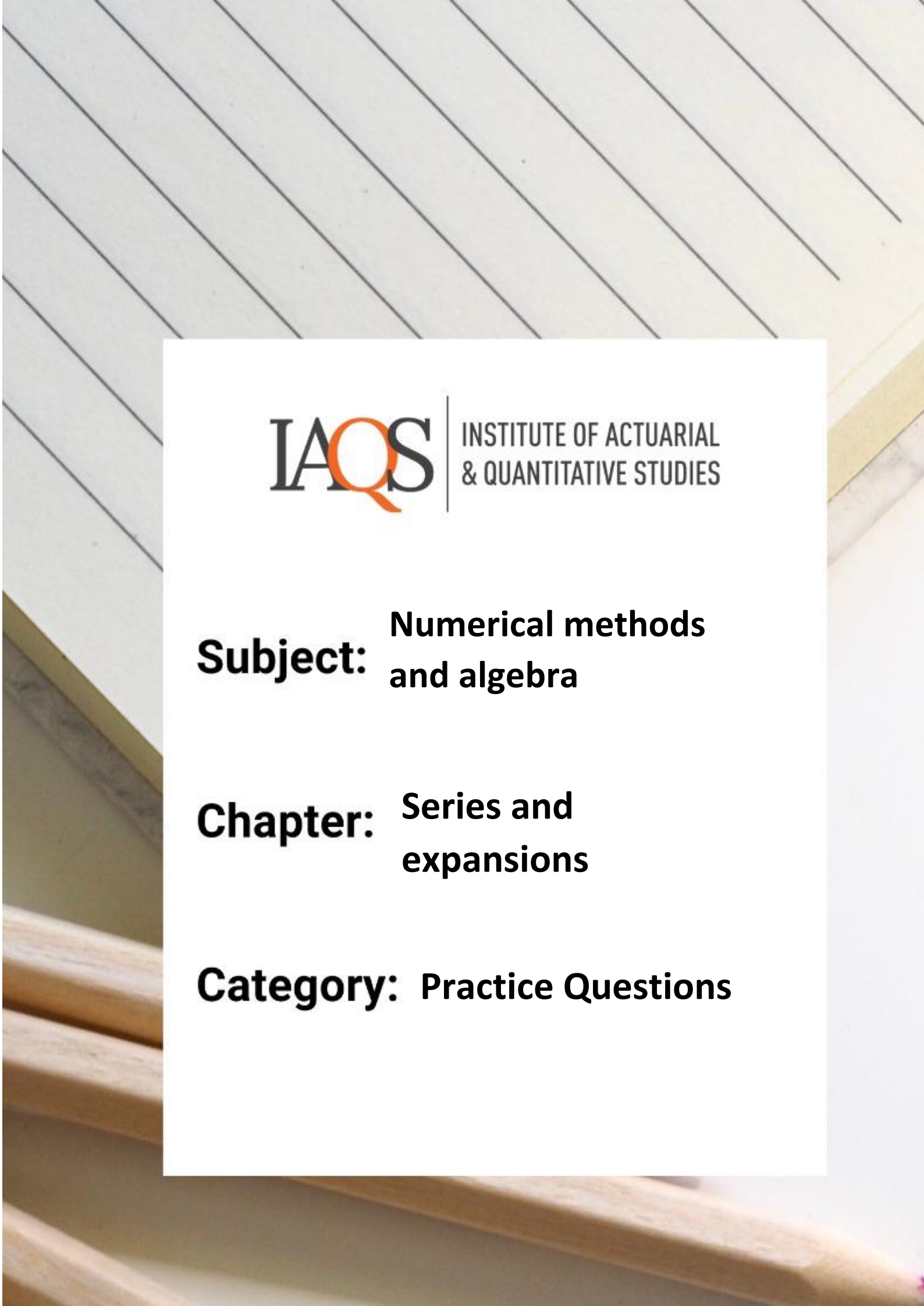

INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Subject: Numerical methods and algebra

Chapter: Series and expansions

Category: Practice Questions

Product

1. Suppose our list has the following numbers 1,3,5,7. Find the product of the squares of these numbers.

2 $\prod_{n=1}^{50}\left(1+\frac{4}{n}+\frac{4}{n^2}\right)$.

Summation

3. Express the following sums in summation notation and evaluate using appropriate summation formula:

a) $3 + 7 + 11 + \cdots + (4n - 1)$
b) $(1/3)^2 - (1/3)^4 + (1/3)^6 - (1/3)^8 + \cdots$

A.P.

4. An arithmetic progression has 23 terms, the sum of the middle three terms of this AP is 720, and the sum of the last three terms of this AP is 1320. What is the 18th term of this AP?

5. The first term of an AP is 10 and the last term is 28. If the sum of all terms is 190, what is the common difference?

6. The first term of an Arithmetic progression is 15 and the last term is 85. If the sum of all terms is 750, what is the 6th term?

7. The sum of three numbers in AP is 72 and their product is 11880. What are the numbers?

A. 21, 24, 27

B. 12, 24, 36

C. 18, 24, 30

D. 15, 24, 33

8. Find the sum of the series $-5-3-1+\cdots\cdots+123$

9. Given an arithmetic sequence with T2=7 and d=3, determine how many terms must be added together to give a sum of 2 146.

G.P.

10. Ram gives his son Rs. 100 on one day, Rs. 50 on the second day, Rs. 25 on third day and so on. What will be total amount given by Ram to his son starting from the first day, if he lives forever?

11. The 3rd and the 8th term of a G.P. are 4 and 128 respectively. Find the G.P.

12. In a G.P, the second term is 12 and the sixth term is 192. Find the 11^{th} term.

Binomial Expansions

13. Simplify

$$\frac{(a+1)^4+(a-1)^4}{(a+1)^4-(a-1)^4}$$

14.Find out the fourth term of the following formula after its binomial expansion:

$(x+\frac{2}{x})^8$

15.Which term of the binomial expansion given below contains ?

$(2x^3+5x^{-1})^{10}$