times 5^3 \div 5^{\frac{3}{2}} = 5^{a+2}$,
then the value of a is

- (1) 4
(2) 5
(3) 6
(4) 8

Solution : 1

(1)

$$5\sqrt{5} \times 5^3 \div 5^{\frac{3}{2}} = 5^{a+2}$$

$$\Rightarrow 5 \times 5^{\frac{1}{2}} \times 5^3 \div 5^{\frac{3}{2}} = 5^{a+2}$$

$$\Rightarrow 5^{1+\frac{1}{2}+3-\frac{3}{2}} = 5^{a+2}$$

$$\Rightarrow 5^6 = 5^{a+2} \Rightarrow a+2 = 6$$

$$\Rightarrow a = 6 - 2 = 4$$

$$[a^m \times a^n = a^{m+n}]$$

$$[a^m \div a^n = a^{m-n}]$$

If $x^2 - 3x + 1 = 0$, then the val-

16. ue of $\frac{x^6 + x^4 + x^2 + 1}{x^3}$ will be

- (1) 18
(2) 15
(3) 21
(4) 30

Solution : 3

$$(3) x^2 - 3x + 1 = 0$$

$$\Rightarrow x^2 + 1 = 3x$$

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

$$\Rightarrow x + \frac{1}{x} = 3 \quad \dots\dots\dots (i)$$

$$\therefore \frac{x^6 + x^4 + x^2 + 1}{x^3}$$

$$= \frac{x^6}{x^3} + \frac{x^4}{x^3} + \frac{x^2}{x^3} + \frac{1}{x^3}$$

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

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

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

$$+ \left(x + \frac{1}{x}\right)$$

$$= 3^3 - 3 \times 3 + 3 = 27 - 9 + 3$$

$$= 21$$

17. A boat goes 24 km upstream and 28 km downstream in 6 hours. It goes 30 km upstream and 21 km downstream in 6 hours and 30 minutes. The speed of the boat in still water is

- (1) 8 km/hr
- (2) 9 km/hr
- (3) 12 km/hr
- (4) 10 km/hr

Solution : 4

• (4) Speed of boat in still water

= x kmph

Speed of current = y kmph

\therefore Rate upstream = $(x - y)$ kmph

Rate downstream = $(x + y)$ kmph

Case I,

$$\frac{24}{x-y} + \frac{28}{x+y} = 6$$

$$\Rightarrow \frac{24(x+y) + 28(x-y)}{(x+y)(x-y)} = 6$$

$$\Rightarrow 52x - 4y = 6(x^2 - y^2)$$

$$\Rightarrow 26x - 2y = 3(x^2 - y^2) \dots (i)$$

Case II,

$$\frac{30}{x-y} + \frac{21}{x+y} = \frac{13}{2}$$

$$\Rightarrow \frac{30(x+y) + 21(x-y)}{(x+y)(x-y)} = \frac{13}{2}$$

$$\Rightarrow \frac{30x + 30y + 21x - 21y}{x^2 - y^2}$$

$$= \frac{13}{2}$$

$$\Rightarrow 51x + 9y = \frac{13}{2}(x^2 - y^2)$$

..... (ii)

On dividing equation (i) by (ii),

$$\frac{26x - 2y}{51x + 9y} = \frac{\frac{3}{13}}{\frac{2}{13}} = \frac{6}{13}$$

$$\Rightarrow 338x - 26y = 306x + 54y$$

$$\Rightarrow 338x - 306x = 26y + 54y$$

$$\Rightarrow 32x = 80y$$

$$\Rightarrow 2x = 5y$$

$$\Rightarrow y = \frac{2x}{5} \dots (iii)$$

From equation (i),

$$26x - \frac{2 \times 2x}{5} = 3 \left(x^2 - \frac{4x^2}{25} \right)$$

$$\Rightarrow \frac{130x - 4x}{5}$$

$$= 3 \left(\frac{25x^2 - 4x^2}{25} \right)$$

$$\Rightarrow \frac{126x}{5} = \frac{3 \times 21x^2}{25}$$

$$\Rightarrow 3 \times 21x = 126 \times 5$$

$$\Rightarrow x = \frac{126 \times 5}{3 \times 21} = 10 \text{ kmph}$$

18. The compound interest on a certain sum of money for 2 years at 5% per annum is 410. The simple interest on the same sum at the same rate and for the same time is
- (1) 400
 - (2) 300
 - (3) 350
 - (4) 405

Solution : 1

(1) Compound Interest

$$= P \left[\left(1 + \frac{R}{100} \right)^T - 1 \right]$$

$$\Rightarrow 410 = P \left[\left(1 + \frac{5}{100} \right)^2 - 1 \right]$$

$$\Rightarrow 410 = P \left[\left(1 + \frac{1}{20} \right)^2 - 1 \right]$$

$$\Rightarrow 410 = P \left[\left(\frac{21}{20} \right)^2 - 1 \right]$$

$$\Rightarrow 410 = P \left(\frac{441}{400} - 1 \right)$$

$$\Rightarrow 410 = P \left(\frac{41}{400} \right)$$

$$\Rightarrow P = \frac{410 \times 400}{41} = \text{Rs. } 4000$$

 \therefore S.I.

$$= \frac{\text{Principal} \times \text{Time} \times \text{Rate}}{100}$$

$$= \frac{4000 \times 2 \times 5}{100}$$

$$= \text{Rs. } 400$$

19. The graphs of $x = a$ and $y = b$ intersect at

(1) (a, b)

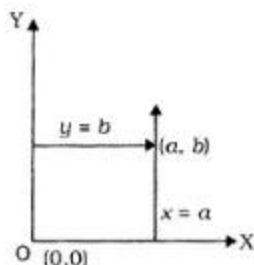
(2) (b, a)

(3) (-a, b)

(4) (a, -b)

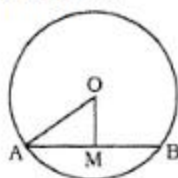
Solution : 1

∴ (1) Point of intersection
= (a, b)



20. 'O' is the centre of the circle, AB is a chord of the circle, $OM \perp AB$. If $AB = 20$ cm, $OM = 2\sqrt{11}$ cm, then radius of the circle is
- (1), 15 cm
 - (2) 12 cm
 - (3) 10 cm
 - (4) 11 cm

Solution : 2



$AB = 20$ cm.

$AM = MB = 10$ cm.

$OM = 2\sqrt{11}$ cm.

∴ Radius $OA = \sqrt{OM^2 + AM^2}$

$= \sqrt{(2\sqrt{11})^2 + 10^2}$

$= \sqrt{4 \times 11 + 100} = \sqrt{44 + 100}$

$= \sqrt{144} = 12$ cm.

21. If the angles of a triangle ABC are in the ratio $2 : 3 : 1$, then the angles $\angle A$, $\angle B$ and $\angle C$ are
- (1) $\angle A = 60^\circ$, $\angle B = 90^\circ$, $\angle C = 30^\circ$
 - (2) $\angle A = 40^\circ$, $\angle B = 120^\circ$, $\angle C = 20^\circ$
 - (3) $\angle A = 20^\circ$, $\angle B = 60^\circ$, $\angle C = 60^\circ$
 - (4) $\angle A = 45^\circ$, $\angle B = 90^\circ$, $\angle C = 45^\circ$

Solution : 1

(1) Sum of three angles of triangle = 180°

$$\angle A = 2x^\circ$$

$$\angle B = 3x^\circ$$

$$\angle C = x^\circ$$

$$\Rightarrow 2x^\circ + 3x^\circ + x^\circ = 180^\circ$$

$$\Rightarrow 6x^\circ = 180^\circ$$

$$\Rightarrow x = \frac{180}{6} = 30$$

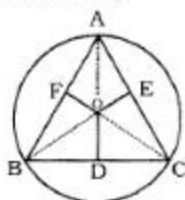
$$\therefore \angle A = 2 \times 30^\circ = 60^\circ$$

$$\angle B = 3x = 3 \times 30 = 90^\circ$$

$$\angle C = x = 30^\circ$$

22. In $\triangle ABC$, $\angle ABC = 70^\circ$, $\angle BCA = 40^\circ$. O is the point of intersection of the perpendicular bisectors of the sides, then the angle LBOC is

- (1) 100°
- (2) 120°
- (3) 130°
- (4) 140°

Solution : 4

$$OA = OB = OC$$

= Circum - radius

In $\triangle ABC$,

$$\angle A = 180^\circ - 70^\circ - 40^\circ$$

$$= 180^\circ - 110^\circ = 70^\circ$$

The angle subtended by an arc at the centre is twice to that at the circumference.

$$\therefore \angle BOC = 2 \angle BAC$$

$$= 2 \times 70 = 140^\circ$$

23. If the measures of the sides of triangle are $(x^2 - 1)$, $(x^2 + 1)$ and $2x$ cm, then the triangle would be
- (1) equilateral
 - (2) acute-angled
 - (3) isosceles

(4) right-angled

Solution : 4

$$\begin{aligned}
 (4) & (2x)^2 + (x^2 - 1)^2 \\
 &= 4x^2 + x^4 - 2x^2 + 1 \\
 &= x^4 + 2x^2 + 1 = (x^2 + 1)^2 \\
 &\text{It is a right angled triangle.}
 \end{aligned}$$

24. If $2^x = 4^y = 8^z$ and $xyz = 288$,
the value of $\frac{1}{2x} + \frac{1}{4y} + \frac{1}{8z}$ is

- (1) $11/12$
 (2) $11/96$
 (3) $29/96$
 (4) $27/96$

Solution : 2

$$\begin{aligned}
 (2) & 2^x = 4^y = 8^z \\
 \Rightarrow & 2^x = (2^2)^y = (2^3)^z \\
 \Rightarrow & 2^x = 2^{2y} = 2^{3z} \\
 \therefore & x = 2y = 3z \Rightarrow x = 3z;
 \end{aligned}$$

$$y = \frac{3}{2}z$$

$$\therefore xyz = 288$$

$$\Rightarrow 3z \times \frac{3}{2}z \times z = 288$$

$$\Rightarrow \frac{9}{2}z^3 = 288$$

$$\Rightarrow z^3 = \frac{288 \times 2}{9} = 64$$

$$\Rightarrow z = \sqrt[3]{4 \times 4 \times 4} = 4$$

$$\therefore x = 3z = 3 \times 4 = 12,$$

$$y = \frac{3}{2}z = \frac{3}{2} \times 4 = 6$$

$$\therefore \frac{1}{2x} + \frac{1}{4y} + \frac{1}{8z}$$

$$= \frac{1}{2 \times 12} + \frac{1}{6 \times 4} + \frac{1}{8 \times 4}$$

$$= \frac{1}{24} + \frac{1}{24} + \frac{1}{32}$$

$$= \frac{4 + 4 + 3}{96} = \frac{11}{96}$$

If $x^4 + \frac{1}{x^4} = 119$ and $x > 1$.

25. then find the positive value of

$$x^3 - \frac{1}{x^3}.$$

(1) 25

(2) 27

(3) 38

(4) 49

Solution : 3

$$(3) x^4 + \frac{1}{x^4} = 119$$

$$\Rightarrow \left(x^2 + \frac{1}{x^2}\right)^2 - 2 = 119$$

$$\Rightarrow \left(x^2 + \frac{1}{x^2}\right)^2 = 119 + 2 = 121$$

$$\Rightarrow \left(x^2 + \frac{1}{x^2}\right)^2 = 11^2$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 11$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^2 + 2 = 11$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^2 = 11 - 2 = 9 = 3^2$$

$$\Rightarrow x - \frac{1}{x} = 3$$

On cubing both sides,

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

$$\Rightarrow x^3 - \frac{1}{x^3} - 3x \cdot \frac{1}{x} \left(x - \frac{1}{x}\right) = 27$$

$$\Rightarrow x^3 - \frac{1}{x^3} - 3 \times 3 = 27$$

$$\Rightarrow x^3 - \frac{1}{x^3} = 27 + 9 = 36$$

26. The value of

$$(3+2\sqrt{2})^{-3} + (3-2\sqrt{2})^{-3} \text{ is}$$

- (1) 198
(2) 180
(3) 108
(4) 189

Solution : 1

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

$$= (3)^2 - (2\sqrt{2})^2 = 9 - 8 = 1$$

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

$$(x+y)^3 + (x-y)^3 = x^3 + y^3 + 3x^2y$$

$$+ 3xy^2 + y^3 + x^3 - y^3 - 3x^2y$$

$$+ 3xy^2$$

$$= 2x^3 + 6xy^2$$

$$\therefore (3+2\sqrt{2})^{-3} + (3-2\sqrt{2})^{-3}$$

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

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

$$= 2 \times (3)^3 + 6 \times 3 \times (2\sqrt{2})^2$$

$$= 2 \times 27 + 18 \times 8$$

$$= 54 + 144 = 198$$

27. The value of $\sin^2 30^\circ \cos^2 45^\circ + 5 \tan^2 30^\circ + 3/2 \sin^2 90^\circ - 3 \cos^2 90^\circ$ is

- (1) $3\sqrt{7}/24$
(2) $3\sqrt{3}/24$
(3) $3\sqrt{1}/24$
(4) $3\sqrt{5}/24$

Solution : 1

(1)

$$\sin^2 30^\circ \cos^2 45^\circ + 5 \tan^2 30^\circ$$

$$+ \frac{3}{2} \sin^2 90^\circ - 3 \cos^2 90^\circ$$

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

$$\frac{3}{2} \times 1 - 3 \times 0$$

$$= \frac{1}{4} \times \frac{1}{2} + 5 \times \frac{1}{3} + \frac{3}{2}$$

$$= \frac{1}{8} + \frac{5}{3} + \frac{3}{2} = \frac{3+40+36}{24}$$

$$= \frac{79}{24} = 3 \frac{7}{24}$$

28. If $\cos^2 \theta - \sin^2 \theta = 1/3$, where $0 \leq \theta \leq \pi/2$
then the value of $\cos^4 \theta - \sin^4 \theta$ is

- (1) $1/3$
(2) $2/3$
(3) $1/9$
(4) $2/9$

Solution : 1

$$(1) \cos^2 \theta - \sin^2 \theta = \frac{1}{3}$$

$$\cos^4 \theta - \sin^4 \theta$$

$$(\cos^2 \theta + \sin^2 \theta) (\cos^2 \theta - \sin^2 \theta)$$

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

29. If $\tan \theta = 1/\sqrt{11}$ $0 < \theta < \pi/2$,
then the value of

$$\frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{\operatorname{cosec}^2 \theta + \sec^2 \theta} \text{ is}$$

- (1) $3/4$
(2) $4/5$
(3) $5/6$
(4) $6/7$