

Most Expected Questions for SSC CGL 2019-20 Tier-II Exam



1. Expand: $(5a + 4b - 6c)^2$
 A. $25a^2 + 16b^2 + 36c^2 + 40ab - 48bc + 60ca$
 B. $25a^2 + 16b^2 + 36c^2 + 40ab - 48bc - 60ca$
 C. $25a^2 + 16b^2 - 36c^2 + 40ab - 48bc - 60ca$
 D. $25a^2 + 16b^2 + 36c^2 + 40ab + 48bc + 60ca$

2. Suppose there is a polynomial $p(x) = x^4 - 8x^3 - px^2 + qx + 16$ that has positive real roots. Find pq:
 A. -768
 B. 848
 C. 768
 D. 978

3. A principal sum is invested at 10% compound interest annually for 2 years. It would fetch Rs 1762 more if the interest is compounded half-yearly. Find the sum?
 A. Rs 560000
 B. Rs 320000
 C. Rs 420000
 D. Rs 600000

4. A tradesman gives 40% discount on the marked price and gives 2 articles free for buying every 14 articles and thus gains 40%. Then find that the marked price is how much percent is above the cost price?

- A. $44\frac{2}{3}\%$
 B. $22\frac{3}{2}\%$
 C. $33\frac{3}{4}\%$
 D. $66\frac{2}{3}\%$

5. Ram went to shop for buying a smart-phone. He asked him to pay 15% tax, if he wanted a bill, and if not then he could buy the smart-phone after getting discount of 8% on the actual price. Then Ram decided not to take the bill and paid Rs 5520. How much money did Ram save on purchasing the phone as compared to the billed amount?

- A. Rs 1380
 B. Rs 1420
 C. Rs 1680
 D. Rs 1850

6. If Rahim decreases his speed by 25% then he will take 2 more hours to reach his destination. How much time will Rahim take reach his destination with his usual speed?

- A. 8 hours
 B. 4 hours
 C. 5 hours
 D. 6 hours

7. There are two types of employees in Future Construction, general graduates and engineers. Of the total, 60% of the employees are engineers. And 55% of general graduates earn more than Rs. 6 lakh/year. If 70% of total employees earn more than Rs. 6 lakh/year, then what proportion of engineers earn less than Rs. 6 lakh/year?

- A. $\frac{1}{3}$
 B. $\frac{1}{6}$
 C. $\frac{1}{4}$
 D. $\frac{1}{5}$

8. A takes three times as long as B and C together to do a job. If B takes four time as long as A and C together to do the same work and if all the three working together can complete the job in 24 days, then the number of days, B and C will take to finish the job is

- A. 48
 B. 32
 C. 96
 D. 36

9. A can do as much work as B and C together can do. A and B can together do a piece of work in 10 hours and C can do it in 50 hrs. Then, time that B needs to do the double of the total work alone is -



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- A. 25 hrs.
- B. 48 hrs
- C. 50 hrs.
- D. 12.5 hrs.

10. A number is divided into two parts in such a way that 80% of 1st part is 3 more than 60% of 2nd part and 80% of 2nd part is 6 more than 90% of the 1st part. Then the Number is

- A. 125
- B. 130
- C. 135
- D. 145

11. Rate of interest on a sum of money is 5% per annum for the first 2 years. 8% per annum for the next 4 years & 10% per annum for the period beyond 6 years. SI accrued on the sum for a total period of 9 years is Rs. 1440. What is the sum (in Rs.)?

- A. 1750
- B. 2000
- C. 2333.33
- D. 2100

12. A mixture of two liquids X and Y in the ratio 1:6 is present in a tank. When 16L of the mixtures is taken out and 16L of liquid X is poured in the tank, this ratio becomes 3:2. Find the final quantity of liquid X contained in the tank.

- A. 18L
- B. 12L
- C. 8L
- D. 30L

13. A batsman has a certain average of runs in 20 innings. In the 21st innings, he scores 137 runs and his average of runs increases by 4 runs. What will be his average after 21st innings?

- A. 61 runs
- B. 49 runs
- C. 53 runs
- D. 57 runs

14. ₹ 1170 is distributed among A, B and C such that A gets 25% less than B but B

gets $\frac{1}{3}rd$ less than C. Find the amount obtained by B and C together.

- A. 900
- B. 700
- C. 1000
- D. 950

15. A bus crosses a man moving along the road at 9 km/hr. The man could see the bus up to 3 minutes. What is the speed of the bus, if at the time of disappearance the distance between bus and man is 2.75 km?

- A. 64 km/hr
- B. 55 km/hr
- C. 46 km/hr
- D. 73 km/hr

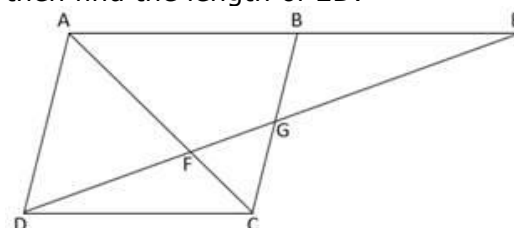
16. In $\triangle ABC$, BD bisects $\angle B$ and intersects AC at D. If BC = 12, AC = 13 and AB = 14, then find AD ?

- A. 6 cm
- B. 8 cm
- C. 7 cm
- D. None of these

17. In $\triangle ABC$, AD and BE are perpendicular from vertices A and B on sides BC and AC respectively and intersect each other at O. If BD = DC and $\angle BAC = 66^\circ$, then find the measure of $\angle BCO$:

- A. 66°
- B. 49.5°
- C. 99°
- D. 33°

18. In the given figure, ABCD is a parallelogram. If AB = BE and FG = 4 cm, then find the length of ED.



- A. 16 cm
- B. 24 cm
- C. 20 cm
- D. 32 cm

19. ABCD is a trapezium, in which $AB \parallel DC$. If AB = 15.6 cm and length of line segment adjoining the midpoints of



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diagonals AC and BD is 3.6 cm, then find the length of CD. (CD > AB)

- A. 19.2 cm
- B. 12 cm
- C. 8.4 cm
- D. 22.8 cm

20. ABCD is a trapezium, in which $AB \parallel DC$ and $AB = 4$ cm, $BC = 5$ cm, $CD = 6$ cm, $AD = 8$ cm then $AC^2 + BD^2$ is equal to:

- A. 141 cm^2
- B. 122 cm^2
- C. 137 cm^2
- D. 131 cm^2

21. In a ΔABC , AD and BE are altitudes on BC and AC respectively intersecting each other at O. If $AO : OD = 7 : 9$, $BO : OE = 5 : 3$, then find the ratio between area of ΔABD and area of ΔACD :

- A. 1 : 6
- B. 1 : 36
- C. 1 : 3
- D. 1 : 9

22. If $\sin\theta$, $\sin 2\theta$, $\sin 3\theta$ are in A.P. if value of θ :

- A. $\frac{n\pi}{3}$, $n \in \mathbb{I}$
- B. $\frac{n\pi}{6}$, $n \in \mathbb{I}$
- C. $n\pi$, $n \in \mathbb{I}$
- D. $\frac{n\pi}{2}$, $n \in \mathbb{I}$

23. If $\cos(A - B)$, $\cos A$ and $\cos(A + B)$ are in H.P., then find the value of $\cos A \cdot \sec \frac{B}{2}$:

- A. $\pm \sqrt{2}$
- B. ± 2
- C. 0
- D. ± 1

24. If the roots of the quadratic equation $Ax^2 + Bx + C = 0$ are $\cot 34^\circ$ and $\tan 79^\circ$,

$$\frac{A + 2B + 2C}{A}$$

then find the value of $\frac{A + 2B + 2C}{A}$:

- A. 1

- B. 2
- C. 3
- D. -1

25. If $x + \frac{1}{x} = 2\sin 15^\circ$, then find the value of $x^{2089} + \frac{1}{x^{2137}}$:

- A. $2\cos 15^\circ \cot 75^\circ$
- B. 0
- C. $2\cos 15^\circ$
- D. $2\sin 15^\circ \tan 15^\circ$

Direction: Select the most appropriate option to substitute the underlined segment in the given sentence. If no substitution is required, select No improvement.

26. Beside being a honest person, he is a great leader.

- A. Besides being an honest person
- B. Though he is an honest person
- C. In fact being honest
- D. Even being an honest person

Select the most appropriate option to fill in the blank.

27. Noah thought she had a good chance to get the job, _____ her mother was on the company's board of members.

- A. and
- B. for
- C. yet
- D. still

Choose the most appropriate option to change the narration (direct/indirect) of the given sentence.

28. The student said, "Alas! My fate has failed me even after the hard work went through".

- A. The student exclaimed sadly that his fate had failed him even after the hard work he had gone through.
- B. The student told that his fate failed him even after the hard work he had gone through.
- C. The student told sadly that his fate had failed him even after the hard work he had gone through.



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D. The student exclaimed sadly that his fate failed him even after the hard work he went through.

Choose the most appropriate option to change the narration (direct/indirect) of the given sentence.

29. Aditi said to Keshav, "You should consult a psychologist right now".

- A. Aditi commanded Keshav to consult a psychologist right in that time.
- B. Aditi request Keshav that he should consult a psychologist right at that time.
- C. Aditi advised Keshav to consult a psychologist right at that time.
- D. Aditi told Keshav that he should consult a psychologist right at that time.

Select the most appropriate synonym of the given word.

30. Evocative
- A. reminiscent
 - B. inciting
 - C. incendiary
 - D. falsified

Select the most appropriate antonym of the given word.

31. Decant
- A. siphon
 - B. inundate
 - C. troglodyte
 - D. effuse

Select the word which means the same as the group of words given.

32. One who studies methods of improving the quality of the human race especially by selective breeding
- A. demagogue
 - B. psephologist
 - C. eugenicist
 - D. pedagogue

Select the word which means the same as the group of words given.

33. The fear of the sun
- A. hemophobia
 - B. homophobia
 - C. heliophobia
 - D. hypochondria

Select the word which means the same as the group of the words given.

34. A person who makes or sells women's hats
- A. clique
 - B. milliner
 - C. nimble
 - D. pedant

Select the word which means the same as the group of the words given.

35. A solemn procession, especially for a funeral
- A. cortege
 - B. colt
 - C. blurb
 - D. alibi

36. Select the INCORRECTLY spelt word.

- A. influence
- B. itinerent
- C. ignorance
- D. impeach

37. Select the correctly spelt word.

- A. embarasment
- B. encouragement
- C. conscinteous
- D. comotion

Select the most appropriate synonym of the given word.

38. PUCKER
- A. smoothness
 - B. crumple
 - C. polish
 - D. shine

Select the most appropriate synonym of the given word.

39. IMPIETY
- A. irreverence
 - B. approbation
 - C. bow
 - D. veneration

Given below are four jumbled sentences. Out of the given options pick the one that gives their correct order.

40. P) Whereas Deimos orbits farther away, along an orbit that's tilted by 2

degrees off the plane of the Martian equator.

Q) The wonky orbit adds evidence to the idea that Phobos may once have been a giant ring that eventually coalesced into its present shape.

R) Mars has two small, lumpy moons, Phobos and Deimos.

S) Phobos orbits closer to the Red Planet and follows the line of Mars' equator.

A. RSPQ

B. RPQS

C. QSRP

D. QPRS

Given below are four jumbled sentences. Out of the given options pick the one that gives their correct order.

41. P) It is grown in plantations and private properties.

Q) Also unlike other trees that go on to live for hundreds of years, coconut palm has a limited lifespan of about 50-80 years.

R) After producing nuts and leaves for these many years, when the tree senile and poses a threat of falling and causing threat to life and property, it is culled.

S) Coconut palm is not a naturally occurring indigenous forest species and is not part of the forest ecosystem.

A. SQRP

B. SPQR

C. RPQS

D. PQSR

In the sentence, identify the segment which contains the grammatical error. If the sentence has no error, then select 'No error'.

42. This emotion endorses the understanding that this Sikh practise is something exceptional.

A. This emotion endorses the

B. No error

C. understanding that this

D. Sikh practise is something exceptional

In the sentence, identify the segment which contains the grammatical error. If the sentence has no error, then select 'No error'.

43. To paraphrase Marcel Proust, the real voyage of discovery consists not in seeking new landscapes but to have new eyes.

A. To paraphrase Marcel Proust, the

B. landscapes but to have new eyes

C. real voyage of discovery consists not

D. No error

Direction (44 – 48) : Given below is a passage with five blanks which have been numbered. Fill in the blanks by choosing the correct option given against the corresponding Question number.

Thought is the response of memory that has been stored through knowledge; knowledge is gathered through experience. That is, experience, knowledge, memory stored in the brain, then _____(###Q1###), then action. This _____(###Q2###) our pattern of living, and the whole process is based on this movement. Man has done this for the last million years. He _____(###Q3###) caught in the cycle, which is the movement of thought. And within this area, he has choice. He can go from one corner to the other and say, "This is my choice, this is my movement of freedom" — but it is always within the _____(###Q4###) field of the known. And knowledge is always accompanied by _____(###Q5###) because there is no complete knowledge about anything.

44. Select the most appropriate option to fill in the blank.

A. confused

B. thought

C. sarcastic

D. honest

45. Select the most appropriate option to fill in the blank.

A. is

B. are

C. have

D. has

46. Select the most appropriate option to fill in the blank.

A. was being



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- B. were being
- C. has been
- D. have been

47. Select the most appropriate option to fill in the blank.

- A. limited
- B. unfettered
- C. unlimited
- D. cosmic

48. Select the most appropriate option to fill in the blank.

- A. cognizance
- B. ignorance
- C. wisdom
- D. competence

Direction: Select the most appropriate option to substitute the underlined segment in the given sentence. If no substitution is required, select No improvement.

49. Rati is two week too move the huge box to the second floor.

- A. too week to move
- B. too weak to move
- C. take two week moving
- D. cannot move

Direction: Select the most appropriate option to substitute the underlined segment in the given sentence. If no substitution is required, select No improvement.

50. Suppose if he win what would I have done!

- A. Suppose he be winner
- B. When he will win
- C. Even that he will win
- D. If he wins



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###ANSWERS###

1. Ans. B.

Consider $(5a + 4b - 6c)^2$

We know that

$$\begin{aligned}
 (a+b-c)^2 &= a^2 + b^2 + c^2 + 2(ab - bc - ca) \\
 \Rightarrow (5a + 4b - 6c)^2 &= \\
 (5a)^2 + (4b)^2 + (6c)^2 + 2(20ab - 24bc - 30ca) \\
 &= 25a^2 + 16b^2 + 36c^2 + 40ab - 48bc - 60ca
 \end{aligned}$$

Trick: This kind of questions can be solved using options and checking "+" or "-" signs. Here, variable "c" has negative sign. Thus, negative sign will be removed on squaring in term "c²" but "ca" and "bc" term will carry a negative sign.

2. Ans. C.

Let a, b, c and d be the roots of the polynomial p(x):

$$\therefore \text{Sum of the roots} = a + b + c + d = 8$$

$$\text{And product of roots} = abcd = 16$$

Such situation occurs only when $a = b = c = d = 2$

Here, AM of four positive real roots:

$$(a+b+c+d)/4 = 2 \text{ and } GM = \sqrt[4]{abcd} = 2$$

AM = GM occurs only when the numbers are equal.

$$\therefore a = b = c = d = 2$$

$$\text{Here, } ab + ac + ad + bc + bd + cd = -p$$

$$\therefore p = -24$$

$$\text{Also, } abc + acd + abd + bcd = -q$$

$$\therefore q = -32$$

$$\therefore pq = 768$$

3. Ans. B.

Let the sum be p.

 \therefore According to the question,

$$\left\{ p \left(1 + \frac{10}{100 \times 2} \right)^{2 \times 2} - p \right\} - \left\{ p \left(1 + \frac{10}{100} \right)^2 - p \right\} = 1762$$

$$\Rightarrow \left\{ p \times \left(\frac{21}{20} \right)^4 - p \right\} - \left\{ p \times \left(\frac{11}{10} \right)^2 - p \right\} = 1762$$

$$\frac{34481p}{160000} - \frac{21p}{100} = 1762$$

$$\frac{34481p - 33600p}{160000} = 1762$$

$$\frac{881p}{160000} = 1762$$

$$\Rightarrow p = \text{Rs } 320000$$

Hence, option B is the correct answer.

4. Ans. D.

Let the CP of each article be 10x and MP be y

 \therefore CP of 16 articles will be $16 \times 10x = 160x$

$$\text{Also, SP of 14 articles} = 160x \times \frac{(100+40)}{100} = 224x$$

$$\therefore \text{SP of each article} = \frac{224x}{14} = 16x$$

$$16x = y \times \left(1 - \frac{4}{100} \right)$$

Now,

$$16x = y \times \frac{96}{100}$$

$$\Rightarrow y = \frac{50x}{3}$$

According to the question;

$$\frac{50x/3 - 10x}{10x} \times 100$$

$$\frac{20x}{30x} \times 100 = 66\frac{2}{3}\%$$

Hence, option D is the correct answer.

5. Ans. A.

According to the question,

$$SP \times \frac{(100-8)}{100} = 5520$$

$$SP \times \frac{92}{100} = 5520$$

$$SP = \text{Rs } 6000$$

$$\text{SP with Tax} = 6000 + \frac{15}{100} \times 6000$$

$$= 6000 + 900 = \text{Rs } 6900$$

$$\therefore \text{Reqd. savings} = 6900 - 5520 = \text{Rs } 1380$$

Hence, option A is the correct answer.

6. Ans. D.

$$\text{Rahim's decreased speed} = (100 - 25)\%$$

$$\frac{3}{4}$$

Ratio of his usual speed with his

$$\text{decreased speed} = 1 : \frac{3}{4} = 4 : 3$$

$$\text{So, ratio of time} = 3 : 4$$

$$\text{Here, } (4 - 3) = 1 \rightarrow 2 \text{ hour}$$



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Therefore, his usual time will be $3 \times 2 = 6$ hours

7. Ans. D.

Let total number of employees be 100

Then, number of engineers = 60 and

number of general graduates = 40

Number of general graduates who earn more than Rs. 6 lakh/year = $40 \times 55\% = 22$

So, number of engineers who earn more than Rs. 6 lakh/year = $100 \times 70\% - 22 = 48$

Therefore, proportion of engineers who earn less than Rs. 6 lakh/year =

$$\frac{60 - 48}{60} = \frac{1}{5}$$

8. Ans. B.

A : (B + C) = 1 : 3 (efficiency ratio)

(A+B+C) : (B+C) = 4 : 3 (efficiency ratio)

Let efficiency of (A+B+C) = 4 units/day

Efficiency of (B+C) = 3 units/day

Given, working together they take 24 days to complete the work.

Hence, Total work = $4 \times 24 = 96$ units

(B+C) will do the work in = $96/3 = 32$ days

Hence, Option B is the right answer.

9. Ans. C.

$$\begin{array}{ccc} A + B = 10 \text{ hrs} & & 5 \\ & \searrow \quad \nearrow & \\ & 50 & \\ & \nearrow \quad \searrow & \\ C = 50 \text{ hrs} & & 1 \end{array}$$

(A + B + C) efficiency = $5 + 1 = 6$ units/hour

Efficiency of C = 1 unit/hour

Efficiency of A+B = 5 unit/hour

As per question,

Efficiency of A = Efficiency of B+C

Let efficiency of A = A unit/hour

Then, $A = (5-A) + 1$

$A = 3$ unit/hour

$B = 5-A = 2$ unit/hour

Now, total work = $50 \times C = 50 \times 1 = 50$ units

Double of total work = 100 units

Time taken by B to do double of total work = $100 \div 2 = 50$ hours

Hence, Option C is the right answer.

10. Ans. C.

Let the First part = Rs. a and the Second part = Rs. b

$$\frac{a \times 80}{100} = \frac{b \times 60}{100} + 3$$

$$4a - 3b = 15 \dots\dots\dots(1)$$

$$\frac{4b}{5} = \frac{9a}{10} + 6$$

$$\text{Again } 8b - 9a = 60 \dots\dots\dots(2)$$

By solving equations(1) and (2), we have:

$a = 60$ and $b = 75$

So, $a + b = 135$

Hence, Option C is the right answer.

11. Ans. B.

Let the sum of money be P.

Then, as per question:

$$5\% \times 2P + 8\% \times 4P + 10\% \times 3P = \text{Rs } 1440$$

$$72\% P = 1440$$

$$\text{Then, } 100\% \text{ of } P = (1440/72) \times 100 = \text{Rs } 2000$$

Hence, Option B is the right answer.

12. Ans. A.

	X : Y		X : Y
Initially	1 : 6	→ diff. ↑	1 : 6
Finally	(3 : 2) × 3	→ 8 ↓	9 : 6

Now, some amount of mixture is taken out and liquid X is added. So, make the proportion of Y equal.

Since, Difference $(9 - 1) = 8$ units = 16L
(Given: 16L is poured into the tank)

$$\therefore 1 \text{ unit} = 2 \text{ L}$$

$$\text{Quantity of Mixture} = 9 + 6 = 15 \text{ units} = 15 \times 2 = 30\text{L}$$

$$\text{Initially - } X:Y = 3:2$$

$$3x + 2x = 30\text{L}$$

$$\Rightarrow x = 6\text{L}$$

$$\therefore \text{Final quantity of liquid X} = 3 \times 6 = \mathbf{18\text{L}}$$

13. Ans. D.

Let the average in 20 innings be x runs

Therefore, total runs till 20th innings = $20x$.

As per question,

$$20x + 137 = 21(x + 4)$$

$$\Rightarrow x = 137 - 84 = 53$$

Therefore, his avg. of runs after 21st innings = $x + 4 = 53 + 4 = 57$ runs

14. Ans. A.

A gets 25% less than B

$$25\% = \frac{1}{4}$$

This means if B obtain 4 unit then A will get only 3 unit.



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Amount of A : Amount of B = 3 : 4
.....(1)

B gets $\frac{1}{3}$ rd less than C.

This means if C obtain 3 unit then B will get only 2 unit.

Amount of B : Amount of C = 2 : 3

Also, Amount of B : Amount of C = 4 : 6.....(2)

Combining equation (1) and (2)

Amount of A : Amount of B : Amount of C = 3 : 4 : 6

Hence, Amount obtained by B and C together = 4 + 6 = 10 unit

According to question

$$\Rightarrow 13 \text{ unit} = 1170$$

$$\Rightarrow 1 \text{ unit} = 90$$

$$\Rightarrow 10 \text{ unit} = 900$$

Amount obtained by B and C together = ₹ 900

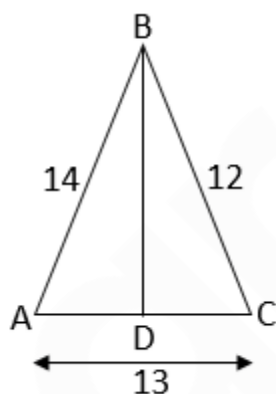
15. Ans. A.

Relative speed of bus and man = 2.75

$$3 \times \frac{1}{60} = 55 \text{ km/hr}$$

Speed of Bus = Relative speed + Speed of man = 55 + 9 = 64 km/hr

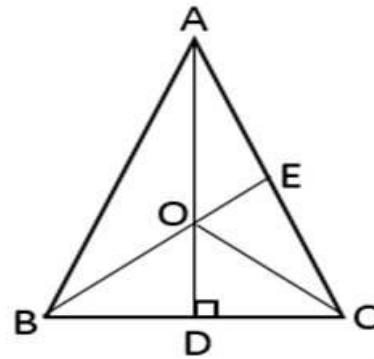
16. Ans. C.



We know that AD : DC = AB : BC = 14 : 12 = 7 : 6

$$\text{Now, } AD = AC \times \frac{7}{13} = 13 \times \frac{7}{13} = 7 \text{ cm}$$

17. Ans. D.



Given:

$$\angle BAC = 66^\circ$$

Since AD and BE are working as altitude of $\triangle ABC$, O is the orthocentre

$$\text{So } \angle BOC = 180^\circ - \angle BAC$$

$$\angle BOC = 180^\circ - 66^\circ = 114^\circ$$

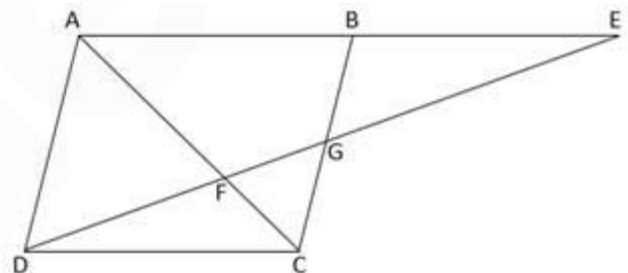
Now, in $\triangle BOC$,

OD is altitude and median both so $\triangle BOC$ is an isosceles triangle.

And $BO = OC$ and $\angle OBC = \angle OCB$

$$\angle BCO = 66^\circ / 2 = 33^\circ$$

18. Ans. B.



In $\triangle AED$ and $\triangle BEG$,

$BG \parallel AD$

so $\triangle BEG \sim \triangle AED$

$$\frac{BE}{AE} = \frac{BG}{AD} = \frac{GE}{DE} = \frac{1}{2}$$

Since $2BG = AD = BC$,

$BG = GC$

$$\text{so } \frac{GC}{AD} = \frac{1}{2}$$

Now, in $\triangle GFC$ and $\triangle ADF$,

$$\angle AFD = \angle GFC$$

$$\text{and } \angle FAD = \angle FCG$$

so $\triangle FCG \sim \triangle FAD$

$$\frac{FG}{FD} = \frac{GC}{AD} = \frac{1}{2}$$

$$\text{So } FD = 2FG = 8 \text{ cm}$$

$$\text{and } GD = 4 + 8 = 12 \text{ cm}$$

Now, the required

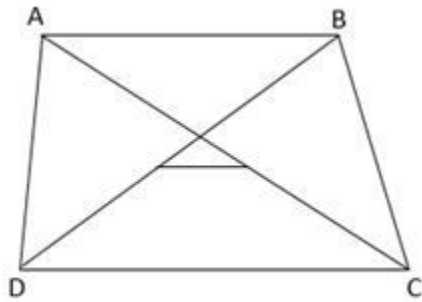
$$ED = 2GD = 2 \times 12 = 24 \text{ cm}$$

19. Ans. D.



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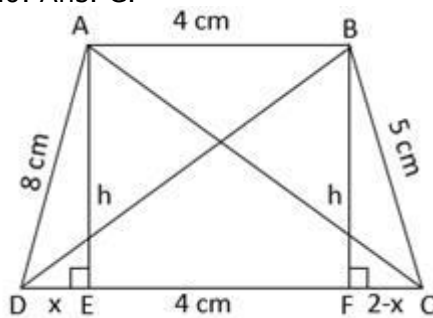
By the property of Trapezium,
length of line adjoining the midpoints of

$$\text{diagonals} = \frac{1}{2} (CD - AB)$$

$$3.6 = \frac{1}{2} (CD - 15.6)$$

$$CD = 7.2 + 15.6 = 22.8 \text{ cm}$$

20. Ans. C.



Let $AE = BF = h$ and $DE = x$,
then $CF = (2 - x)$

In $\triangle BDF$,
By Pythagoras Theorem,
 $BF^2 + FD^2 = BD^2$

$$\Rightarrow BD^2 = h^2 + (4 + x)^2 \dots (1)$$

In $\triangle BFC$,
By Pythagoras Theorem,
 $BF^2 + FC^2 = BC^2$

$$\Rightarrow 5^2 = h^2 + (2 - x)^2$$

$$\Rightarrow h^2 = 21 + 4x - x^2$$

Put this value in Equation (1)

$$\Rightarrow BD^2 = 21 + 4x - x^2 + 16 + 8x + x^2$$

$$\Rightarrow BD^2 = 37 + 12x \dots (2)$$

In $\triangle ACE$,
By Pythagoras Theorem,
 $AE^2 + EC^2 = AC^2$

$$\Rightarrow AC^2 = h^2 + (6 - x)^2 \dots (3)$$

In $\triangle ADE$,
By Pythagoras Theorem,
 $AE^2 + ED^2 = AD^2$

$$\Rightarrow 8^2 = h^2 + x^2$$

$$\Rightarrow h^2 = 64 - x^2$$

Put this value in Equation (3)

$$\Rightarrow AC^2 = 64 - x^2 + 36 - 12x + x^2$$

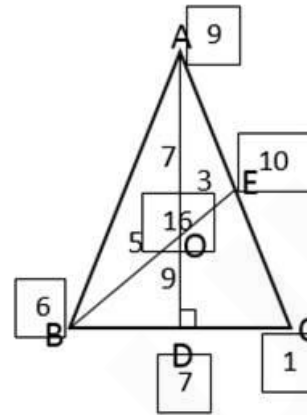
$$\Rightarrow AC^2 = 100 - 12x \dots (4)$$

By adding equation (3) and (4)

$$\Rightarrow AC^2 + BD^2 = 100 - 12x + 37 + 12x$$

$$\Rightarrow AC^2 + BD^2 = 137$$

21. Ans. A.



Given $AO : OD = 7 : 9$

Let point A has a weight of 9 mass point,
then D will have a weight of 7 mass point
and total weight on point O will be of 16
(9 + 7) mass point.

Again given $BO : OE = 5 : 3$

point O has a weight of 16 mass point, so
point B will have a weight of 6 mass point

$\times \frac{3}{8}$
(16 $\times \frac{3}{8}$) and point E will have 10 (16 - 6)
mass point.

And point C will have a weight of 1 mass
point (7 - 6).

So, $BD : DC = 1 : 6$

Since height of both the $\triangle ABD$ and $\triangle ACD$
is same, ratio of their areas will be equal
to ratio of their bases.

So Area ($\triangle ABD$) : Area ($\triangle ACD$) = $BD : DC$
= 1 : 6

22. Ans. D.

Given,

$\sin \theta, \sin 2\theta, \sin 3\theta$ are in A.P.

Then, $2\sin 2\theta = \sin \theta + \sin 3\theta$

$$\Rightarrow 2\sin 2\theta = 2\sin 2\theta \cos \theta$$

$$\Rightarrow \sin 2\theta (\cos \theta - 1) = 0$$

$$\Rightarrow \sin 2\theta = 0 \text{ or } \cos \theta = 1$$

$$\Rightarrow \theta = \frac{n\pi}{2} \text{ or } \theta = 2n\pi, n \in \mathbb{I}$$



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Hence $\theta = \frac{n\pi}{2}$ is the solution.

23. Ans. A.

Given,

$\cos(A - B)$, $\cos A$ and $\cos(A + B)$ are in H.P.

then $\frac{1}{\cos(A - B)}$, $\frac{1}{\cos A}$ and $\frac{1}{\cos(A + B)}$ will be in A.P.

So,

$$\frac{2}{\cos A} = \frac{1}{\cos(A - B)} + \frac{1}{\cos(A + B)}$$

$$\Rightarrow \frac{2}{\cos A} = \frac{\cos(A - B) + \cos(A + B)}{\cos(A - B)\cos(A + B)}$$

$$\Rightarrow \cos A = \frac{2\cos(A - B)\cos(A + B)}{\cos(A - B) + \cos(A + B)}$$

$$\Rightarrow \cos A = \frac{\cos 2A + \cos 2B}{2\cos A \cos B} \quad [\because$$

$$2\cos A \cos B = \cos(A + B) + \cos(A - B)]$$

$$\Rightarrow 2\cos^2 A \cos B = 2\cos^2 A - 1 + 1 - 2\sin^2 B$$

($\because \cos 2A = 2\cos^2 A - 1$ and $\cos 2B = 1 - 2\sin^2 B$)

$$\Rightarrow 2\cos^2 A \cos B - 2\cos^2 A = -2\sin^2 B$$

$$\Rightarrow 2\cos^2 A (\cos B - 1) = -2\sin^2 B$$

$$\Rightarrow 2\cos^2 A (1 - 2\sin^2 \frac{B}{2} - 1) = -2(4\sin^2 \frac{B}{2} \cos^2 \frac{B}{2})$$

$$\Rightarrow 2\cos^2 A (-2\sin^2 \frac{B}{2}) = -8\sin^2 \frac{B}{2} \cos^2 \frac{B}{2}$$

$$\Rightarrow \cos^2 A = 2\cos^2 \frac{B}{2}$$

$$\Rightarrow \cos^2 A \cdot \sec^2 \frac{B}{2} = 2$$

$$\Rightarrow \cos A \cdot \sec \frac{B}{2} = \pm \sqrt{2}$$

24. Ans. C.

Given,

$\cot 34^\circ$ and $\tan 79^\circ$ (or $\cot 11^\circ$) are the roots of equation $Ax^2 + Bx + C = 0$

then, Sum of roots = $\frac{-B}{A} = \cot 34^\circ + \cot 11^\circ$

and Product of roots = $\frac{C}{A} = \cot 34^\circ \cdot \cot 11^\circ$

We know that $\cot 45^\circ = 1$

$$\Rightarrow \cot(34^\circ + 11^\circ) = 1$$

$$\Rightarrow \frac{\cot 34^\circ \cot 11^\circ - 1}{\cot 34^\circ + \cot 11^\circ} = 1$$

$$\Rightarrow \cot 34^\circ \cot 11^\circ - 1 = \cot 34^\circ + \cot 11^\circ$$

$$\Rightarrow \cot 34^\circ + \cot 11^\circ - \cot 34^\circ \cot 11^\circ = -1$$

Now, the required,

$$\frac{A + 2B + 2C}{A}$$

$$= 1 + \frac{2B}{A} + \frac{2C}{A}$$

$$= 1 - 2(\cot 34^\circ + \cot 11^\circ - \cot 34^\circ \cdot \cot 11^\circ)$$

$$= 1 - 2 \times (-1)$$

$$= 1 + 2$$

$$= 3$$

25. Ans. A.

$$\text{Given, } x + \frac{1}{x} = 2\sin 15^\circ$$

$$\Rightarrow x + \frac{1}{x} = 2 \times \frac{\sqrt{3} - 1}{2\sqrt{2}}$$

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

By squaring both sides,

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

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

By cubing both sides

$$\Rightarrow x^6 + \frac{1}{x^6} + 3x^2 \cdot \frac{1}{x^2} \left(x^2 + \frac{1}{x^2} \right) = -3\sqrt{3}$$

$$\Rightarrow x^6 + \frac{1}{x^6} + 3(-\sqrt{3}) = -3\sqrt{3}$$

$$\Rightarrow x^6 + \frac{1}{x^6} = 0$$

$$\Rightarrow \frac{x^{12} + 1}{x^6} = 0$$



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$$\Rightarrow x^{12} = -1$$

Now, the required,

$$\begin{aligned} & x^{2089} + \frac{1}{x^{2137}} \\ &= (x^{12})^{174} \cdot x + \frac{1}{(x^{12})^{178} \cdot x} \\ &= (-1)^{174} \cdot x + \frac{1}{(-1)^{178} \cdot x} \end{aligned}$$

$$\begin{aligned} &= x + \frac{1}{x} = 2\sin 15^\circ \\ &= 2\cos 15^\circ \cdot \tan 15^\circ \\ &= 2\cos 15^\circ \cdot \cot 75^\circ \end{aligned}$$

26. Ans. A.

'Beside' is a preposition meaning next to something/ someone" and 'Besides' means "as well as something/ someone". But here we need the adverb "besides" here, to refer to two different qualities, honesty and leadership, parallelly. Also, 'honest' starts with a consonant but sounds as a vowel, as the H becomes silent. So, 'an' is the correct article to use here.

'Though' and 'even' are used to draw difference, not parallelism. And "In fact" does not go with the context of the sentence.

Thus, option a becomes the correct answer

27. Ans. B.

Here the second sentence is the reason for the preceding clause. Therefore, we will use the conjunction "for" here as it is used to introduce the reason for the preceding clause.

Hence, option B is the correct answer.

28. Ans. A.

It is an exclamatory sentence. When the exclamatory words like hurrah, bravo, alas etc. are used we use the verb according to the expression or use the structure "exclaim with _ (the expression)_" / "exclaim + adverb form of expression". As of here, the student seems to be disappointed or sad. Hence, "exclaim sadly" is the correct verb to use here.

Also, in case of exclamatory sentences 'that' is used as a conjunction and the

tense of the reported verb (has failed, went) is changed according to the reporting verb (said).

Hence, Option A is correct.

29. Ans. C.

It is an imperative sentence. This is a piece of advice. Hence "Advise" is the correct verb to use here. As the sentence is in past tense, it has become 'advised'. Also, in case of imperative sentences 'to' is used as a conjunction being followed by the verb of reported portion, making it an infinitive. So, the second verb remains in its root form. Hence, option C is the correct answer.

30. Ans. A.

Let us understand the meaning of these words-

Evocative- bringing strong images, memories, or feelings to mind

Reminiscent- absorbed in or suggesting absorption in memories

Inciting- encourage or stir up (violent or unlawful behavior)

Incendiary- (of a device or attack) designed to cause fires

Falsified- alter (information, a document, or evidence) so as to mislead

Hence option A is the correct answer

31. Ans. B.

Let us understand the meaning of these words-

Decant- to pour (a liquid, especially wine) from one container into another

Siphon- a tube used to convey liquid upwards from a reservoir and then down to a lower level of its own accord. Once the liquid has been forced into the tube, typically by suction or immersion, flow continues unaided

Inundate- overwhelm (someone) with things or people to be dealt with

Troglodyte- a person who is regarded as being deliberately ignorant or old-fashioned

Effuse- give off (a liquid, light, smell, or quality)

As we can see that option A and D are synonyms of Decant and option C has no relation to Decant. Hence option B is the correct answer.

32. Ans. C.

Let us understand their meanings-



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Demagogue- A political leader who tries to win support by using Arguments based on emotion rather than reason

Psephologist- A person (sociologist) who studies election trends

Eugenicist- A person who studies methods of improving the quality of the human race especially by selective breeding

Pedagogue- a teacher, especially a strict or pedantic one

Hence option C is the correct answer.

33. Ans. C.

Let us understand their meanings-

Hemophobia- Fear of blood

Homophobia- dislike of or prejudice against homosexual people

Heliophobia- Fear of the sun

Hypochondria- Fear of getting ill

Hence option C is the correct answer.

34. Ans. B.

Clique: An exclusive circle of people with a common purpose

Milliner: Someone who makes and sells hats

Nimble: Moving quickly and lightly

Pedant: A person who pays more attention to formal rules and book learning than they merit

Hence, option B is the correct answer.

35. Ans. A.

Cortege: A funeral procession

Colt: A young male horse under the age of four

Blurb: A promotional statement (as found on the dust jackets of books)

Alibi: A claim or piece of evidence that one was elsewhere when an act, typically a criminal one, is alleged to have taken place.

Hence, option A is the correct answer.

36. Ans. B.

The incorrectly spelt word is "Itinerent" and the correctly spelt word is "Itinerant" which means traveller.

Let's understand the meaning of other words:

Influence: a power to affect persons or events especially power based on prestige etc

Ignorance: lack of knowledge

Impeach: to charge someone of misconduct

Hence, option B is the correct answer.

37. Ans. B.

Option B has the correctly spelt word.

Encouragement means

Correct spelling of other words along with their meanings:

Embarrassment: The shame you feel when your inadequacy or guilt is made public

Conscientious: Characterized by extreme care and great effort

Commotion: A disorderly outburst or tumult

38. Ans. B.

Let's understand the meaning of the given words:

Pucker: tightly gather or contract into wrinkles or small folds.

E.g.: the child's face puckered, ready to cry

Smoothness: a texture without roughness; smooth to the touch

Crumple: to gather something into small wrinkles or folds

E.g.: she crumpled her lips

Polish: make (a surface) shiny

Shine: be bright by reflecting or casting light

Hence, option B is the correct answer.

39. Ans. A.

Let's understand the meaning of the given words:

Impiety = lack of piety or reverence

E.g.: he blamed the fall of the city on the impiety of the people

Irreverence = a lack of respect for people or things that are generally taken seriously

E.g.: an attitude of irreverence towards politicians

Approbation = official recognition or approval

Bow = bend one's knee or body, or lower one's head

Veneration = a feeling of profound respect for someone or something

Hence, option A is the correct answer.

40. Ans. A.

Sentence R is the best fit for the opening sentence as it introduces the topic – the two moons of Mars. This eliminates option C and D.



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Sentences Sand P make a mandatory pair as they both tells us about the two moons of the mars – Phobos and Deimos (use of “whereas” in P suggests that it comes after S); this eliminates option B.

The correct logical sequence is RSPQ. Hence, option A is the correct answer.

41. Ans. B.

Sentence S is the best fit for the opening sentence as it mentions the introduction of the ‘coconut tree’.

This eliminates option C and D.

Sentences S and P are mandatory pairs as sentence P explains where actually the coconut trees, mentioned in the opening sentence, are grown (i.e. in plantations and private properties).

The correct logical order is SPQR.

Hence, option B is the correct answer.

42. Ans. D.

Option D has the grammatically incorrect part. The word “practise” is a verb which means to do or play something regularly or repeatedly in order to become skilled at it. “Practice” is a noun which means something that is usually or regularly done, often as a habit, tradition, or custom. Here in the sentence, we need a noun. Therefore, replace “practise” with “practice” to make the sentence grammatically correct.

43. Ans. B.

Option B has the grammatically incorrect answer. The phrase before ‘but’ uses the gerund – seeking (a noun). To maintain the parallel structure of the sentence, replace ‘to have’ with “having” (a gerund).

44. Ans. B.

A Noun is required in the blank. Out of the given options only ‘thought’ is a noun which means an idea. All the other options confused, sarcastic and honest are adjectives. Also from the first sentence of the passage, we can see a process that is mentioned in the first sentence is arranged in reverse order in the 2nd one. Hence, option B is the correct answer.

45. Ans. A.

“This” is a singular pronoun and it will take singular helping verb “is” after it. Thus, “are” and “have” are eliminated.

Also, the sentence is in simple present tense; therefore “has” is also eliminated. Hence, option A is the correct answer.

46. Ans. C.

“He” is a singular pronoun and it will take singular helping verb after it. Thus, “were being” and “have been” are eliminated. Also, the sentence is in active voice thus “was being” is also eliminated. Thus, option C is the correct answer.

47. Ans. A.

In context of the sentence, a word is required to compliment the word “within” which means inside or surrounded by. Thus, ‘limited’ is the correct word. ‘Unfettered’ means lose which does not fit in context of the sentence. Similarly, ‘cosmic’ and ‘unlimited’ are in contrast with the word “within”. Thus, option A is the correct answer.

48. Ans. B.

Ignorance which means lack of knowledge is the most appropriate option as in the latter part of the sentence it is mentioned that “there is no complete knowledge about anything.” Thus, “ignorance” is the word complementing this part. Cognizance means knowledge or awareness, wisdom means knowledge, competence means ability. All the other options are in contrast with the latter part of the sentence. Hence, option B is the correct answer.

49. Ans. B.

The given sentence does not make sense as it is grammatically incorrect. While forming a simple sentence we use the structure “too....to”. Also, a person cannot be ‘week’ for week means “a period of seven days”. It should be ‘weak’, meaning lacking the physical strength or energy.

Hence, option B is the correct answer.

50. Ans. D.

To form a conditional sentence, either use ‘suppose’ or ‘if’. They cannot be used together. He is a third person and singular noun, and the sentence is in present tense. Hence ‘-s’ will be added with the verb. Thus, option D is the correct answer.



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