SAMPLE PAPER AND SOLUTIONS
*Variety of thought provoking questions will be asked in actual NTCE and all the variations of such sets and various topics of aptitude will be covered under a course you will opt.

SECTION 1: READING COMPREHENSION

From the beginning of photography in 1839, photographers sought recognition as artists. However, the way they talked about it – often using the term 'drawing' – made many believe that photography was trying to occupy a part in the realm of older visual arts. It is quite possible that they used the term in the absence of anything more suitable; nevertheless, photography came to be seen as an attempt to replace portraiture or landscape painting, inspiring thoughtful people to ask if photography had the better qualities of painting or drawing. Going against that, Lady Elizabeth Eastlake was the first to present – in 1857 – a modernist aesthetic: that photography should be measured not by aesthetic standards of older visual arts but by those of photography itself, because it had strengths that fine arts could never possess, such as the capacity for infinite detail or instant production.This idea justified writing the history of photography more or less without much reference to the history of contemporaneous art. The earliest of these focused more on technological progress than on the photographers or their output, but Beaumont Newhall's The History of Photography (1937), inverted the focus, even though it reiterated the notion that technological breakthroughs helped propel aesthetic ones and referred rarely to painting.

Newhall went on to establish the Museum of Modern Art and led a university department of photography. In 1964, John Szarkowski, then the director of the photography department at the Museum of Modern Art, listed – in The Photographer's Eye – five essential characteristics of the medium: the thing itself, the detail, the frame, the time, and the vantage point. Contemporary photographers reflected on these characteristics and, more generally, on the idea that whatever else a photograph is about, it ultimately is about the nature of photography itself. Photography also developed its own independent exhibition system, arguably out of necessity, since it was excluded from the 19th-century salons, excepting the Paris Salon of 1859. As a result, by the end of the century, photographers had established their own salons to present their work to general public as art – in England, Austria and France – as a new generation of photographers with artistic aspirations replaced the medium's pioneers. These new photographers created photography's first international aesthetic movement, pictorialism.

Pictorialists made their case for photography as an art by producing photographs that looked as if they had been made by hand. The only trouble was that the art of painting itself, especially the avant garde movement centered at Paris, was changing so rapidly at the turn of the century that these photographers' efforts came to seem retardataire. Alfred Stieglitz, of New York, is often credited with single-handedly promoting photography as an art in early 20th century America. Young Stieglitz was an ardent pictorialist, until he went to Paris and met great modern, abstract painters like Cézanne, Pablo Picasso and Henri Matisse. Thereafter, at his modest gallery, Stieglitz alternated modernist European art with pictorialist photography shows. By 1910, he virtually stopped featuring pictorialist photography and became a promoter of modernist art not only from Europe but also from America. The last photography show Stieglitz mounted featured the work of Paul Strand whose close-in, near-abstract pictures of porch shadows and bowls eerily resembled modernist paintings.

1. **Based on the passage, which of the following can be said about painting at the turn of the 19ᵗʰ century?**
   A. It was dominated by a trio consisting of Cézanne, Pablo Picasso and Henri Matisse.
   B. The most influential paintings were acquiring an appearance that photography could not imitate.
   C. The avant garde movement in art was instrumental in creating photography's first international aesthetic movement, pictorialism
   D. Pictorialist photographers contributed to the change that occurred in the field of painting at the turn of the 19ᵗʰ century.

2. **Lady Eastlake's modern aesthetics of photography** …
   A.   Defined the standards for aesthetic photography.
   B.   Applied the standards of fine arts to photography.
   C.   Wrote the history of photography without reference to fine arts.
   D.   Effectively placed photography outside the purview of fine arts.

3. **Which of the following clusters most closely summarizes the main points of the essay?**
   A.   Photography as Drawing – Photography as Art – Technological Progress – Pictorialism
   B.   Origins – Photography as Art - Essential Characteristics – Pictorialism
   C.   Photography as Drawing – Independent History – Exhibition System – Pictorialism
   D.   Origins – Independent History – Technological Progress – Pictorialism

4. **The last photography show Stieglitz mounted:**
   A.   Merged pictorialist photography and modernist art.
   B.   Resembled contemporary avant garde paintings.
   C.   Was also the last of the Pictorialist exhibitions to be held.
   D.   Pioneered Pictorialist photography in America.

SECTION 2: IQ BASED SETS

SET1. Patel Printer' got the printing order of the State Board's mathematics book for the 6th standard. The design of the cover-leaf, content and index is ready. The final version of the edited proof of the chapters is yet to arrive. The DTP designer has decided to use 70 GSM (gram per square meter) paper of dimension 27.94 cm by 43.18 cm for printing the book. The final dimension of the book shall be 20 cm width by 25 cm height. This will be achieved by printing 4 different numbered pages on the two sides of each piece of paper and then all the papers will be folded together from the central crease line so that they can be stapled with pins along the crease line. Thus, when a student opens the book the dimension of the book becomes 40 cm by 25 cm. Apart from the cover leaf, the book has 2 pages of 'Contents' and 4 pages of 'Index'. By the word 'page', we mean one face of the paper of dimension 20 cm width by 25 cm height with a unique number at the bottom corner (either left or right). The page numbering starts from the first page of the 'Contents' and ends at the last page of the 'Index' sequentially. The cover leaf has no page number but counts additional 4 pages when the total number of pages in the book is counted and it is mentioned on the back side of the cover-leaf. After the final version of the edited proof of the chapters arrives, the designer finds that one page has to be left blank. He decides to put the blank page at the end of the book (the piece of paper on which 'Contents' is printed) . The book does not contain anything apart from 'Contents', 'Chapters', 'Index', and one blank page in that order along with the cover-leaf. The blank page has no page number on it.

5. **Which of the following can be the number of pages consumed by 'Chapters' only?**
   A. 175   B. 176   C.176   D. 178
6. **What is the sum of the largest and the smallest page number printed on the paper on which four consecutive page numbers have been printed if the highest page number printed in the book is between 213 to 225 (inclusive) and the sum of its digits is a prime number? (Integer type Question)**
7. **What are the other two-page numbers printed on the paper on which page number 67 and 68 has been printed if the highest page number printed in the book is between 213 to 225 (inclusive) and the sum of its digits is a prime number?**
   A. 153, 162   B. 155, 160   C. 157, 158   D. 154, 156

8. **The back cover of the book is printed with the following line: "Total number of pages in the book = 228". What will be the sum of the four-page numbers printed on a paper randomly selected from the book?**
   A. 446   B. 448   C. 450   D. 452

9. The back cover of the book is printed with the following line: "Total number of pages in the book = 200". What will be the largest page number printed in the book?

10. The back cover of the book is printed with the following line: "Total number of pages in the book = 228". Suppose that the cover leaf has the same paper which has been used for printing the book. What will be the weight of each piece of book (in gram)? Assume that the weight of the stapler pin used in a single book is 1 gram and any other material apart from the papers used in preparing the book has no weight.

SET2. Five families decided to go for a picnic this coming Sunday at 'Mermaid Water Park'. Here, the word 'family' means a married couple with at most 2 children. Each family decides to reach the picnic spot in their own vehicle. All the members of a family reached together. No two families reached together. The five husbands are Amit, Kamal, Narendra, Nirmal and Paresh. (Assume that the park was visited by these five families only on that Sunday).

Further it is known that –

1. Ranjana's only child was the first kid to reach the park.
2. Although Tanuja came to the picnic with her husband, their only child could not come because of her forthcoming examination. All the children from the other families attended the picnic.
3. Narendra's only child, who was not the first kid to reach the park, reached the park before the family who came to picnic with two kids.
4. Kamal was the first to reach the park with his wife.
5. Mahua came immediately after Ranjana and Paresh came after Rakhi and Jayashree.
6. No family reached the park between Tanuja and Rakhi.
7. Neither Paresh nor Nirmal is the husband of Mahua.
8. Once the fourth family reached the park, the number of children became equal to that of families present in the park for the second time.
9. Mahua and her husband got married 2 months back and they do not have any child.

11. Who is the husband of Jayashree?
    A. Kamal   B. Amit   C. Narendra   D. Nirmal

12. Who is Paresh's wife?
    A. Ranjana   B. Jayashree   C. Rakhi   D. Tanuja

13. Which is the fourth family to enter the park?
    A. Amit and Mahua B. Narendra and Rakhi C. Nirmal and Rakhi D. Nirmal and Jayashree

14. How many children entered the park after Mahua? (Integer type)

15. How many families among the five families have exactly one kid? (Integer type)

16. Whose family arrived between the family of Mahua and family of Nirmal?
    A. Amit   B. Kamal   C. Rakhi   D. Jayashree

SECTION 3: BASIC APTITUDE

17. Three jars A, B and C of equal capacity are completely filled with the solution of rose syrup diluted with milk or water or both. Jar A has rose syrup and milk in the ratio of 1 : 1, Jar B has rose syrup, water and milk in the ratio of 1 : 1 : 1 and Jar C has rose syrup, water and milk in the ratio of 1 : 2 : 3. If solutions from jars A, B and C are taken out in the ratio 1 : 2 : 3 and poured in an empty Jar D of equal capacity, what must be the concentration of rose syrup in completely filled Jar D?

18. Amit can give Bikram a start of 12.5 feet in a 100-foot race. In a 560-foot race, Amit gives Bikram a start of 126 feet. How far from the finish line (in feet) will the loser be when the winner crosses the finish line?

19. In 2020, Mr. Paritosh invested 25% of his savings in Mutual funds and 15% in fixed deposits. Out of the remaining part of his savings, 25% was invested in Gold bonds and the rest of the amount was invested in shares. If his investment in shares is Rs. 20000 more as compared to the investment in Mutual Funds, how much amount (in Rs.) had he invested in Gold bonds?

20. How many factors of $(2^{15} \times 3^{31})^2$ are less than $2^{15} \times 3^{31}$ and are not factors of $2^{15} \times 3^{31}$?

21. A milkman mixes 10 litres of water in x litres of milk and sells the entire mixture claiming to make a 17% profit. If in fact he makes a 43% profit in this transaction, find x.

22. Consider a three digit number in base 9. If the same number is expressed in base 5, it becomes a four digit number with digit 1 in the leftmost place and the same digits in the remaining three places in the same order (i.e. if the three digit number expressed in base 9 is 'ABC', then the same number, when converted to base 5 becomes '1ABC'). How many such numbers exist?

SOLUTIONS:

1. **B**
Option 1: Incorrect. "Young Stieglitz was an ardent pictorialist, until he went to Paris and met great modern, abstract painters like Cézanne, Pablo Picasso and Henri Matisse." This does not imply that they 'dominated' the scene or they were the only great painters.
Option 2: **Correct**. "Pictorialists made their case for photography as an art by producing photographs that looked as if they had been made by hand. The only trouble was that art of painting itself, especially the avant garde movement centered at Paris, was changing so rapidly at the turn of the century that these photographers' efforts came to seem retardataire." In other words, the pictorialist photographers work resembled paintings form an earlier, bygone era (and not the contemporary painters at the turn of the 19th century). The paintings at the turn of the 19th century were avant-garde and photographers could not imitate them.
Option 3: Incorrect. That avant garde movement did not influence photography nor pictorialism
Option 4: Incorrect. Pictorialists took the cue from painters, not the other way round.

2. **D**
"Going against that, Lady Elizabeth Eastlake was the first to present – in 1857 – a modernist aesthetic: that photography should be measured not by aesthetic standards of older visual arts but by those of photography itself, because it had strengths that fine arts could never possess, such as the capacity for infinite detail or instant production."
Option 1: Incorrect. She didn't define the standards for photography. She argued that photography should be considered a distinct art form different from other fine arts.
Option 2: Incorrect. Contrary to the passage.
Option 3: Incorrect. She didn't write history but caused the history of photography to be written separate from other fine arts.
Option 4: **Correct**. "… not by aesthetic standards of older visual arts but by those of photography itself, because it had strengths that fine arts could never possess…"

3. **B**
The passage is about the history of photography. The first two paragraph describe the Origins. (began in 1839, called drawing, 1857 Lady Elizabeth Eastlake gave it the status of independent art form.)
The third, fourth and fifth paragraphs trace its history as an art form – for some time the history focused on technological progress. With Beaumont Newhall and John Szarkowski the photography developed as an art form further – its essential characteristics were defined, got its own Museum of Art and University Departments
The last two paragraphs describe Pictorialism – the international movement in photography. These are the highlights in its history.
Option 1: Incorrect. Photography as Drawing and Technological Progress are details of its history rather than a summary of the main points.
Option 2: Correct. See explanation above.

Option 3: Incorrect. The first three points are details rather than main points.

Option 4: Incorrect. Photography being considered and developed as an art form different from other fine arts is not captured. Technological progress is mentioned but not pursued as a main point.

4. **B**

Option1: Incorrect. There is no information to this effect. We know that he alternated between them, finally (perhaps) moving on to paintings.

Option 2: **Correct**. Stieglitz's works "resembled modernist paintings."

Option 3: Incorrect. It was the last of the pictorialist exhibitions hosted by Stieglitz, but may not have been the last to be held (there might have been others mounting such shows).

Option 4: Incorrect. The last show did not pioneer the movement but Stieglitz did.

5. **C**

Each piece of paper is used for printing 4 different numbered pages on the two sides. Thus, the total number of pages should be a multiple of 4.

The book has 2 pages of 'Contents', 4 pages of 'Index', and one blank page.

$\{(175 + 7) \div 4\} = 45.5$

$\{(176 + 7) \div 4\} = 45.75$

$\{(177 + 7) \div 4\} = 46$

$\{(178 + 7) \div 4\} = 46.25$

6. **225**

The highest page number printed in the book is of the form 4k - 1. There are 3 such numbers between 213 to 225 (inclusive). They are: 215 (sum of digits is 8), 219 (sum of digits is 12), and 223 (sum of digits is 7). Thus the highest page number printed in the book is 223.

The piece of paper which contains 4 consecutive page numbers is the centrally located paper inside the book where the stapler pin is visible. The numbers printed on the centrally located paper are 111, 112, 113 and 114.

Thus, the sum = 111 + 114 = 225

Therefore, the required answer is 225

7. **157, 158**

The highest page number printed in the book is of the form 4k - 1. There are 3 such numbers between 213 to 225 (inclusive). They are: 215 (sum of digits is 8), 219 (sum of digits is 12), and 223 (sum of digits is 7). Thus the highest page number printed in the book is 223.

The sum of page numbers printed on any of the piece of paper (except the page containing blank page) = 1 + 2 + 223 + 224= 450

450 – (67 + 68) = 315.

So, the other two page numbers = $\{(315 + 1) \div 2\} = 158$ and $\{(315 - 1) \div 2\} = 157$

8. **450**

The cover leaf has no page number but counts additional 4 pages when the total number of pages in the book is counted and it is mentioned on the back side of the cover-leaf.

228 – 4 = 224

The sum of page numbers printed on any of the piece of paper = 1 + 2 + 223 + 224 = 450

9. **195**

200 – 4 = 196

The blank page has no page number and is located at the end of the book.

Thus, the largest page number printed in the book is = 196 – 1 = 195

Therefore, the required answer is 195.

10. **400**

Dimension of each piece of paper = $\{(20 + 20) \times 25\}$ sq. cm = 1000 sq.cm = 0.1 sq. meter

The paper is 70 GSM i.e., 70 gram per square meter in weight.

Total weight of paper used in a single piece of book = $\{70 \times 0.1 \times (228 \div 4)\}$ gram = 399 gram

Weight of the stapler pin is 1 gram.

Therefore, weight of each piece of book = (399 + 1) grams = 400 grams

11. **C**

This scheduling problem can be solved by the method of linear arrangement.

Using 1 and 4 we get the following arrangement:

Kids	1				
Husband	Kamal				
Wife	Ranjana				

Using 5 and 6 we get the following arrangement:

Kids	1				
Husband	Kamal				Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 1, 3 and 9 we get the following arrangement:

Kids	1	0	1	1	0
Husband	Kamal		Narendra		Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 7 and 8 we can complete the arrangement as follows:

Kids	1	0	1	2	0
Husband	Kamal	Amit	Narendra	Nirmal	Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

12. **D**

This scheduling problem can be solved by the method of linear arrangement.

Using 1 and 4 we get the following arrangement:

Kids	1				
Husband	Kamal				
Wife	Ranjana				

Using 5 and 6 we get the following arrangement:

Kids	1				
Husband	Kamal				Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 1, 3 and 9 we get the following arrangement:

Kids	1	0	1	1	0
Husband	Kamal		Narendra		Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 7 and 8 we can complete the arrangement as follows:

Kids	1	0	1	2	0
Husband	Kamal	Amit	Narendra	Nirmal	Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

13. **C**

This scheduling problem can be solved by the method of linear arrangement.

Using 1 and 4 we get the following arrangement:

Kids	1				
Husband	Kamal				
Wife	Ranjana				

Using 5 and 6 we get the following arrangement:

Kids	1				
Husband	Kamal				Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 1, 3 and 9 we get the following arrangement:

Kids	1	0	1	1	0
Husband	Kamal		Narendra		Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 7 and 8 we can complete the arrangement as follows:

Kids	1	0	1	2	0
Husband	Kamal	Amit	Narendra	Nirmal	Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

14. **3**

This scheduling problem can be solved by the method of linear arrangement.
Using 1 and 4 we get the following arrangement:

Kids	1				
Husband	Kamal				
Wife	Ranjana				

Using 5 and 6 we get the following arrangement:

Kids	1				
Husband	Kamal				Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 1, 3 and 9 we get the following arrangement:

Kids	1	0	1	1	0
Husband	Kamal		Narendra		Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 7 and 8 we can complete the arrangement as follows:

Kids	1	0	1	2	0
Husband	Kamal	Amit	Narendra	Nirmal	Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

15. **3**

This scheduling problem can be solved by the method of linear arrangement.
Using 1 and 4 we get the following arrangement:

Kids	1				
Husband	Kamal				
Wife	Ranjana				

Using 5 and 6 we get the following arrangement:

Kids	1				
Husband	Kamal				Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 1, 3 and 9 we get the following arrangement:

Kids	1	0	1	1	0
Husband	Kamal		Narendra		Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 7 and 8 we can complete the arrangement as follows:

Kids	1	0	1	2	0
Husband	Kamal	Amit	Narendra	Nirmal	Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

16. **D**

This scheduling problem can be solved by the method of linear arrangement.
Using 1 and 4 we get the following arrangement:

Kids	1				
Husband	Kamal				
Wife	Ranjana				

Using 5 and 6 we get the following arrangement:

Kids	1				
Husband	Kamal				Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 1, 3 and 9 we get the following arrangement:

Kids	1	0	1	1	0
Husband	Kamal		Narendra		Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

Using 7 and 8 we can complete the arrangement as follows:

Kids	1	0	1	2	0
Husband	Kamal	Amit	Narendra	Nirmal	Paresh
Wife	Ranjana	Mahua	Jayashree	Rakhi	Tanuja

17. **27.78%**

Let the capacity of each jar be 6X litres. Therefore, X litres solution from Jar A, 2X litres solution from Jar B and 3X litres solution from Jar C is transferred to Jar D.

Jar A has rose syrup and milk in the ratio of $1 : 1$. $\therefore$ X litres solution from jar A has $\left(\dfrac{x}{2}\right)$ litres of rose syrup . Jar B has rose syrup, water and milk in the ratio of $1 : 1 : 1$. $\therefore$ 2X litres solution from jar B has $\left(\dfrac{2x}{3}\right)$ litres of rose syrup. Jar C has rose syrup, water and milk in the ratio of $1 : 2 : 3$. $\therefore$ 3X litres solution from jar C has $\left(\dfrac{x}{2}\right)$ litres of rose syrup.

The required % $= \dfrac{\left[\left(\frac{X}{2}\right) + \left(\frac{2X}{3}\right) + \left(\frac{X}{2}\right)\right]}{6X} \times 100 = 27.78\%$

18. **64**

Since Amit can run 100 feet when Bikram runs 87.5, the ratio of their speeds must be 8 : 7. Now in the 560-foot race, Bikram covers 560 – 126 = 434 feet. In the same time Amit will have covered 434 × 8/7 = 496 feet and hence will be 64 feet from the finish line at that moment.
Therefore, the required answer is 64.

19. **15000**

Let the total amount invested by Mr. Paritosh be Rs. 'X'.
Therefore, investments in
Mutual funds: 0.25X
Fixed Deposits: 0.15X
Investment other than Mutual funds and Fixed Deposits = X – 0.25X – 0.15X = 0.6X
Gold bonds: 0.25 × 0.6X = 0.15X
Shares: 0.6X – 0.15X = 0.45X

∴ O.45X – 0.25X = 20000
∴ 0.2X = 20000
∴ X = 100000
∴ 0.15X = 15000
The amount invested in Gold bonds = Rs. 15000

Therefore, the required answer is 15000.

20. **465**

Let $N = 2^{15} \times 3^{31}$

The number of factors of $N^2 = 2^{30} \times 3^{62}$ is $(30 + 1)(62 + 1) = 1953$ one factor is $N = 2^{15} \times 3^{31}$.

Each factors of N^2 which is less than N has a corresponding factors which is more than N.

$$= \frac{1953 - 1}{2} = 976 \text{ factors are less than N.}$$

Of these $(15 + 1)(31 + 1) = 16 \times 32 = 512$ factors are also factors of N and 511 factors are less than N.
⇒ The remaining 976 – 511 = 465 factors of N^2 are less than N and not a factor of N.

21. **45**

Assuming the cost price of milk as 1 unit, the milkman buys x litres of milk so his total cost should be x. Since he makes a profit of 43%, his total revenue is 1.43x. Now he earns this by selling (x+10) litres at 1.17 units each so 1.17(x + 10) = 1.43x. Solving, we get x = 45 litres.
Therefore, the required answer is 45.

22. **0**

We have, $(ABC)_9 = (1ABC)_5$
∴ 81A + 9B + C = 125 + 25A + 5B + C
∴ 56A + 4B = 125
Now, LHS is a multiple of 4 but RHS is not. Therefore, no natural number solution for this equation exists.
Therefore, the required answer is 0.