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

GENERAL AWARENESS

1. If the average revenue is a horizontal straight line, marginal revenue will be
   (1) U shaped
   (2) Kinked
   (3) Identical with average revenue
   (4) L shaped

   Solution : 3

2. The hypothesis that rapid growth of per capita income will be associated with a reduction in poverty is called
   (1) trickle down Hypothesis
   (2) trickle up hypothesis
   (3) U shaped hypothesis
   (4) poverty estimation hypothesis

   Solution : 1

3. According to Keynes, business cycles are due to variation in the rate of investment caused by fluctuations , in the
   (1) Marginal efficiency of capital
   (2) Marginal propensity to save
   (3) Marginal propensity to consumption
   (4) Marginal efficiency to investment

   Solution : 1

4. The main emphasis of Keynesian economics is on
   (1) Expenditure
   (2) Exchange
   (3) Foreign trade
   (4) Taxation

   Solution : 1

5. The main feature of the Federal State is
   (1) Decentralisation
   (2) Centralisation
   (3) Theory of separation of powers
   (4) Sovereignty

   Solution : 1

6. Public opinion is
   (1) The opinion of the majority
   (2) The opinion of the people on political matters
   (3) Opinion of the citizens of the country
   (4) The opinion based on reasoning which is for the welfare of the whole society

   Solution : 1

7. In India the largest single item of current government expenditure is
   (1) Defence Expenditure
   (2) Interest payment of debt
   (3) Payment of subsidies
   (4) Investment in social overheads

   Solution : 2

8. The demand of a factor of production is
   (1) direct
   (2) derived
   (3) neutral
   (4) discretion of the producer

   Solution : 2

9. The first woman to preside over the UN General Assembly:
   (1) Rajkumari Amrit Kaur
   (2) Vijaylakshmi Pandit
   (3) Karnla Nehru
   (4) Indira Gandhi

   Solution : 2

10. Pancha siddhantharn of Varaha inihira deals with
    (1) Astrology
    (2) Astronomy
    (3) Medicine
    (4) Anatomy

Solution : 2

11. Which one of the following coins was issued in silver during the Gupta period ?
(1) Kakini
(2) Nishka
(3) Rupyaka
(4) Dinar

Solution : 3

12. Lothal, the dockyard site of the Indus Valley Civilization, is situated In
(1) Gujarat
(2) Punjab
(3) Pakistan
(4) Haryana

Solution : 1

13. Who among the Delhi Sultans died of a sudden fall from a horse at Lahore while playing Chaugan ?
(1) Qutbuddin Aibak
(2) II tu trni sh
(3) Balban
(4) Jalaluddin Khilji

Solution : 1

14. Buddha means
(1) Great Conqueror
(2) Great Saint
(3) Wise one
(4) Enlightened one

Solution : 4

15. Which one of the following is an item included in the list of Fundamental Duties of an Indian citizen in the Constitution ?
(1) To practice secularism.
(2) To develop scientific temper, humanism and the spirit of enquiry and reform.
(3) To pay all taxes to government regularly and correctly.
(4) Not to assault any public servant in the (during) performance of his duties.

Solution : 2

16. Where is the headquarters of Hindustan Zinc Ltd ?

(1) Udaipur
(2) Jodhpur
(3) Jaisalmer
(4) Jaipur

Solution : 1

17. Leaving agricultural land uncultivated for some years known as
(1) Intensive farming
(2) Fallowing
(3) Shifting cultivation
(4) Subsistence fanning

Solution : 2

18. The sky appears blue due to
(1) Rayleigh scattering
(2) Mie scattering
(3) Back scattering
(4) None of the above

Solution : 1

19. The mountain formed on the earth crust due to tension is called
(1) Young folded mountain
(2) Old folded mountain
(3) Laccolith mountain
(4) Block mountain

Solution : 4

20. Movement of hairs in Drosera is referred to as
(1) Heliotropism
(2) Thigmotropism
(3) Photonastic
(4) Seismonastic

Solution : 2

21. Which of the following is an example of parasitic alga ?
(1) Ulothrix
(2) Cephaleuros
(3) Oedogonium
(4) Sargassum

Solution : 2

22. Solitary cyrnose inflorescence is observed in
(1) Rose
(2) Chinarose
(3) Tuberose
(4) Gardenia

Solution : 4

23. The excretory aperture in Paramoecium is known as
(1) Cytopharynx
(2) Cytostome
(3) Cytopyge
(4) Cryptospere

Solution : 3

24. IVF (In Vitro Fertilization) Technique was first devised by
(1) Patrick Steptoe and Robert Edwards
(2) Dr. Henry Dixon
(3) Robertson
(4) Dr. Martin Cooper

Solution : 1

25. What is 'Biodiversity' ?
(1) Many types of flora & fauna in one forest
(2) Many types of flora and fauna in many forests
(3) Many population of one species in one forest
(4) All the above are true.

Solution : 1

26. A particle is moving in a uniform circular motion with constant speed v along a circle of radius r. The acceleration-of the particle is
(1) zero
(2) V / r
(3) V / r^2
(4) V^2 / r

Solution : 3

27. Which of the following devices can be used to detect radiant heat ?
(1) Liquid thermometer
(2) Six's maximum and minimum thermometer
(3) Constant volume air ther – mometer

(4) Thermopile

Solution : 4

28. In which one of the following the phenomenon of total internal reflection of light is used ?
(1) Formation of mirage
(2) Working of binoculars
(3) Formation of rainbow
(4) Twinkling of stars

Solution : 3

29. Period of oscillation of 3 cm microwaves in seconds is
(1) 1×10^{10}
(2) 1×10^{-10}
(3) 0.01
(4) 0.001

Solution : 2

30. The most advanced form Of Read Only Memory (ROM) is
(1) PROM
(2) RAM
(3) Cache Memory
(4) EEPROM

Solution : 4

31. A computer program that translates one program instruction one at a time into machine language is called a/ an
(1) Interpreter
(2) Compiler
(3) Simulator
(4) Commander

Solution : 1

32. Which of the following is very reactive and kept in kerosene?
(1) Sodium
(2) Potassium
(3) Iodine
(4) Bromine

Solution : 1

33. Just born baby has the respiratory rate as
(1) 32 times/minute
(2) 26 times/minute
(3) 18 times/minute
(4) 15 times/minute

Solution : 1

34. In the periodic table of elements, on moving from left to right across a period, the atomic radius
(1) decreases
(2) increases
(3) remains unchanged
(4) does not follow a definite pattern

Solution : 1

35. Vulcanized rubber contains sulphur
(1) 2%
(2) 3-5%
(3) 7-9%
(4) 10-15%

Solution : 2

36. Uric acid is the chief nitrogenous wastes in
(1) Frogs
(2) Birds
(3) Fishes
(4) Mankind

Solution : 2

37. To conserve coral reefs, the Government of India declared one of the following as Marine Park ;
(1) Gulf of Kutch
(2) Lakshadweep Islands
(3) Gulf of Mannar
(4) Andaman Islands

Solution : 1

38. The special modified epidermal cells surrounding stomatal pore are called
(1) Epithelial cells
(2) Guard cells

(3) Subsidiary cells
(4) Accessory cells

Solution : 2

39. Transpiration through leaves is called as
(1) Cauline transpiration
(2) Foliar transpiration
(3) Cuticular transpiration
(4) Lenticular transpiration

Solution : 2

40. Who is the brand ambassador of Nokia Phones in India ?
(1) Shah Rukh Khan
(2) Aamir Khan
(3) Abhishek Bachchan
(4) M.S. Dhoni

Solution : 1

41. Which of the following is a metallic ore ?
(1) Mica
(2) Quartz
(3) Feldspar
(4) Galena

Solution : 4

42. 'Canterbury', the premium Indian brand of woollen cardigans and pullovers is from the house of
(1) Monte-Carlo
(2) Woodland
(3) Digjam
(4) OCM

Solution : 1

43. Lionel Messi, the winner of four FIFA Ballion d'or and World Player of the year, belongs to
(1) Brazil
(2) Spain
(3) Argentina
(4) Germany

Solution : 3

44. Who is the brand ambassador of the Hockey India League (HIL) 2013 ?
(1) Pargat Singh
(2) Dhanraj Pillai
(3) Navjot Singh Siddhu
(4) Virat Kohli

Solution : 3

45. "Consumer Electronic Imaging' Fair 2013", formally called as "Photo Fair", will be organize in January 2015 at
(1) Kolkata
(2) Chennai
(3) Delhi
(4) Mumbai

Solution : 3

46. Which Indian State is the leading cotton producer ?
(1) Gujarat
(2) Maharashtra
(3) Andhra Pradesh
(4) Madhya Pradesh

Solution : 1

47. The 'more mega store' retail chain belongs to which Indian Industry ?
(1) Reliance Industry
(2) Bharti Enterprises
(3) Aditya Birla Group
(4) None of these

Solution : 3

48. Who among the following was responsible for the revival of Hinduism in 19th century?
(1) Swami Dayanand
(2) Swami Vivekanand
(3) Guru Shankaracharya
(4) Raja Ram Mohan Roy

Solution : 2

49. The Nobel Peace Prize is awarded in which city ?
(1) Brussels
(2) Geneva

(3) Oslo
(4) Stockhlm

Solution : 3

50. Where is the headquarters of the International Olympic Committee located ?
(1) Italy
(2) Switzerland
(3) Belgium
(4) France

Solution : 2

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 the answer. If a sentence is free from error, your answer is (4) i.e. No error.*

1. He feels his troubles (1)/ as much or (2)/ even more than they. (3)/ No error (4)

   Solution : 3

2. I like reading (1)/ more than (2)/ to play. (3)/ No error (4)

   Solution : 3

3. The old lady swooned (I)/ but was soon (2)/ restored at senses. (3)/ No error (4)

   Solution : 3

4. I shall have to (1)/ withdraw from my savings (2)/ to buy a new car. (3)/ No error. (4)

   Solution : 4

5. The whole block of flats (1)/ including two shops were (2)/ destroyed in fire. (3)/ No error (4)

   Solution : 2

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

6. He was..... about whether to do it or not.
   (1) ambiguous
   (2) ambivalent
   (3) ambidextrous
   (4) uncertain

   Solution : 4

7. The minister..... on the petition before it was taken up for discussion.
   (1) could sign
   (2) signed

(3) had signed
(4) must sign

Solution : 3

8. The foolish crows .....to sing.
(1) crow
(2) jump
(3) tried
(4) try

Solution : 4

9. Truculent in defending their individual rights of sovereignty under the Articles of Confederation, the newly formed states..... constantly.
(1) apologized
(2) digressed
(3) conferred
(4) squabbled

Solution : 1

10. His conduct is bad. and his honesty is not..... suspicion.
(1) above
(2) beyond
(3) under
(4) in

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. Porous
(1) Adventurous
(2) Permeable
(3) Pungent
(4) Concrete

Solution : 2

12. Insipid
(1) Spicy
(2) Bland

(3) Interesting
(4) Warm

Solution : 2

13. Convalesce
(1) Diminish
(2) Admonish
(3) Recover
(4) Convey

Solution : 3

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

14. Suppress
(1) Reveal
(2) Increase
(3) Open
(4) Explain

Solution : 1

15. Vocal
(1) Voluble
(2) Calm
(3) Quite
(4) Silent

Solution : 4

16. Indict
(1) Accuse
(2) Exonerate
(3) Incriminate
(4) Impeach

Solution : 2

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. There is no **cut and dried method** for doing this.
(1) simple
(2) honest
(3) ready made
(4) understandable

Solution : 2

18. Suddenly the man **blacked out** during the parade and had to be helped to a quiet place.
(1) lost temper
(2) lost control over himself
(3) lost consciousness
(4) lost balance

Solution : 3

19. **Hold your horses** for a moment while I make a phone call.
(1) Be patient
(2) Stayout
(3) Be quiet
(4) Wait

Solution : 4

20. Sachin Tendulkar's batting skills make him **a cut above** the rest.
(1) taller than
(2) superior to
(3) senior to
(4) different from

Solution : 2

21. I am very interested to know the outcome of the debate, kindly keep me **in the loop.**
(1) out of it
(2) informed about the fees
(3) informed about the last date of joining
(4) informed regularly

Solution : 1

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. The visitors arrived at **a lucky** moment.
(1) an opportunistic
(2) an opportunity
(3) an opportune
(4) No improvement

Solution : 3

23. 'The government **can see scarcely any valid reason** to launch an inquiry.
(1) cannot scarcely see any valid reason
(2) can see any valid reason scarcely
(3) can scarcely see any valid reason
(4) No improvement

Solution : 3

24. Henry is **taking John for tea.**
(1) taking John on tea
(2) taking John to tea
(3) taking John at tea
(4) No improvement

Solution : 4

25. **The medicines made miracles** and healed me in two days.
(1) The medicines brought acles
(2) The medicines worked miracles
(3) The medicine performed miracles
(4) No improvement

Solution : 2

26. **Any of these** two books is good.
(1) Any of this
(2) Either of these
(3) Any other of this
(4) No improvement

Solution : 2

27. The report **highlights a number of instance of injustice.**
(1) highlight a number of instances of injustice
(2) highlights a numbers of instances of injustice
(3) highlights a number of instances of injustice
(4) No improvement

Solution : 3

28. He was **for a time** our captain.
(1) for sometime
(2) once
(3) at any time
(4) No improvement

Solution : 2

29. He made **the utmost effort** to save us.
(1) an all-out
(2) an altered
(3) an intentional
(4) No improvement

Solution : 1

30. He belongs to a **rich family.**
(1) a well-to-do family
(2) an upper class family
(3) a well-known family
(4) No improvement

Solution : 1

31. Suraj looked at Sunil **with a question.**
(1) questioningly
(2) questionably
(3) wistfully
(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. To remove an objectionable part from a book.

(1) Exterminate
(2) Expurgate
(3) Extirpate
(4) Destroy

Solution : 2

33. Pertaining to sheep
(1) Canine
(2) Bovine
(3) Ovine
(4) Feline

Solution : 3

34. Hole excavated by an animal as dwelling
(1) Borrow
(2) Burrow
(3) Bore
(4) Pierce

Solution : 2

35. Person believing in free will
(1) Guardian
(2) Tyrant
(3) Humanitarian
(4) Libertarian

Solution : 4

36. Small pieces of metal that fly out from an exploding bomb
(1) Shrapnel
(2) Splinters
(3) Filings
(4) Bullets

Solution : 2

37. All the arts, beliefs and social institutions etc. characteristic of a race
(1) Culture
(2) Civilization
(3) Infrastructure
(4) Ritual

Solution : 1

38. The act of speaking about one's thoughts when one is alone.
(1) Silence
(2) Monologue
(3) Dialogue
(4) Soliloquy

Solution : 4

Direactions (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. (1) Corralative
(2) Correlative
(3) Corilative
(4) Correletive

Solution : 2

40. (1) Sychological
(2) Psychological
(3) Psykological
(4) Sykological

Solution : 2

Directions (41-50) : 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 – 1

(Q. Nos. 41 to 45)

Poverty can be defined as a social phenomenon in which a section of the society is unable to fulfill even its basic necessities of life. When a substantial segment of the society is deprived of the minimum level of living and continues at a bare subsistence level, that society is said to be plagued with mass poverty. The countries of the third world exhibit invariably the existence of mass poverty, although pockets of poverty exist even in the developed countries of Europe and America.

Attempts have been made in all societies to define poverty, but all of them are conditioned by the vision of minimum or good life obtaining in society. For instance, the concept of poverty in the U.S.A. would be significantly different from that in

India because the average man is able to afford a much higher level of living in the United States. There is an effort in all definitions of poverty to approach the average level of living in a society and as such these definitions reflect the coexistence of inequalities in a society and the extent to which different societies are prepared to tolerate them. For instance, in India, the generally accepted definition of
poverty emphasizes minimum level of living rather than a reasonable level of living. This attitude is borne out of a realization that it would not be possible to provide even a minimum quantum of basic needs for some decades and therefore, to talk about a reasonable level of living or good life may appear to be wishful thinking at the present stage. Thus, political considerations enter the definitions of poverty because programmes of alleviating poverty may become prohibitive as the vision of a good life widens.

41. What is poverty according to the writer?
(1) Ability to consider it as social phenomenon of a substantial segment of society.
(2) Inability of a society to provide the basic necessities of life.
(3) A political compulsion that dictates economic policies.
(4) A form of exhibition of subsistence living.

Solution : 2

42. What conditions the various attempts to define poverty ?
(1) The definition of poverty in India
(2) The definition of poverty in the USA
(3) The vision of minimum or good life
(4) Political considerations

Solution : 3

43. What do all definitions of poverty do ?
(1) Reflect coexistence of inequalities in society.
(2) Societies tolerance of inequalities.
(3) Approach the average level of living in a society.
(4) Minimum level of living in India.

Solution : 1

44. Definition of poverty in India emphasizes minimum level of living because
(1) It is impossible at this stage to provide a reasonable quantum of living.
(2) Political considerations enter the definitions of poverty,
(3) There is a reasonable level of good living.
(4) Programmes of alleviation of poverty have been initiated.

Solution : 1

45. Societies in the third world can be characterised plagued by mass poverty, because
(1) Europe and America have pockets of poverty.
(2) Poverty is a mass social phenomenon.
(3) There is a wide variation in the definition of poverty.
(4) Societies live at a bare subsistence level.

Solution : 4

Passage – II
(Q. Nos. 46 to 50)

By the mid-nineteenth century, mass production of paper patterns, the emergence of the home sewing machine, and the convenience of mail order catalogues brought fashionable clothing into the American home. By the early twentieth century, home economists working in extension and outreach programs taught women how to use paper patterns to improve the fit and efficiency to new garments as well as how to update existing ones.

Teachers of home economics traditionally made home sewing a critical part of their curriculum, emphasizing self-sufficiency and resource fulness for young women. However, with the increasing availability of mass-produced clothing in catalogues and department stores, more and more women preferred buying garments to making them. As a result, home economists shifted their attention to consumer education.

Through field study's analysis and research, they became experts on the purchase and preservation of ready-to-wear clothing for the family, offering budgeting instruction targeted at adolescent girls. Modern home sewing made it possible for American women to transcend their economic differences and geographic locations with clothing that was increasingly standardized. The democratization of fashion continued through the twentieth century as the ready-to-wear market expanded and home sewing became more of a pastime than a necessity.

46. What were the skills that were emphasized for young women ?
(1) Self confidence and self-esteem
(2) Self-sufficiency and resourcefulriess
(3) Resourcefulness and self-confidence
(4) Prudence and resourcefulness

Solution : 2

47. Who became experts on the purchase and preservation of ready-to-wear clothing

for the family ?
(1) Owners of department stores
(2) Field-study analysts
(3) Young women
(4) Teachers of home economics

Solution : 4

48. Who was the target group ?
(1) Young women
(2) Young girls
(3) Adolescent girls
(4) Working women

Solution : 3

49. How did home sewing help American women ?
(1) They became field analysts and researchers.
(2) They went beyond economic boundaries.
(3) They found good jobs.
(4)They became excellent teachers.

Solution : 2

50. What improved the fit and efficiency of new garments ?
(1) Sewing machines
(2) Economists
(3) Mass production
(4) Paper patterns

Solution : 4

QUANTITATIVE APTITUDE

1. For any integral value of n, $3^{2n} + 9n + 5$ when divided by 3 will leave the remainder
   (1) 1
   (2) 2
   (3) 0
   (4) 5

Solution : 2

(2) Expression $= 3^{2n} + 9n + 5$
$= (3^{2n} + 9n + 3) + 2$
$= 3\,(3^{2n-1} + 3n + 1) + 2$
Clearly, remainder = 2

2. Three men A. B and C working together can do a job in 6 hours less time than A alone, in 1 hour less time than B alone and in one half the time needed by C when working alone. Then A and B together can do the Job in
   (1) 2/3 hour
   (2) 3/4 hour
   (3) 3/2 hour
   (4) 4/3 hour

Solution : 4

(4) Let A, B and C together do the work in x hours.
$\therefore$ Time taken by A
$= (x + 6)$ hours
Time taken by B= $(x + 1)$ hours
Time taken by C = $2x$ hours

$$\therefore \frac{1}{x+6} + \frac{1}{x+1} + \frac{1}{2x} = \frac{1}{x}$$

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

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

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

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

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

$\Rightarrow 2x^2 + 2x = x + 6 - x^2 - 6x$
$\Rightarrow 3x^2 + 7x - 6 = 0$
$\Rightarrow 3x^2 + 9x - 2x - 6 = 0$
$\Rightarrow 3x(x+3) - 2(x+3) = 0$
$\Rightarrow (3x-2)(x+3) = 0$
$\Rightarrow 3x - 2 = 0$ as $x + 3 \neq 0$

$$\Rightarrow x = \frac{2}{3}$$

$$\therefore \text{Time taken by A} = 6 + \frac{2}{3}$$

$$= \frac{18+2}{3} = \frac{20}{3} \text{ hours}$$

$$\text{Time taken by B} = 1 + \frac{2}{3}$$

$$= \frac{5}{3} \text{ hours}$$

$\therefore$ (A +B)'s 1 hour's work

$$= \frac{3}{20} + \frac{3}{5} = \frac{3+12}{20}$$

$$= \frac{15}{20} = \frac{3}{4}$$

$$\therefore \text{Required time} = \frac{4}{3} \text{ hours}$$

3. A swimming pool is fitted with three pipes. The first two pipes working simultaneously, fill the pool in the same time as the third pipe alone. The second pipe alone fills the pool 5 hours faster than the first pipe and 4 hours slower than the third pipe. In what time will the second and third pipes together fill the pool?
   (1) 3 hours
   (2) 3.75 hours

(3) 4 hours

(4) 4.75 hours

Solution : 2

(2) Time taken by second pipe in filling the pool = x hours

$\therefore$ Time taken by first pipe = $(x + 5)$ hours

Time taken by third pipe = $(x - 4)$ hours

$$\therefore \frac{1}{x} + \frac{1}{x+5} = \frac{1}{x-4}$$

$$\Rightarrow \frac{x+5+x}{x(x+5)} = \frac{1}{x-4}$$

$$\Rightarrow \frac{2x+5}{x^2+5x} = \frac{1}{x-4}$$

$$\Rightarrow 2x^2 - 8x + 5x - 20 = x^2 + 5x$$

$$\Rightarrow 2x^2 - 3x - 20 = x^2 + 5x$$

$$\Rightarrow x^2 - 8x - 20 = 0$$

$$\Rightarrow x^2 - 10x + 2x - 20 = 0$$

$$\Rightarrow x(x - 10) + 2(x - 10) = 0$$

$\Rightarrow (x + 2)(x - 10) = 0 \Rightarrow x = 10$, as $x \neq -2$

$\therefore$ Part of the pool filled by second and third pipes in an hour

$$= \frac{1}{x} + \frac{1}{x-4}$$

$$= \frac{1}{10} + \frac{1}{6}$$

$$= \frac{3+5}{30} = \frac{8}{30} = \frac{4}{15}$$

$$\therefore \text{Required time} = \frac{15}{4}$$

= 3.75 hours

4. Arranging the following in descending order, we get

$\sqrt[3]{4}, \sqrt{2}, \sqrt[6]{3}, \sqrt[4]{5}$

(1) $\sqrt[3]{4} > \sqrt[4]{5} > \sqrt{2} > \sqrt[6]{3}$

(2) $\sqrt[4]{5} > \sqrt[3]{4} > \sqrt[6]{3} > \sqrt{2}$

(3) $\sqrt{2} > \sqrt[6]{3} > \sqrt[3]{4} > \sqrt[4]{5}$

(4) $\sqrt[6]{3} > \sqrt[4]{5} > \sqrt[3]{4} > \sqrt{2}$

Solution : 1

(1) LCM of indices = LCM of 3, 6, 4 and 2 = 12

$\therefore \sqrt[3]{4} = (4)^{\frac{1}{3}} = (4)^{\frac{1}{12}} = \sqrt[12]{4^4}$

$= \sqrt[12]{256}$

$\sqrt{2} = (2)^{\frac{1}{2}} = \sqrt[12]{2^6} = \sqrt[12]{64}$

$\sqrt[6]{3} = \sqrt[12]{3^2} = \sqrt[12]{9}$

$\sqrt[4]{5} = \sqrt[12]{5^3} = \sqrt[12]{125}$

Clearly, $\sqrt[3]{4} > \sqrt[4]{5} > \sqrt{2} > \sqrt[6]{4}$

5. The base of a right prism is a quadrilateral ABCD. Given that AB = 9 cm, BC = 14 cm, CD = 13 cm, DA = 12 cm and $\Delta DAB = 90^\circ$. If the volume of the prism be 2070 cm^3, then the area of the lateral surface is

(1) 720 cm^2

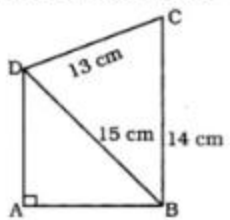
(2) 810 cm^2

(3) 1260 cm^2

(4) 2070 cm^2

Solution : 1

(1) Area of base = Area of Δ ABD + Area of Δ BCD



In, Δ ABD

$BD = \sqrt{AB^2 + AD^2} = \sqrt{9^2 + 12^2}$

$= \sqrt{81+144} = \sqrt{225} = 15$ cm

Area of Δ ABD

$= \frac{1}{2} \times AB \times AD$

$= \frac{1}{2} \times 9 \times 12$

$= 54$ sq. cm

For Δ BCD,

Semi-perimeter $(s) = \frac{13+14+15}{2}$

$= \frac{42}{2} = 21$

$\therefore$ Area of Δ BCD

$= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{21(21-13)(21-14)(21-15)}$

$= \sqrt{21 \times 8 \times 7 \times 6}$

$= 21 \times 4 = 84$ sq. cm

Area of quadrilateral ABCD

$= 54 + 84 = 138$ sq. cm

$\therefore$ Height of prism

$= \frac{\text{Volume}}{\text{Area of base}} = \frac{2070}{138}$

$= 15$ cm

Perimeter of base

$= (9 + 14 + 13 + 12)$ cm

$= 48$ cm

$\therefore$ Area of lateral surfaces

= perimeter $\times$ height

$= 48 \times 15 = 720$ sq. cm.

6. The volumes of a right circular cylinder and a sphere are equal. The radius of the cylinder and the diameter of the sphere are equal. The ratio of height and radius of the cylinder is

(1) 3 : 1

(2) 1 : 3

(3) 6 : 1

(4) 1 : 6

Solution : 4

(4) Radius of cylinder = r units

Radius of sphere = $\frac{r}{2}$ units

Let the height of cylinder be h units,

$\therefore$ Volume of cylinder = Volume of sphere

$\Rightarrow \pi r^2 h = \frac{4}{3}\pi\left(\frac{r}{2}\right)^3$

$\Rightarrow \pi r^2 h = \frac{1}{6}\pi r^3$

$\Rightarrow h = \frac{1}{6} r$

$\Rightarrow \frac{h}{r} = \frac{1}{6}$

7. A wire of length 44 cm is first bent to form a circle and then rebent to form a square. The difference of the two enclosed areas is

(1) 44 cm^2

(2) 33 cm^2

(3) 55 cm^2

(4) 66 cm^2

Solution : 2

(2) Circumference of circle

$= 2\pi r = 44$

$\Rightarrow 2 \times \frac{22}{7} \times r = 44$

$\Rightarrow r = \frac{44 \times 7}{2 \times 22} = 7$ cm.

Area of circle = πr^2

$= \frac{22}{7} \times 7 \times 7$

= 154 sq. cm.

Perimeter of square = 44 cm.

Side of square = $\frac{44}{4}$ = 11cm.

Area of square = 11 × 11

= 121 sq. cm.

Difference = 154 – 121

= 33 sq. cm.

8. A shopkeeper listed the price of goods at 30% above the cost price. He sells half the stock at this price, one fourth of the stock at a discount of 15% and the remaining at 30% discount. His overall profit is
(1) 15 3/8 %
(2) 15%
(3) 15 3/5 %
(4) 15 2/3 %

Solution : 1

(1) C.P. of articles = Rs. 100 (let)
Marked price of articles

$$= \frac{100 \times 130}{100} = \text{Rs. } 130$$

S.P. of half of articles

$$= \frac{130}{2} = \text{Rs. } 65$$

S.P. of one-fourth of articles at

$$15\% \text{ discount} = \frac{65}{2} \times \frac{85}{100}$$

= Rs. 27 .625
S.P. of remaining articles

$$= \frac{65}{2} \times \frac{70}{100} = \text{Rs. } 22.75$$

Total S.P.
= Rs. (65 + 27.625 + 22.75)
= Rs. 115.375

$$\therefore \text{ Profit \%} = 15.375\% = 15\frac{3}{8}\%$$

9. A takes three times as long as B and C together to do a job. B takes four times as long as A and C together to do the work. If all the three, working together can complete the job in 24 days, then the number of days, A alone will take to finish the job is
(1) 100
(2) 96
(3) 95
(4) 90

Solution : 2

(2) Time taken by B and C
= x days (let)
∴ Time taken by A = $3x$ days
∴ Part of work done by A, B and C in 1 day

$$= \frac{1}{x} + \frac{1}{3x} = \frac{3+1}{3x} = \frac{4}{3x}$$

$$\therefore \frac{4}{3x} = \frac{1}{24} \Rightarrow 3x = 4 \times 24$$

$$\Rightarrow x = \frac{4 \times 24}{3} = 32 \text{ days}$$

∴ Time taken by A = 32×3
= 96 days

10. A shopkeeper allows a discount of 10% on the marked price of an item but charges a sales tax of 8% on the discounted price. If the customer pays 3,402 as the price including the sales tax, then the marked price is
(1) Rs.3,400
(2) Rs. 3,500
(3) Rs. 3,600
(4) Rs. 3,800

Solution : 2

(2) Marked price of article
= Rs. x (let)
∴ S.P. of article

$$= \text{Rs.} \left(x \times \frac{90}{100} \times \frac{108}{100} \right)$$

$$\therefore x \times \frac{90}{100} \times \frac{108}{100} = 3402$$

$$\Rightarrow x = \frac{3402 \times 100 \times 100}{90 \times 108}$$

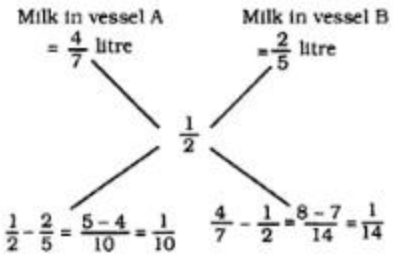
= Rs. 3500

11. The milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C containing half milk and half water ?
(1) 7 : 5

(2) 5 : 2
(3) 3 : 11
(4) 1 : 2

Solution : 1

(1) By the rule of alligation,



$\therefore$ Required ratio $= \frac{1}{10} : \frac{1}{14}$

$= 14 : 10 = 7 : 5$

12. Two numbers A and B are such that the sum of 5% of A and 4% of B is 2/3 rd of the sum of 6% of A and 8% of B. The ratio A : B is

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

Solution : 1

(1) Numbers $\Rightarrow$ A and B

$\therefore \frac{A \times 5}{100} + \frac{B \times 4}{100}$

$= \frac{2}{3}\left(\frac{A \times 6}{100} + \frac{B \times 8}{100}\right)$

$\Rightarrow 5A + 4B = \frac{12A + 16B}{3}$

$\Rightarrow 15A + 12B = 12A + 16B$
$\Rightarrow 15A - 12A = 16B - 12B$
$\Rightarrow 3A = 4B$

$\Rightarrow \frac{A}{B} = \frac{4}{3}$

13. The average marks obtained by 40 students of a class is 86. If the 5 highest marks are removed „the average reduces by one mark. The average marks of the top 5 students is

(1) 92
(2) 96
(3) 93
(4) 97

Solution : 3

(3) Sum of marks of top 5 students = $40 \times 86 - 35 \times 85$
$= 3440 - 2975 = 465$

$\therefore$ Their average = $\frac{465}{5} = 93$

14. A student finds the average of 10, 2 – digit numbers. If the digits of one of the numbers is interchanged, the average increases by 3.6. The difference between the digits of the 2-digit numbers is

(1) 4
(2) 3
(3) 2
(4) 5

Solution : 1

(1) Total increase = 3.6×10
$= 36$
$\therefore$ If the number be $10x + y$, then
Number obtained after reversing the digits $= 10y + x$
$\therefore 10y + x - 10x - y = 36$
$\Rightarrow 9y - 9x = 36$
$\Rightarrow 9(y - x) = 36$

$\Rightarrow y - x = \frac{36}{9} = 4$

15. A trader buys goods at 20% discount on marked price. If he wants to make a profit of 25% after allowing a discount of 20%, by what percent should his marked price be greater than the original marked price ?

(1) 15%
(2) 65%
(3) 25%
(4) 20%

Solution : 3

(3) Original marked price of goods = Rs.100

$$C.P = \frac{100 \times 80}{100} = \text{Rs. } 80$$

Case II,

If the marked price be Rs. x, then

$$x \times \frac{80}{100}$$

$$= \frac{80 \times 125}{100}$$

$$\Rightarrow x = \frac{80 \times 125}{100} = \text{Rs.}125$$

16. A man spends 75% of his income. His income increases by 20% and his expenditure also increases by 10%. The percentage of increase in his savings is
(1) 40%
(2) 30%
(3) 50%
(4) 25%

Solution : 3

(3) Man's income = Rs. 100 (let)
Expenditure = Rs. 75
Savings = Rs. 25

$$\text{New income} = \frac{100 \times 120}{100}$$

= Rs. 120

$$\text{New expenditure} = \frac{75 \times 110}{100}$$

= Rs. 82.5
Savings = 120 – 82.5 = Rs. 37.5
Increase in savings = 37.5 – 25
= Rs. 12.5
∴ Increase per cent

$$= \frac{12.5}{25} \times 100$$

= 50 %

17. A car travels from P to g at a constant speed. If its speed were increased by 10 km/h, it would have been taken one hour lesser to cover the distance. It would have taken further 45 minutes lesser if the speed was further increased by 10 km/h. The distance between the two cities is
(1) 540 km
(2) 420 km
(3) 600 km
(4) 620 km

Solution : 2
(2) Fixed distance = x km and
certain speed = y kmph (let).
Case I,

$$\frac{x}{y+10} = \frac{x}{y} - 1$$

$$\Rightarrow \frac{x}{y+10} + 1 = \frac{x}{y} \quad \text{--- (i)}$$

Case II.

$$\frac{x}{y+20} = \frac{x}{y} - 1 - \frac{3}{4}$$

$$= \frac{x}{y} - \frac{4+3}{4}$$

$$\Rightarrow \frac{x}{y+20} + \frac{7}{4} = \frac{x}{y} \quad \text{--- (ii)}$$

From equations (i) and (ii),

$$\frac{x}{y+10} + 1 = \frac{x}{y+20} + \frac{7}{4}$$

$$\Rightarrow \frac{x}{y+10} - \frac{x}{y+20} = \frac{7}{4} - 1$$

$$\Rightarrow x\left(\frac{y+20-y-10}{(y+10)(y+20)}\right)$$

$$= \frac{7-4}{4} = \frac{3}{4}$$

$$\Rightarrow \frac{x \times 10}{(y+10)(y+20)} = \frac{3}{4}$$

$$\Rightarrow 3\,(y+10)\,(y+20) = 40\,x$$

$$\Rightarrow \frac{3(y+10)(y+20)}{40} = x \quad \text{--(iii)}$$

From equation (i),

$$\frac{3(y+10)(y+20)}{40(y+10)} + 1$$

$$= \frac{3\,(y+10)\,(y+20)}{40y}$$

$$\Rightarrow 3\,(y+20) + 40$$

$$= \frac{3(y+10)(y+20)}{y}$$

$$\Rightarrow 3y^2 + 60y + 40\,y = 3(y^2 + 30y + 200)$$

$$\Rightarrow 3y^2 + 100y = 3y^2 + 90y + 600$$

$$\Rightarrow 10y = 600 \Rightarrow y = 60$$

Again from equation (i),

$$\frac{x}{y+10} + 1 = \frac{x}{y}$$

$$\Rightarrow \frac{x}{60+10} + 1 = \frac{x}{60}$$

$$\Rightarrow \frac{x}{70} + 1 = \frac{x}{60}$$

$$\Rightarrow \frac{x+70}{70} = \frac{x}{60}$$

$$\Rightarrow 6x + 420 = 7x$$

$$\Rightarrow 7x - 6x = 420$$

$$\Rightarrow x = 420 \text{ km}.$$

18. A train leaves a station A at 7 am and reaches another station B at 11 am. Another

train leaves B at 8 am and reaches A at 11.30 am. The two trains cross one another at

(1) 8:36 am

(2) 8:56 am

(3) 9:00 am

(4) 9:24 am

Solution : 4

(4) Let both trains meet after t hours since 7 a.m.

Distance between stations A and B = x Km.

$$\therefore \frac{x}{4} \times t + \frac{x}{\frac{7}{2}} \times (t-1) = x$$

$$\left[\text{Speed} = \frac{\text{Distance}}{\text{Time}}\right]$$

$$\Rightarrow \frac{t}{4} + \frac{2(t-1)}{7} = 1$$

$$\Rightarrow \frac{7t + 8t - 8}{28} = 1$$

$$\Rightarrow 15t - 8 = 28$$

$$\Rightarrow 15t = 28 + 8 = 36$$

$$\Rightarrow t = \frac{36}{15} = \frac{12}{5} \text{ hours}$$

= 2 hours 24 minutes

∴ Required time = 9 :24 a.m.

19. A man gave 50% of his savings of 84,100 to his wife and divided the remaining sum among his two sons A and B of 15 and 13 years of age respectively. He divided it in such a way that each of his sons, when they attain the age of 18 years, would receive the same amount at 5% compound interest per annum. The share of B was

(1) 20,000

(2) 20,050

(3) 22,000

(4) 22,050

Solution : 1

(1) Amount given to sons

$= 84100 \times \frac{1}{2}$

= Rs. 42050

Amount given to B = Rs. x (let)

∴ Amount given to A

= Rs. $(42050 - x)$

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

$$\Rightarrow (42050 - x)\left(1+\frac{R}{100}\right)^3$$

$$= x\left(1+\frac{R}{100}\right)^5$$

$$\Rightarrow (42050 - x) = x\left(1+\frac{R}{100}\right)^2$$

$$\Rightarrow (42050 - x) = x\left(1+\frac{5}{100}\right)^2$$

$$\Rightarrow (42050 - x) = x\left(1+\frac{1}{20}\right)^2$$

$$\Rightarrow 42050 - x = x\left(\frac{21}{20}\right)^2$$

$$\Rightarrow 42050 - x = \frac{441x}{400}$$

$$\Rightarrow 42050 = \frac{441x}{400} + x$$

$$\Rightarrow 42050 = \frac{441x + 400x}{400}$$

$$= \frac{841x}{400}$$

$$\Rightarrow 841\,x = 42050 \times 400$$

$$\Rightarrow x = \frac{42050 \times 400}{841}$$

= Rs. 20,000

20. A fruit-seller buys some oranges and by selling 40% of them he realises the cost price of all the oranges. As the oranges being to grow over-ripe, he reduces the price and sells 80% of the remaining oranges at half the previous rate of profit. The rest of the oranges being rotten are thrown away. The overall percentage of profit

is

(1) 80

(2) 84

(3) 94

(4) 96

Solution : 2

. (2) Number of oranges bought = 100 (let)

C.P. = Rs.100 (let)

S.P of 40 oranges = Rs.100

$\therefore$ Gain percent = $\frac{100-40}{40} \times 100 = 150\ \%$

Remaining oranges = 60

Their 80 % = $\frac{60 \times 80}{100} = 48$

These are sold at a profit of 75 %

$\therefore$ Their S.P. = $\frac{48 \times 175}{100}$

= Rs. 84

$\therefore$ Gain per cent = 84%

21. If $\frac{p}{a}+\frac{q}{b}+\frac{r}{c} = 1$ and $\frac{a}{p}+\frac{b}{q}+\frac{c}{r}=0$, where p, q, r and a, b, c are non-zero, then the value of $\frac{p^2}{a^2}+\frac{q^2}{b^2}+\frac{r^2}{c^2}$ is

(1) -1

(2) 0

(3) 1

(4) 2

Solution : 3

. (3) Let $\frac{p}{a} = x$, $\frac{q}{b} = y$, $\frac{r}{c} = z$

$\therefore x + y + z = 1$

and $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$

$\Rightarrow \frac{yz + xz + xy}{xyz} = 0$

$\Rightarrow xy + yz + zx = 0$

$\therefore x + y + z = 1$

On squaring both sides

$x^2 + y^2 + z^2 + 2xy + 2yz + 2zx = 1$

$\Rightarrow x^2 + y^2 + z^2 + 0 = 1$

$\Rightarrow x^2 + y^2 + z^2 = 1$

22. If x is a rational number and

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

then the sum of numerator and denom inator of x is

(1) 3

(2) 4

(3) 5

(4) 7

Solution : 2

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

$$\Rightarrow \frac{(x^3+3x^2+3x+1)-(x^3-3x^2+3x-1)}{(x^2+2x+1)-(x^2-2x+1)}$$

$$= 2$$

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

$$= 2$$

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

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

$$\Rightarrow 3x^2-4x+1 = 0$$

$$\Rightarrow 3x^2-3x-x+1 = 0$$

$$\Rightarrow 3x(x-1)-1(x-1) = 0$$

$$\Rightarrow (3x-1)(x-1) = 0$$

$$\Rightarrow x = \frac{1}{3} \text{ or } 1$$

$\therefore$ Required answer $= 1+3 = 4$

23. The area in sq. unit. of the triangle formed by the graphs of$x = 4$, $y = 3$ and $3x + 4y = 12$ is

(1) 12

(2) 8

(3) 10

(4) 6

Solution : 4