J.K. SHAH®
TEST SERIES
Evaluate Learn Succeed

SUGGESTED SOLUTION

FYJC

SUBJECT- MATHEMATICS

Test Code - FYJ 6072 A

BRANCH - () (Date :)

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ANSWER : 1

(a) (i) let $z = 3 + i$ (02)

$\therefore \bar{z} = 3 - i$

(ii) let $z = \sqrt{5} - i$

$\therefore \bar{z} = \sqrt{5} + i$

(b) $2z_1 - (5z_2 + 2z_3)$ **(02)**

$= 2(7 + i) - [5(4i) + 2(-3 + 2i)]$

$= 14 + 2i - [20i - 6 + 4i]$

$= 14 + 2i - [-6 + 24i]$

$= 14 + 2i + 6 - 24i$

$= 20 - 22i$

(02)

(c) $z_1 = 2 + 3i$, $z_2 = 3 - 2i$

$z_1 . z_2 = (2 + 3i)(3 - 2i) = 2(3 - 2i) + 3i(3 - 2i)$

$= 6 - 4i + 9i - 6i^2$

$= 6 - 4i + 9i + 6 \quad (\because i^2 = -1)$

$= 12 + 5i$

ANSWER : 2

(a) **(03)**

$(1 - w)(1 - w^2)(1 - w^4)(1 - w^5)$

$= (1 - w)(1 - w^2)(1 - w^3 \cdot w)(1 - w^3 \cdot w^2)$

$= (1 - w)(1 - w^2)(1 - w)(1 - w^2)$

$= (1 - w)^2 (1 - w^2)^2$

$= [(1 - w)(1 - w^2)]^2$

$= (1 - w^2 - w + w^3)^2$

$= [1 - (w^2 + w) + 1]^2$

$= [1 - (-1) + 1]^2$

$= (1 + 1 + 1)^2$

$= (3)^2$

$= 9$

(b) Let z = (1 + 2i) (–2 + i) **(03)**

$= -2 + i - 4i + 2i^2$

$= -2 - 3i + 2(-1)$ ..... $\because i^2 = -1$

$= -2 - 3i - 2$

$= -4 - 3i$

on comparing with z = a + bi

$a = -4$ & b = – 3

ANSWER : 3

(04)

(a) Given quadratic equation is

$x^2 + 4ix - 5 = 0$

Comparing with $ax^2 + bx + c = 0$

a = 1, b = 4i, c = –5

Consider $b^2 - 4ac = (4i)^2 - 4(1)(-5)$

$= 16i^2 + 20$

$= -16 + 20 \quad (\therefore i^2 = -1)$

$= 4$

The roots of quadratic equation are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-4i \pm \sqrt{4}}{2(1)}$$

$$= \frac{-4i \pm 2}{2}$$

$x = -2i \pm 1$

Solution set = {– 2i + 1, – 2i – 1}

(b) $x = -5 + 2\sqrt{-4}$ **(04)**

$\therefore x = -5 + 4i$

$\therefore x + 5 = 4i$

On squaring both sides

$(x + 5)^2 = (4i)^2$

$\therefore x^2 + 10x + 25 = -16$

$\therefore x^2 + 10x + 41 = 0$

$$x^2+10x+41 \overline{)\, x^4+9x^3+35x^2-x+64 \,} \quad x^2-x+4$$

$x^4 + 10x^3 + 41x^2$

$-x^3 - 6x^2 - x + 64$

$-x^3 - 10x^2 - 41x$

$4x^2 + 40x + 64$

$4x^2 + 40x + 164$

-100

$\therefore x^4 + 9x^3 + 35x^2 - x + 64$

$= (x^2 + 10x + 41)(x^2 - x + 4) - 100$

$0 \times (x^2 - x + 4) - 100$

$= -100$