

SUBJECT: MATH EXAM 2nd Annual 2022 CLASS: Inter P-I
 GROUP: I DATE: 21-12-22

(GENERAL INSTRUCTIONS FOR MARKING KEY)

Q (b)

Let $A_1, A_2, \dots, A_n$ be n A.M's
 b/w a and b

$a, A_1, A_2, \dots, A_n, b$ A.P

$$a_n = a_1 + (n-1)d$$

$$b = a + (n-1)d$$

$$d = \frac{b-a}{n-1} \quad (1M)$$

$$A_1 = a + 1d$$

$$= a + \frac{b-a}{n-1}$$

$$= \frac{na+b}{n-1} \quad (1M)$$

$$A_n = a + nd$$

$$= a + n \left(\frac{b-a}{n-1} \right)$$

$$= \frac{nb+a}{n-1} \quad (1M)$$

We know

$$S_n = \frac{n}{2} (a_1 + a_n)$$

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 نام ذیل کے سربراہان اساتذہ پڑھ چکے ہیں اور ہدایات کے حوالے سے مکمل طور پر قلمبندی کر چکے ہیں۔

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Sum of n A.M's

$$S_n = \frac{n}{2} (A_1 + A_n) \quad (1M)$$

$$= \frac{n}{2} \left(\frac{na+b}{n-1} + \frac{nb+a}{n-1} \right)$$

$$= \frac{n}{2} \left(\frac{n(a+b) + 1(a+b)}{(n-1)} \right)$$

$$= \frac{n(a+b)}{2} \quad (1M)$$

$$= n \cdot \left(\frac{a+b}{2} \right) \Rightarrow n \cdot (A.M) \quad (1M)$$

Hence the result

7(a)

$${}^{16}C_{11} + {}^{16}C_{10} = {}^{17}C_{11} \quad (1M)$$

$$\text{L.H.S} \quad \therefore {}^nC_r = \frac{n!}{r!(n-r)!} \quad (1M)$$

$$= \frac{16!}{11!5!} + \frac{16!}{10!6!}$$

$$= \frac{16!}{11 \times 10!5!} + \frac{16!}{10!6 \times 5!}$$

$$= \frac{16!}{10!5!} \left[\frac{1}{11} + \frac{1}{6} \right] \quad (1M)$$

$$= \frac{16!}{10!5!} \left(\frac{17}{11 \cdot 6} \right) \quad (1M)$$