

Question 5

- (a) If $y = (\cot^{-1} x)^2$, show that $(1+x^2)^2 \frac{d^2 y}{dx^2} + 2x(1+x^2) \frac{dy}{dx} = 2$ [5]
- (b) Find the maximum volume of the cylinder which can be inscribed in a sphere of radius $3\sqrt{3}$ cm. (Leave the answer in terms of π) [5]

Question 6

- (a) Evaluate: $\int \frac{\cos^{-1} x}{x^2} dx$ [5]
- (b) Find the area bounded by the curve $y = 2x - x^2$, and the line $y = x$. [5]

Question 7

- (a) Find the Karl Pearson's co-efficient of correlation between x and y for the following data: [5]

x	16	18	21	20	22	26	27	15
y	22	25	24	26	25	30	33	14

- (b) The following table shows the mean and standard deviation of the marks of Mathematics and Physics scored by the students in a school: [5]

	Mathematics	Physics
Mean	84	81
Standard Deviation	7	4

The correlation co-efficient between the given marks is 0.86. Estimate the likely marks in Physics if the marks in Mathematics are 92.

Question 8

- (a) Bag A contains three red and four white balls; bag B contains two red and three white balls. If one ball is drawn from bag A and two balls from bag B, find the probability that: [5]
- (i) One ball is red and two balls are white;
- (ii) All the three balls are of the same colour.

2013 Mathematics Question Paper Ecol

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A. El-Tantawy**



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