

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

GENERAL AWARENESS

1. Franchising is
- (1) not having to pay any fee
 - (2) a form of licensing
 - (3) operating a business without a licence
 - (4) operating with less control

Solution:2

2. The maximum strength of Rajya Sabha is
- (1) 220
 - (2) 200
 - (3) 250
 - (4) 240

Solution:2

3. If the President of India wants to resign, he has to address the letter of resignation to the
- (1) Chief Justice of India
 - (2) Prime Minister
 - (3) Vice-President
 - (4) Speaker

Solution:3

4. The playing time (in seconds) of the full version of Indian National Anthem is
- (1) 60
 - (2) 52
 - (3) 55
 - (4) 57

Solution:2

5. The tomb of Jahangir was built at
- (1) Gujarat
 - (2) Delhi

(3) Lahore

(4) Agra

Solution:3

6. What was the original name of Nur Jahan ?

(1) Zeb-un-Nissa

(2) Fatima Begum

(3) Mehr-un-Nissa

(4) Jahanara

Solution:3

7. The study of factor pricing is alternatively called the theory of

(1) functional distribution

(2) personal distribution

(3) income distribution

(4) wealth distribution

Solution:1

8. SEBI was set up in

(1) 1992

(2) 1980

(3) 1984

(4) 1988

Solution:4

9. In a free enterprise economy, resource allocation is determined by

(1) the pattern of consumers' spending

(2) the wealth of the entrepreneurs

(3) decision of the Government

(4) the traditional employment of factors

Solution:1

10. Rashtriya Krishi Bima Yojana was introduced In

(1) 1992

(2) 1998

(3) 1999

(4) 1996

Solution:3

11. Buyers and Sellers will have perfect knowledge of market conditions under

- (1) Duopoly
- (2) Perfect competition
- (3) Monopolistic competition
- (4) Oligopoly

Solution:1

12. Who acts as the channel of communication between the President and the Council Ministers

- (1) Chairman, Rajya Sabha
- (2) Speaker of Lok Sabha
- (3) Vice-President
- (4) Prime Minister

Solution:4

13. Largest producer of Bauxite in the world is

- (1) U.S.A.
- (2) Jamaica
- (3) Chile
- (4) Australia

Solution:4

14. The two richest Eco-zones of India are

- (1) The Himalayas and VindhYas
- (2) The Himalayas and Eastern Ghats
- (3) The Himalayas and Western Ghats
- (4) The Himalayas and Aravallis

Solution:3

15. At the time of independence, predominantly India practised

- (1) Subsistence agriculture
- (2) Mixed farming
- (3) Plantation agriculture
- (4) Shifting agriculture

Solution:1

16. Species which has restricted distribution is called

- (1) Eco species
- (2) Endemic
- (3) Sympatric
- (4) Allopatric

Solution:2

17. 2, 4-D is used as

- (1) Weedicide
- (2) Vitamin
- (3) Fertilizer
- (4) Insecticide

Solution:1

18. Widal test is used for the diagnosis of

- (1) Salmonellosis
- (2) Malaria
- (3) Cholera
- (4) Typhoid

Solution:4

19. Which Charter Act brought to an end, the East India Company's monopoly in India's foreign trade ?

- (1) Charter Act of 1853
- (2) Charter Act of 1793
- (3) Charter Act of 1813
- (4) Charter Act of 1833

Solution:3

20. The Declaration of the Rights of Man is related with

- (1) The Russian Revolution
- (2) The French Revolution
- (3) The American War of Independence
- (4) The Glorious Revolution of England

Solution:2

21. The policy of 'imperial preferences' adopted by Britain in its colonies in 1932 is also known as the

- (1) Hong Kong Agreement
- (2) London Agreement
- (3) Ottawa Agreement
- (4) Paris Agreement

Solution:3

22. The planet which has the highest surface temperature is

- (1) Jupiter
- (2) Earth
- (3) Pluto
- (4) Venus

Solution:4

23. Atmospheric temperature increasing at the higher altitudes is called

- (1) Radiation
- (2) Inversion
- (3) Conduction
- (4) Convection

Solution:2

24. In a conductor

- (1) there is no conduction band
- (2) the forbidden energy gap is :very wide
- (3) the forbidden energy gap is very narrow
- (4) the valence band and the conduction band overlap each other

Solution:4

25. Which one of the following converts assembly language into machine language ?

- (1) Algorithm
- (2) Interpreter
- (3) Compiler
- (4) Assembler

Solution:4

26. How many bytes are equal to one kilobyte ?

- (1) 1050
- (2) 1000
- (3) 976
- (4) 1024

Solution:4

27. Which one of the following elements exhibits the greatest tendency to lose electrons ?

- (1) Fluorine
- (2) Lithium
- (3) Oxygen
- (4) Zinc

Solution:2

28. Poison used for killing rats is

- (1) Calcium phosphide (Ca_3P_2)
- (2) Zinc phosphide (Zn_3P_2)
- (3) Magnesium nitride (Mg_3N_2)
- (4) Magnesium phosphide (Mg_3P_2)

Solution:2

29. Antacid tablets consist of

- (1) Hydroxides of sodium, magnesium and aluminium
- (2) Hydroxides of magnesium and aluminium
- (3) Hydroxides of sodium and aluminium
- (4) Hydroxides of magnesium and sodium

Solution:2

30. The element absorbed both in cation and anion form is

- (1) Sulphur
- (2) Nitrogen
- (3) Calcium
- (4) Phosphorus

Solution:2

31. What accumulates in the muscles after continuous strenuous physical exercise as a result of temporary anaerobic respiration that causes muscular fatigue ?

- (1) ATP
- (2) Lactic acid
- (3) Ethyl alcohol
- (4) Carbon dioxide

Solution:2

32. Thalassaemia is an example of

- (1) Deletion mutation
- (2) Point mutation
- (3) Silent mutation
- (4) Frame shift mutation

Solution:4

33. Eutrophication of a water body enhances

- (1) Organic matter production

- (2) Biological oxygen demand
- (3) Both (1) and (2)
- (4) Neither (1) nor (2)

Solution:3

34. The moment of inertia of a body does not depend upon its

- (1) axis of rotation
- (2) angular velocity
- (3) form of mass
- (4) distribution of mass

Solution:2

35. To open a door easily, the handle should be fixed

- (1) near the hinges
- (2) away from mid-point opposite to hinges
- (3) in the middle
- (4) None of these

Solution:4

36. Nucleons are regarded as composite sub-particles known as

- (1) Mesons
- (2) Quarks
- (3) Leptons
- (4) Photons

Solution:2

37. The name of the common currency launched by members of the European Union is

- (1) Sterling
- (2) Dollar
- (3) Euro
- (4) Pound

Solution:3

38. National Science Day in India is celebrated on

- (1) 30th April
- (2) 1st February
- (3) 28th February
- (4) 23th March

Solution:3

39. Red Data Book contains
- (1) Red pandas
 - (2) Rare plants and animals under threat
 - (3) Rare minerals
 - (4) Vanishing rivers

Solution:2

40. Which of the following is India's highest honour in the field of literature ?
- (1) Saraswati Samman
 - (2) Vyas Samman
 - (3) Kalidas Samman
 - (4) Jnanpith Award

Solution:4

41. Which scientist discovered the radioactive element Radium ?
- (1) Marie Curie
 - (2) Isaac Newton
 - (3) Albert Einstein
 - (4) Benjamin Franklin

Solution:1

42. Golden Globe Awards are associated with
- (1) Social work
 - (2) Journalism
 - (3) Peace initiative
 - (4) Films

Solution:4

43. The name of the great maestro of Indian Music "Ustad Bismillah Khan" is related to
- (1) Shehnai
 - (2) Tabla
 - (3) Sarod
 - (4) Flute

Solution:1

44. Which of the following is not a greenhouse gas ?
- (1) Water vapour
 - (2) O₂
 - (3) O₃

(4) CO₂

Solution:2

45. Interveneal necrotic spots on leaves appear due to

- (1) HF injury
- (2) SO₂ injury
- (3) NO₂ injury
- (4) O₃ injury

Solution:2

46. Nuclear fallout contains

- (1) Alpha particles
- (2) β -particles
- (3) Both (1) and (2)
- (4) Neither (1) nor (2)

Solution:3

47. Which of the following water bodies is not a freshwater resource ?

- (1) Jaisamand
- (2) Ganga river
- (3) Yamuna river
- (4) Chilika lake

Solution:3

48. Who among the following is the Home-Minister in the Union Cabinet of India ?

- (1) Sushma Swaraj
- (2) Narendra Modi
- (3) Rajnath Singh
- (4) Arun Jaitley

Solution:3

49. Who among the following was the 14th Prime Minister of India ?

- (1) Manmohan Singh
- (2) Narendra Modi
- (3) Atal Bihari Vajpayee
- (4) None of these

Solution:1

50. Which is the world's cultural capital in India ?

- (1) Kolkata
- (2) Trivandrum
- (3) Madurai
- (4) Mumbai

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

1. In his book (1)/ Churchill describes (2)/ that historical first meeting with Roosevelt. (3)/ No error (4)

Solution:3

2. The ant who was nearby (1)/ walked forward and bit the hunter (2)/ sharply in the ankle. (3)/ No error (4)

Solution:1

3. They can promise you (1)/ an experience (2) / you won't never forget. (3)/ No error (4)

Solution:3

4. The dress that the (1) / girl wore was (2)/ more attractive than the other girls. (3)/ No error (4)

Solution:3

5. Fifty years has passed (1)/ since man first ventured (2)/ into outer space. (3)/ No error (4)

Solution:1

Directions (5-10) : 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. I can..... him without qualifications.
 (1) recommend
 (2) commend
 (3) praise
 (4) suggest

Solution:1

7. She let her horse..... in the field.
 (1) loosen
 (2) loose
 (3) loosely

(4) lose

Solution:2

8. It is hoped that a..... will be reached in the meeting.

- (1) statement
- (2) comparison
- (3) compromise
- (4) compression

Solution:3

9. We are fortunate to have extremelyand visionary leaders,

- (1) competitive
- (2) complex
- (3) complaisant
- (4) competent

Solution:4

10. Some people regard the world as an.....

- (1) imitation
- (2) allusion
- (3) illusion
- (4) elision

Solution:3

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. Scintillating

- (1) moving
- (2) interesting
- (3) burning
- (4) glittering

Solution:4

12. Transient

- (1) fleeting
- (2) transparent
- (3) feeble
- (4) fanciful

Solution:1

13. Voracious
 (1) hungry
 (2) hasty
 (3) thirsty
 (4) greedy

Solution:4

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

14. Virtue
 (1) fault
 (2) vice
 (3) anger
 (4) ill-temper

Solution:2

15. Flexible
 (1) blunt
 (2) rigid
 (3) gentle
 (4) rough

Solution:2

16. Obscure
 (1) clear
 (2) gloomy
 (3) unpleasant
 (4) dark

Solution:1

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. The present manner of delimitation has been done in a **gerrymandering way**.
 (1) in a legal and constitutional manner
 (2) in a judicial and fair way
 (3) in a manipulative and unfair way
 (4) in a dictative manner like the Germans

Solution:3

18. The performance of the lead actors in the play **brought the house down**.
 (1) made the audience applaud enthusiastically
 (2) made the audience leave
 (3) made the audience cry
 (4) made the audience request an encore

Solution:1

19. People like her, who are **salt of the earth**, are very difficult to find.
 (1) dedicated to better the world
 (2) good, honest and ideal
 (3) extraordinary
 (4) one with the common folk

Solution:2

20. The Alpha and Omega
 (1) beginning and end
 (2) a Shakespearean play
 (3) a Greek song
 (4) a Swiss watch

Solution:1

21. Jane earned **pin money** working part-time as a waitress.
 (1) saved money
 (2) additional money
 (3) a small amount of money
 (4) money to be spent only for luxuries and treats

Solution:3

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

22. Loose tea leaves are kept in a tea **box**.
 (1) tin
 (2) cosy
 (3) caddy
 (4) No improvement

Solution:3

23. Shakespeare is **greater than any other poet**.

- (1) greater than many poets
- (2) greater as ,any other poet
- (3) greater than all poets
- (4) No improvement

Solution:4

24. I saw the woman **whom you said lived nest door.**

- (1) that you said live next door
- (2) who you said lived next door
- (3) which you said lived next door
- (4) No improvement

Solution:4

25. A thousand rupees **are** all that he wants.

- (1) are
- (2) was
- (3) is
- (4) No improvement

Solution:3

26. **I have never been hearing** from him since he left for America.

- (1) have never heard
- (2) have never been hearing
- (3) was never heard
- (4) No improvement

Solution:1

27. The camera I bought recently is not **convenient.**

- (1) easy to use
- (2) hard to use
- (3) difficult to use
- (4) No improvement

Solution:1

28. You are a mechanic, **aren't** you?

- (1) wasn't
- (2) isn't
- (3) are
- (4) No improvement

Solution:4

29. Sincere workers do not rest till **they have reached** perfection in their work.
- (1) they had achieved
 - (2) they have achieved
 - (3) they having reached
 - (4) No improvement

Solution:2

30. The interesting tale **had its beginning** more than fifty years ago.
- (1) began
 - (2) was started
 - (3) initiated
 - (4) No improvement

Solution:1

31. One of her friends had just **got down from** the bus.
- (1) alighted from
 - (2) arrived in
 - (3) landed from
 - (4) No improvement

Solution:1

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

32. A person who works for an employer for a fixed period of time in order to learn the particular skills needed in their job
- (1) labourer
 - (2) worker
 - (3) employee
 - (4) apprentice

Solution:4

33. A word or practice that has gone out of use
- (1) obsolete
 - (2) absolute
 - (3) outdated
 - (4) old-fashioned

Solution:1

34. Favouritism granted in politics or business to relatives
- (1) monotheism

- (2) nepotism
- (3) hedonism
- (4) redtapism

Solution:2

35. A person who collects coins

- (1) ornithologist
- (2) numismatist
- (3) philatelist
- (4) coin collector

Solution:2

36. A supplement to a will

- (1) furlough
- (2) adjunct
- (3) effusion
- (4) codicil

Solution:4

37. Estimation of a thing's worth

- (1) pay
- (2) goodness
- (3) appraisal
- (4) beliefs

Solution:3

38. To free completely from blame

- (1) let go
- (2) clear
- (3) exonerate
- (4) release

Solution:3

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. (1) silhouete
(2) silhouette
(3) silohoutte
(4) silhoutte

Solution:2

40. (1) kleptomaniac
 (2) cleptorfianiac
 (3) kleptomaniac
 (4) cleptomeniac

Solution:3

Directions (41-50) : 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 I (Q. Nos. 41 to 45)

India is chiefly an agricultural land. The cultivation of crops depends on a proper supply of water throughout the year. Since olden times, large parts of our country have suffered from occasional periods of too much rain and those of drought.

People have known that if surplus flood water could be stored away for use during the dry season, these problems will be solved. Unfortunately, they had neither the knowledge nor the means to do much in this direction. Whatever little they knew, they tried to put into practice. They dug canals to drain water from perennial rivers. This was heavy and expensive work and practicable over only a small area. Large tanks were excavated and small dams built to hold back floods. But it was not possible to do anything on a countrywide scale.

41. The term 'perennial' means
 (1) rivers flowing into canals
 (2) flowing once a year
 (3) flowing throughout the year
 (4) flowing during the monsoon

Solution:3

42. How has our country suffered since olden times ?
 (1) It has suffered due to the zamindari
 (2) It has suffered from heavy rains or severe droughts
 (3) It has suffered under the British Rule
 (4) It has suffered due to the caste system

Solution:2

43. Why were the people unable to solve the problem ?
 (1) Absence of will power
 (2) They were indifferent to the problem
 (3) They lacked knowledge and the means to solve the Problem

(4) Inadequate finance

Solution:3

44. 'Excavated' means

- (1) to fill
- (2) to make caves
- (3) to dig
- (4) to flood

Solution:3

45. India's economy is chiefly

- (1) socialistic
- (2) industrial
- (3) mixed
- (4) agricultural

Solution:4

Passage II (Q. Nos. 46 to 50)

Stop reading this passage for a few seconds and look around the room you're in. Without any perceived effort at all on your part, your brain will register everything within the scope of your vision. But where does all that information known as sensory memory – go ? Well, pretty quickly, it vanishes.

So what if you want to hold on to these fleeting memories for longer ? The answer is obvious : you need to pay conscious attention to the sensory input we are receiving. By focusing on it, you can take the information to the next memory level, and turn it into working – or short-term- memory. This enables you, say, to remember the words you've just read so that what follows makes overall sense. True to its name, short-term memory lasts for only a few seconds to a few minutes, but it plays a vital role in our daily lives, allowing us to write down doctor's appointment, make everyday decisions or have a conversation (think about it : you have to recall what someone said to you five seconds ago in order to respond). Of course, there is some information you need to keep for days, months or even years. What you need here is long-term memory. With this, the potential is there to remember something forever.

46. The information stored in your sensory memory generally

- (1) stays with you forever
- (2) stays with you for a short while
- (3) disappears completely
- (4) lingers in your brain

Solution:3

47. To convert a sensory memory into a short-term memory we must
- (1) ignore a sensory input completely
 - (2) focus on the information
 - (3) concentrate on what we are looking at
 - (4) be consciously attentive to sensory input

Solution:4

48. Short-term memory allows us to
- (1) remember events for many years
 - (2) remember an event during childhood
 - (3) remember simple things like appointments
 - (4) remember plenty of dates and numbers

Solution:3

49. Long-term memory helps us
- (1) forget unimportant things
 - (2) remember a thing for a long time
 - (3) forget things for a long time
 - (4) erase short-term memory

Solution:2

50. The information that your brain stores within a fleeting moment is called
- (1) memory level
 - (2) sensory memory
 - (3) short-term memory
 - (4) long-term memory

Solution:2

QUANTITATIVE APTITUDE

1. The radius of the base and the height of a right circular cone are doubled. The volume of the cone will be
- (1) 8 times of the previous volume
 - (2) three times of the previous volume
 - (3) $3\sqrt{2}$ times of the previous volume
 - (4) 6 times of the previous volume

Solution:1

$$(1) \text{ Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Again, } r_1 = 2r, h_1 = 2h$$

\therefore Volume of the second cone

$$= \frac{1}{3} \pi r_1^2 h_1$$

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

$$= \frac{1}{3} \pi r^2 h \times 8$$

= Eight times of the previous volume

2. The ratio of weights of two spheres of different materials is 8 : 17 and the ratio of weights per 1 cc of materials of each is 289 : 64. The ratio of radii of the two spheres is
- (1) 8 : 17
 - (2) 4 : 17
 - (3) 17 : 4
 - (4) 17 : 8

Solution:1

(1) Ratio of the volumes of spheres

$$= \frac{8 \times 64}{289 \times 17}$$

$$\Rightarrow \frac{\frac{4}{3} \pi r_1^3}{\frac{4}{3} \pi r_2^3} = \frac{8 \times 8 \times 8}{17 \times 17 \times 17}$$

$$\Rightarrow \frac{r_1^3}{r_2^3} = \left(\frac{8}{17}\right)^3$$

$$\Rightarrow \frac{r_1}{r_2} = \frac{8}{17}$$

3. A shopkeeper buys an article for 360. He wants to make a gain of 25% on it after a discount of 10%. The marked price is

- (1) 486
(2) 450
(3) 500
(4) 460

Solution:3

(3) Marked price of the article
= Rs. x .

$$\therefore \frac{x \times 90}{100} = \frac{360 \times 125}{100}$$

$$\Rightarrow \frac{9x}{10} = 90 \times 5$$

$$\Rightarrow x = \frac{90 \times 5 \times 10}{9} = \text{Rs. } 500$$

4. A is to pay B, 600 in 4 years time. A offers to pay up B at present. What discount should B allow A ?

- (1) 96
- (2) 100
- (3) 120
- (4) 110

Solution:

(*) If the rate = 5% p.a.; then

Present worth

$$= \frac{\text{Amount} \times 100}{100 + (R \times T)}$$

$$= \frac{600 \times 100}{100 + (5 \times 4)} = \frac{600 \times 100}{120}$$

$$= \text{Rs. } 500$$

$$\text{Discount} = 600 - 500 = \text{Rs. } 100$$

Note : No rate is mentioned in the question.

5. A shopkeeper sold an item for ₹1510 after giving a discount of $24\frac{1}{2}\%$ and thereby incurred a loss of 10%. Had he sold the item without discount, his net profit would have been

- (1) ₹ 641
- (2) ₹ $322\frac{1}{9}$
- (3) ₹ $422\frac{2}{9}$
- (4) ₹ $322\frac{2}{9}$

Solution:4

(4) Marked price of the article

= Rs. x

$$\text{Discount} = 24\frac{1}{2}\% = \frac{49}{2}\%$$

$$\therefore \left(100 - \frac{49}{2}\right)\% \text{ of } x = 1510$$

$$\Rightarrow x \times \left(\frac{200 - 49}{200}\right) = 1510$$

$$\Rightarrow x \times \frac{151}{200} = 1510$$

$$\Rightarrow x = \frac{1510 \times 200}{151} = \text{Rs. } 2000$$

$$\therefore \text{C.P. of article} = \frac{1510 \times 100}{90}$$

$$= \text{Rs. } \frac{15100}{9}$$

$$\therefore \text{Gain} = 2000 - \frac{15100}{9}$$

$$= \frac{18000 - 15100}{9} = \frac{2900}{9}$$

$$= \text{Rs. } 322\frac{2}{9}$$

6. 3,000 is divided between A, B and C, so that A receives $\frac{1}{3}$ as much as B and C together receive and B receives $\frac{2}{3}$ as much as A and C together receive. Then the share of C is
- (1) 600
 - (2) 525
 - (3) 1,625
 - (4) 1,050

Solution:4

$$(4) A = \frac{1}{3} (B + C)$$

$$\Rightarrow 3A = B + C \dots (i)$$

$$B = \frac{2}{3} (A + C)$$

$$\Rightarrow 3B = 2A + 2C \dots (ii)$$

From equation (i),

$$3A = B + C$$

$$\Rightarrow 9A = 3B + 3C$$

$$\Rightarrow 9A = 2A + 2C + 3C$$

$$\Rightarrow 7A = 5C \dots (iii)$$

From equation (ii),

$$3B = 2 \left(\frac{5C}{7} \right) + 2C$$

$$\Rightarrow 21B = 10C + 14C$$

$$\Rightarrow 21B = 24C$$

$$\Rightarrow 7B = 8C \dots (iv)$$

From equations (iii) and (iv),

$$C = \frac{7A}{5} = \frac{7B}{8}$$

$$\therefore \frac{A}{5} = \frac{B}{8} = \frac{C}{7}$$

$$C's \text{ share} = \frac{7}{(5+8+7)} \times 3000$$

$$= \text{Rs.} \left(\frac{7}{20} \times 3000 \right)$$

$$= \text{Rs. } 1050$$

7. $4^{61} + 4^{62} + 4^{63} + 4^{64}$ is divisible by

(1) 17

(2) 3

(3) 11

(4) 13

Solution:1

$$\begin{aligned}
 & (1) 4^{61} + 4^{62} + 4^{63} + 4^{64} \\
 &= 4^{61} (1 + 4 + 4^2 + 4^3) \\
 &= 4^{61} (1 + 4 + 16 + 64) \\
 &= 4^{61} \times 85 \text{ which is divisible by } 17.
 \end{aligned}$$

8. The least number which must be added to the greatest number of 4 digits in order that the sum may be exactly divisible by 307 is

- (1) 232
(2) 32
(3) 43
(4) 75

Solution:

$$\begin{aligned}
 & (*) 307 \times 32 = 9824 \\
 & 307 \times 33 = 10131 \\
 & \therefore \text{Required number} \\
 &= 10131 - 9999 \\
 &= 132
 \end{aligned}$$

9. A cistern is provided with two pipes A and B. A can fill it in 20 minutes and B can empty it in 30 minutes. If A and B be kept open alternately for one minute each, how soon will the cistern be filled ?

- (1) 121 minutes
(2) 110 minutes
(3) 115 minutes
(4) 120 minutes

Solution:3

(3) Part of the tank filled in first

$$\text{two minutes} = \frac{1}{20} - \frac{1}{30} = \frac{3-2}{60}$$

$$= \frac{1}{60}$$

∴ Part of tank filled in 114 minutes

$$= \frac{57}{60} = \frac{19}{20}$$

∴ Remaining part of cistern will be filled in 115th minute

10. If 40 men or 60 women or 80 children can do a piece of work in 6 months, then 10 men, 10 women and 10 children together do half of the work in

(1) $5\frac{6}{13}$ months

(2) 6 months

(3) $5\frac{7}{13}$ months

(4) $11\frac{1}{13}$ months

Solution:3

(3) 40 men \equiv 60 women \equiv 80 children

\therefore 10 men $\equiv \frac{80}{40} \times 10 = 20$ children

\therefore 10 women $\equiv \frac{80}{60} \times 10$

$= \frac{40}{3}$ children

\therefore 10 men + 10 women + 10 children

$= \left(20 + \frac{40}{3} + 10 \right)$ children

$= \left(\frac{60 + 40 + 30}{3} \right)$ children

$= \frac{130}{3}$ children

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

$$\Rightarrow 80 \times 6 = 2 \times \frac{130}{3} \times D_2$$

$$\Rightarrow D_2 = \frac{80 \times 6 \times 3}{2 \times 130} = \frac{72}{13}$$

$$= 5 \frac{7}{13} \text{ months}$$

11. If a machine consumes $k/5$ kilowatts of power every t hours, how much power in kilowatts, will three such machines consume in 10 hours ?

(1) $\frac{k}{t}$

(2) $\frac{6t}{k}$

(3) $\frac{6k}{t}$

(4) $\frac{t}{k}$

Solution:3

∴ (3) Power consumed by each machine in 10 hours

$$= \frac{k \times 10}{5 \times t} = \frac{2k}{t} \text{ Kilowatts}$$

∴ Power consumed by three such machines

$$= 3 \times \frac{2k}{t} = \frac{6k}{t} \text{ kilowatts}$$

12. Three cubes of sides 6 cm, 8 cm and 1 cm are melted to form a new cube. The surface area of the new cube is

(1) 486 cm^2

(2) 496 cm^2

(3) 586 cm^2

(4) 658 cm^2

Solution:1

∴ (1) Volume of the new cube

$$= [(6)^3 + (8)^3 + (1)^3] \text{ cu.cm.}$$

$$= (216 + 512 + 1) \text{ cu.cm.}$$

$$= 729 \text{ cu.cm.}$$

$$\text{Edge of new cube} = \sqrt[3]{729}$$

$$= 9 \text{ cm}$$

$$\text{Its surface area} = 6 \times (\text{edge})^2$$

$$= 6 \times 9 \times 9 = 486 \text{ sq. cm.}$$

13. I walk a certain distance and ride back taking a total time of 37 minutes. I could walk both ways in 55 minutes. How long would it take me to ride both ways ?

(1) 30 minutes

- (2) 19 minutes
- (3) 37 minutes
- (4) 20 minutes

Solution:2

(2) Walking + Riding
 $\equiv 37$ minutes ... (i)
 $2 \times \text{Walking} \equiv 55$ minutes ... (ii)
 By equation (i) $\times 2$ - equation (ii),
 $2 \times \text{Riding} = 2 \times 37 - 55$
 $= 74 - 55 = 19$ minutes

14. The compound interest on a certain sum of money at a certain rate per annum for two years is 2,050, and the simple interest on the same amount of money at the same rate for 3 years is 3,000. Then the sum of money is
- (1) 20,000
 - (2) 18,000
 - (3) 21,000
 - (4) 25,000

Solution:1

(1) S.I. for 3 years = Rs. 3000

$$\text{S.I. for 2 years} = \frac{3000}{3} \times 2$$

= Rs. 2000

C.I. - S.I.

$$= 2050 - 2000 = \text{Rs. } 50$$

$$\text{S.I.} = \frac{PR \times 3}{100}$$

$$\Rightarrow PR = \frac{3000 \times 100}{3}$$

= Rs. 100000

$$\therefore \text{Difference} = \frac{P \times R^2}{10000}$$

$$\Rightarrow 50 = \frac{P \times (100000)^2}{10000 \times P^2}$$

$$\Rightarrow P = \frac{1000000}{50} = \text{Rs. } 20000$$

15. If $ab + bc + ca = 0$, then the value of

$$\frac{1}{a^2 - bc} + \frac{1}{b^2 - ac} + \frac{1}{c^2 - ab} \text{ is}$$

(1) 2

(2) -1

(3) 0

(4) 1

Solution:3

$$(3) ab + bc + ca = 0$$

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

$$\therefore a^2 - bc = a^2 + ab + ca$$

$$= a(a + b + c)$$

Similarly,

$$b^2 - ac = b(a + b + c)$$

$$c^2 - ab = c(a + b + c)$$

$$\therefore \frac{1}{a^2 - bc} + \frac{1}{b^2 - ac} + \frac{1}{c^2 - ab}$$

$$= \frac{1}{a(a + b + c)} + \frac{1}{b(a + b + c)} +$$

$$\frac{1}{c(a + b + c)}$$

$$= \frac{bc + ac + ab}{abc(a + b + c)} = 0$$

16. If the equation $2x^2 - 7x + 12 = 0$ has two roots α and β , then the value of

$$\frac{\alpha}{\beta} + \frac{\beta}{\alpha} \text{ is}$$

(1) $\frac{7}{2}$

(2) $\frac{1}{24}$

(3) $\frac{7}{24}$

(4) $\frac{97}{24}$

Solution:2

$$(2) 2x^2 - 7x + 12 = 0$$

$$\therefore \alpha + \beta = \frac{7}{2}$$

$$\alpha\beta = \frac{12}{2} = 6$$

[In equation $ax^2 + bx + c = 0$,

$$\alpha + \beta = \frac{-b}{a}, \alpha\beta = \frac{c}{a}]$$

$$\therefore \frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{\alpha^2 + \beta^2}{\alpha\beta}$$

$$= \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha\beta}$$

$$= \frac{\left(\frac{7}{2}\right)^2 - 2 \times 6}{6}$$

$$= \frac{\frac{49}{4} - 12}{6}$$

$$= \frac{49 - 48}{4 \times 6} = \frac{1}{24}$$

17. Find the value of x for which the expression $2 - 3x - 4x^2$ has the greatest value.

(1) $-\frac{41}{16}$

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

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

(4) $\frac{41}{16}$

Solution:3

$$\therefore (3) \text{ Expression} = 2 - 3x - 4x^2 \\ = -(4x^2 + 3x - 2)$$

$$= - \left[(2x)^2 + 2 \times 2x \times \frac{3}{4} + \left(\frac{3}{4}\right)^2 - \left(\frac{3}{4}\right)^2 - 2 \right]$$

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

The value of expression will be maximum if,

$$2x + \frac{3}{4} = 0$$

$$\Rightarrow 2x = -\frac{3}{4}$$

$$\Rightarrow x = -\frac{3}{8}$$

18. The expression $x^4 - 2x^2 + k$ will be a perfect square if the value of k is

(1) 1

(2) 0

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

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

Solution:1

$$(1) \text{ Expression} = x^4 - 2x^2 + k$$

$$= (x^2)^2 - 2 \cdot x^2 \cdot 1 + (1)^2 - (1)^2 + k$$

For a perfect square,

$$-1 + k = 0 \Rightarrow k = 1$$

19. If $(x - 1)$ and $(x + 3)$ are the factors of $x^2 + k_1x + k_2$ then

(1) $k_1 = -2, k_2 = -3$

(2) $k_1 = 2, k_2 = -3$

(3) $k_1 = 2, k_2 = 3$

(4) $k_1 = -2, k_2 = 3$

Solution:2

$$\begin{aligned}
 (2) \quad f(x) &= x^2 + k_1x + k_2 \\
 (x-1) &\text{ is a factor of } f(x). \\
 \therefore f(1) &= 0 \\
 \Rightarrow 1 + k_1 + k_2 &= 0 \\
 \Rightarrow k_1 + k_2 &= -1 \quad \dots (i) \\
 \text{Again,} \\
 f(-3) &= 0 \\
 \Rightarrow (-3)^2 + k_1(-3) + k_2 &= 0 \\
 \Rightarrow 9 - 3k_1 + k_2 &= 0 \\
 \Rightarrow 3k_1 - k_2 &= 9 \dots (ii) \\
 \text{On adding both equations,} \\
 4k_1 &= 8 \Rightarrow k_1 = 2 \\
 \text{From equation (i),} \\
 k_1 + k_2 &= -1 \\
 \Rightarrow 2 + k_2 &= -1 \\
 \Rightarrow k_2 &= -1 - 2 = -3
 \end{aligned}$$

20. The ratio of the number of boys and girls in a school is 2 : 3. If 25% of the boys and 30% of the girls are scholarship holders, the percentage of the school students who are not scholarship holders is

- (1) 72
- (2) 36
- (3) 54
- (4) 60

Solution:1

• (1) Boys in school = $2x$

Girls = $3x$

Students who are not scholarship holders :

$$\text{Boys} \Rightarrow \frac{2x \times 75}{100} = \frac{6x}{4}$$

$$\text{Girls} \Rightarrow \frac{3x \times 70}{100} = \frac{21x}{10}$$

Total students who do not hold

$$\text{scholarship} = \frac{6x}{4} + \frac{21x}{10}$$

$$= \frac{30x + 42x}{20} = \frac{72x}{20} = \frac{18x}{5}$$

∴ Required percentage

$$\frac{18x}{5x} \times 100 = 72\%$$

21. The mean of 20 items is 55. If two items 45 and 30 are removed, the new mean of the remaining items is

- (1) 65.1
- (2) 65.3
- (3) 56.9
- (4) 56

Solution:3

• (3) Sum of 18 items

$$= 55 \times 20 - 45 - 30$$

$$= 1100 - 75 = 1025$$

$$\therefore \text{Required average} = \frac{1025}{18}$$

$$= 56.9$$

22. The average age of a cricket team of 11 players is the same as it was 3 years back because 3 of the players whose current average age of 33 years were replaced by 3 youngsters. The average age of the newcomers is
- (1) 23 years
 - (2) 21 years
 - (3) 22 years
 - (4) 20 years

Solution:3

$$\begin{aligned}
 & \text{(3) Total age of three youngsters} = 33 \times 3 - 11 \times 3 = 99 - 33 \\
 & = 66 \text{ years} \\
 & \therefore \text{Required average} \\
 & = \frac{66}{3} = 22 \text{ years}
 \end{aligned}$$

23. If there is a profit of 20% on the cost price, the percentage of profit on the sale price is
- (1) $16\frac{2}{3}\%$
 - (2) 12 %
 - (3) $15\frac{1}{3}\%$
 - (4) 16 %

Solution:1

(1) Cost price = Rs. x

$$\text{S.P.} = \frac{120x}{100} = \text{Rs. } \frac{6x}{5}$$

$$\text{Gain} = \text{Rs. } \frac{x}{5}$$

∴ Required gain per cent

$$= \frac{\frac{x}{5}}{\frac{6x}{5}} \times 100$$

$$= \frac{100}{6} = \frac{50}{3}$$

$$= 16\frac{2}{3}\%$$

24. 25% of 120 + 40% + 380 = ? of 637

(1) $\frac{2}{7}$

(2) $\frac{1}{7}$

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

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

Solution:1

$$\therefore (1) \frac{120 \times 25}{100} + \frac{380 \times 40}{100}$$

$$= 637 \times ?$$

$$\Rightarrow 30 + 152 = 637 \times ?$$

$$\Rightarrow 182 = 637 \times ?$$

$$\Rightarrow ? = \frac{182}{637} = \frac{2}{7}$$

25. A thief steals a car at 1.30 p.m. and drives it off at 40 km/hr. The theft is discovered at 2 p.m. and the owner sets off in another car at 50 km/hr. He will, overtake the thief at

- (1) 5 p.m.
- (2) 4 p.m.
- (3) 4.30 p.m.
- (4) 6 p.m.

Solution:2

(2) Distance covered by the

$$\text{thief in half an hour} = \frac{1}{2} \times 40$$

$$= 20 \text{ km}$$

Relative speed of car owner

$$= 50 - 40 = 10 \text{ km}$$

∴ Required time

$$= \frac{\text{Difference of distance}}{\text{Relative speed}}$$

$$= \frac{20}{10} = 2 \text{ hours}$$

i.e. at 4 p.m.

26. In a $\triangle ABC$, $AB = BC$, $\angle B = x^\circ$ and $\angle A = (2x - 20)^\circ$. Then $\angle B$ is

- (1) 54°
- (2) 30°
- (3) 400
- (4) 44°

Solution:4