ALLEN CAREER INSTITUTE

PRELIMINARY EXAM : 2019-20

Paper Set : SET-I(HT) **SUBJECT : Algebra**

SSC Board - Sample Paper - 1 Solutions

Q.1 (A) Choose the correct alternative. **04**

i) Option (a) is correct.

Explanation : In the given A.P.

a = 21

d = 42 – 21

= 21

l = 210

n = ?

l = a + (n – 1)d

210 = 21 + (n – 1)21

n = 9 + 1

n = 10

Hence 210 is the 10th term of the given A.P.

ii) Correct option is (a) added to

iii) Correct option is (c) $\frac{x_i - A}{g}$

iv) Correct option is (d) – 3.

(B) Solve the following questions. **04**

i) $5m^2 - m = 0$

Discriminant

$b^2 - 4ac$

$(-1)^2 - 4 \times 5 \times 0$

= 1

It has 1 as its discriminant.

ii) Rate of CGST = 9%

Rate of SGST = Rate of CGST

Rate of SGST = 9%

Rate of GST = Rate of CGST + Rate of SGST

= 9% + 9%

= 18%

iii) A pie diagram is a circle. A complete circle has 360 angle. The expenditure rupees 45000 on cement was shown by a sector of central 75.

Hence, 360 Angle sector shows expenditure Rs. $\frac{45000}{75} \times 360$ 216000

Hence, total expenditure of construction = 2,16,000.

Q.2 (A) Complete the following activities. (Any two) **04**

i) $\boxed{2}$

$\boxed{2+(n-1)2}$

$\boxed{2}$

$\boxed{74}$

ii) $\boxed{ax^2 \quad bx \quad c \quad 0}$

$\boxed{7}$

$\boxed{12}$

$\boxed{x^2-7x \quad 120 \quad 0}$

iii) i. $\boxed{60-70}$

ii. $\boxed{90-100}$

iii. $\boxed{55}$

iv. $\boxed{15}$

(B) Solve the following questions (Any four) **08**

i. The rate of GST is 18%

$\therefore$ GST on the belt price 586

$$=\frac{18}{100}\times 586$$

$$= 105.48$$

$\therefore$ Price of the belt for customer

= Taxable value + GST

= 586 + 105.48

= 691.48

Price of belt for customer is 691.48 Rs.

ii. a. Money invested in shares = 2000

$$\frac{60}{360}\times \text{Total investment} = 2000$$

Total investment = 12000

b. Money invested in bank

$$\frac{90}{360}\times \text{Total investment}$$

$$= 3000$$

iii. $a = -19$

$d = -4$

$a_2 = a_1 + d$

$= -19 + (-4) = -23$

$a_3 = a_2 + d$

$= -23 + (-4)$

$= -27$

Similarly, $a_4 = -31$

$a_5 = -35$

A.P. $= -19, -23, -27, -31, -35, ...$

iv. Smt. Deshpande invested 20000 Rs. for purchasing shares.

Face value of each shares = 5 Rs.

Premium = 20 Rs.

amount paid for each share

$= 5 + 20 = 25$

No. of shares $= \frac{20000}{25} = 800$ shares.

v. $\alpha = -3$

$\beta = -7$

$\alpha\beta = 21$

$\alpha + \beta = -10$

equation will be

$x^2 - (\alpha + \beta)\, x + \alpha\beta = 0$

$x^2 + 10x + 21 = 0$

Q.3 (A) Complete the following activities (Any one) **03**

i. $\boxed{5m \quad n \quad 2}$

$\boxed{\frac{1}{3}} \quad \boxed{\frac{1}{3}}$

$\boxed{\frac{1}{y-2} \quad \frac{1}{3}}$

$\boxed{x \quad 4} \quad \boxed{y \quad 5}$

ii. $\boxed{27.5}$

$\boxed{10}$

$\boxed{-175}$

$\boxed{\frac{-175}{80}}$

$\boxed{\frac{\Sigma f_i d_i}{\Sigma f_i}}$

$\boxed{35310}$

(B) Solve the following questions (Any two) **06**

i. FV = Face Value

MV = Market value

MV = FV + Primium

Purchases :

Company A :

200 shares FV = Rs. 2 and Premium 18

MV = 2 + 18 = 20

Investment in company A = 200 × 20

= 4000

Company B :

45 shares MV = 500

Investment = 45 × 500 = 22500

Company C :

1 share MV = 10540

Investment = 1 × 10540

= 10540

Total investment = 4000 + 22500 + 10540

= 37040

ii. Let a and d respectively be the first term and common difference of the A.P.

given aq = 0

a + (q – 1)d = 0

a + 8d = 0

a = – 8d

Now 29^{th} term = a + 28d

= – 8d + 28d

= 20d

= 2 × 10d

= 2(– 8d + 18d)

= 2(a + 18d)

29^{th} term = 2 × 19^{th} term

iii. a = 1

b = – 4k

c = k + 3

i. Sum of roots = $-\frac{b}{a}$

$$= -\frac{(-4k)}{1}$$

$$= 4k$$

ii. Product of roots $= \frac{c}{a}$

$$\frac{(k \quad 3)}{1}$$

$$= (k + 3)$$

According to the problem given

$4k = 2(k + 3)$

$k = 3$

iv. No. of event = 1, 2, 3, 4, 5, 6, 7, 8.

a. Odd no. = 1, 3, 5, 7

No. of odd no. = 4

Probability of getting odd no.

$\frac{4}{8} \quad \frac{1}{2}$

b. Total no. 8

No. greater than 2 = 3, 4, 5, 6, 7 8

Probability $= \frac{6}{8} \quad \frac{3}{4}$

c. Total no. 8

No. less than a = 1, 2, 3, 4, 5, 6, 7, 8

Probability $\frac{8}{8} = 1$

Q.4 Solve the following questions. (Any two) **08**

i. Let the sides of two squares be x and y.

area of first square = x^2.

area of second square = y^2.

$x^2 + y^2 = 244$ ... (i)

Perimeter of first square = 4x

Perimeter of second = 4y

$4x - 4y = 8$

$x - y = 2$ ... (ii)

From (ii)

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

$x^2 + y^2 - 2xy = 4$

$244 - 2xy = 4$

$2xy = 240$ ... (iii)

In equation (i) adding, 2xy on both side

$x^2 + y^2 + 2xy = 244 + 2xy$

$x^2 + y^2 + 2xy = 244 + 240$

$(x + y)^2 = 484$

$x + y = 22$ ... (iv)

From (i) and (iv)

$x = 12$ and $y = 10$

Diagonal of square = $a\sqrt{2}$

Hence diagonal of first square

$x\sqrt{2}$

$12\sqrt{2}$

and, that of the second

$y\sqrt{2}$

$10\sqrt{2}$

Ratio of diagonal = $12\sqrt{2} : 10\sqrt{2}$

= 6 : 5

ii. $4x + 3y = 24$

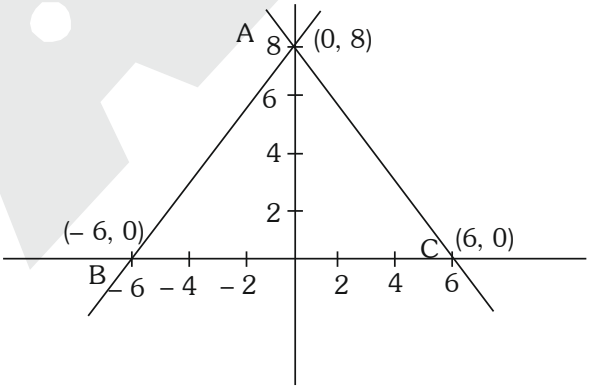
$y \quad \frac{24 - 4x}{3}$

x	0	3	6
y	8	4	0

$4x - 3y = -24$

$y \quad \frac{(24 \quad 4x)}{3}$

x	0	–3	–6
y	8	4	0



Area of triangle

arc $(\Delta ABC) = \frac{1}{2} b \times h = \frac{1}{2} \times 12 \times 8$

$= 48$ sq. unit.

iii.

Marks	Frequency	Cumulative Frequency
20-30	P	P
30-40	15	15 + P
40-50	25	40 + P = CF
50-60	20	60 + P
60-70	Q	60 + P + q
70-80	8	68 + P + q
80-90	10	78 + P + q

$N = 90$

$\frac{N}{2}$ 45

Which lies in the internal 50 – 60

lower limit $l = 50$

$f = 20$

$f_c = 40 + P$

$h = 10$

Median $= l + \frac{\left(\frac{N}{2} - cf\right)}{f} \times h$

$50 \quad \frac{(45 - 40 - P)}{20} \times 10$

$50 \quad 50 \quad \frac{(5 - P)}{2}$

$P = 5$

Also, $78 + P + q = 90$

$q = 90 - 83$

$q = 7$

Q.5 Solve the following questions. (Any one) **03**

i. a. Modal class is defined as the class when the frequency is maximum or highest.

Highest frequency is 82

So the modal class is 74.5 to 79.5

b. Median of the frequencies is

= Middle of sum of frequencies

$\frac{(10 \quad 34 \quad 58 \quad 82 \quad 10 \quad 6)}{2}$ 100

Median class is defined as the class where the median frequency falls in the cumulative frequency

100 frequency comes in 69.5 to 74.5

Hence median class is 69.5 to 74.5

c. Commulative frequency of the class preceding the median class.

Median class preceding the median is 64.5 to 69.5.

Hence frequency of that class is 44.

d. Class interval

= 64.5 – 59.5

= 5

ii. a. The GST amount collected by dealer A is Rs. 5000, which is 5% of the total sale.

Suppose x amount is get by the sale

5% of x = 5000

x = 100000

b. Total GST on purchase amount of B is

= 4000

5% of x = 4000

Purchased amount by B,

x = 80000

c. Tax balance with Govt. for the dealer A = 1000

which is equally divided to CGST and SGST = 500 each.