NAME:...



LIGHT ACADEMY SECONDARY SCHOOL MOCK SET II TERM 2 2017 TIME: 3 HOURS S.6 PURE MATHEMATICS

INSTRUCTIONS:

- > Attempt all questions in Section A and any FIVE in section B.
- Begin every question on a fresh page.
- > Show all the necessary working.

SECTION A

1.
$$log_2 x + log_x 16 = 4$$
 (5 marks)

- 2. Find the Cartesian equation of the locus Z of |Z 2 + i| = 1. (5 marks)
- 3. Find the Cartesian equation of a line through points (2, 0, 1) and (-1, 4, 1).

(5 marks)

4. Solve the equation: $2\cos \alpha + 3\sin \alpha = 5$ for $-\pi \le \alpha \le \pi$. (5 marks)

5. Evaluate
$$\int_0^1 \frac{1}{\sqrt{9-4x^2}} dx$$
 (5 marks)

6. Find the equation of the tangent to the curve 2xy = 3 at the point when x = 3.

(5 marks)

- 7. Find the acute angle between the lines 3y x 6 = 0 and y 2x + 4 = 0. (5 marks)
- 8. Find the Cartesian equation of a curve whose polar equation is $r = 4\sin \theta$.

SECTION B

9.	(a)	Find the distance of the point (2, 1, 2) from the line $x - 1 = y - 2 =$	= Z - 3.
			(7 marks)
	(b)	Find the position vector of the point of intersection of the planes x	-2y-2z=0,
		2x + 3y + z = 1 and $3x - y - 3z = 3$	(5 marks)

10. (a) Prove by induction:

$$\sum_{r=1}^{n} r^{2} = \frac{1}{6} n(n+1)(2n+1)$$
(6 marks)

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(b) The fifth term of an AP is 25 and the fifteenth term is 75. Find the 10th term. (6 marks)

11. Express
$$\frac{3x^2+x+1}{(x-2)(x+1)^3}$$
 into partial fractions. Hence compute
$$\int_3^4 \frac{3x^2+x+1}{(x-2)(x+1)^3} dx$$
(12 marks)

- 12. (a) Solve for θ if $\sin^2 \frac{\theta}{2} = 2 + \cos \theta$ for $180^0 \le \theta \le 360^0$. (5 marks) (b) Solve triangle ABC where C = 5.2 cm, a = 7.4 cm and angle B = 41⁰. (7 marks)
- 13. (a) Find the equation of the circle which passes through the points (1, 2), (2, 5) and (-3, 4). (5 marks)
 - (b) A and B are points (3, 0) and (-1, -3) respectively. P is a variable point such that angle APB is right angled. Find and sketch the locus of P. (7 marks)
- 14. Differentiate

(i)
$$cot^{-1}(Inx)$$

(ii)
$$(\sin x)^x$$
 (12 marks)

15. Solve

(a)
$$x < \frac{2}{x-1}$$
 (5 marks)

(b)
$$\sqrt{3x+1} + \sqrt{4x+5} = \sqrt{16x+9}$$
 (7 marks)

- 16. (a) Find the general solution of $\frac{dy}{dx} = \frac{x^2 + y^2}{x(x+y)}$
 - (b) The rate at which a radioactive material decays are proportional to the amount of such material present.

Half of the original; mass M of the radioactive material undergoes disintegration in a period of 1500 years

- (i) What percentage of the original mass will remain after 3000 years?
- (ii) In how many years will one tenth of the original mass remain?

END.

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