

NCT Examination Paper 2018

Time: 3 Hours]

[M.M.: 100

General Instructions:

- (i) All questions are compulsory.
- (ii) Please check that this question paper contains 29 questions.
- (iii) Questions 1-4 in section – A are very short answer type questions carrying 1 mark each.
- (iv) Questions 5-12 in section – B are short answer type questions carrying 2 marks each.
- (v) Questions 13-23 in section – C are long answer I type questions carrying 4 marks each.
- (vi) Questions 24-29 in section – D are long answer II type questions carrying 6 marks each.
- (vii) Use of calculator is not permitted.

SECTION – ‘A’

1. If A and B are two sets such that $n(A) = 20$, $n(B) = 25$ and $n(A \cup B) = 40$ then find $n(A \cap B)$. 1

Sol. $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$$\Rightarrow 40 = 20 + 25 - n(A \cap B)$$

$$\Rightarrow n(A \cap B) = 5$$

2. If $z = 2 + \sqrt{3}i$, find the value of $z\bar{z}$. 1

Sol. $z = 2 + \sqrt{3}i$, $\bar{z} = 2 - \sqrt{3}i$

$$\therefore z \cdot \bar{z} = (2 + \sqrt{3}i)(2 - \sqrt{3}i) = (2)^2 - (\sqrt{3}i)^2 = 4 - 3i^2 = 4 + 3 = 7.$$

3. Write the negation of the statement “ $\sqrt{2}$ is not a complex number”. 1

Sol. $\sqrt{2}$ is a complex number.

4. Differentiate $f(x) = x^{3/2} \cdot \tan \frac{\pi}{4}$ with respect to x . 1

Sol. $f(x) = x^{3/2} \tan \frac{\pi}{4} = x^{3/2}$

$$f'(x) = \frac{3}{2} \cdot x^{1/2}$$

SECTION – ‘B’

5. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $B = \{2, 4, 6, 8\}$, $C = \{3, 4, 5, 6\}$, $D = \{6, 7, 8, 9\}$, find: 1+1

(i) $(B - C)'$ (ii) $(B \cap D)'$.

Sol. (i) $B - C = \{2, 4, 6, 8\} - \{3, 4, 5, 6\} = \{2, 8\}$

$$(B - C)' = U - (B - C) = \{1, 2, 3, \dots, 9\} - \{2, 8\} = \{1, 3, 4, 5, 6, 7, 9\}$$

(ii) $D' = U - D = \{1, 2, 3, \dots, 9\} - \{6, 7, 8, 9\} = \{1, 2, 3, 4, 5\}$

$$B \cap D' = \{2, 4, 6, 8\} \cap \{1, 2, 3, 4, 5\} = \{2, 4\}.$$

6. $A = \{x, y, z\}$ and $B = \{1, 2\}$, find the number of relations from A into B. 2

Sol. A relation from A to B is a subset of $A \times B$.

$$n(A \times B) = n(A) \times n(B) = 3 \times 2 = 6$$

$$\therefore \text{Number of subsets of } A \times B = 2^6 = 64$$

$$\therefore \text{Number of relations} = 64$$

7. If $\left(\frac{1+i}{1-i}\right)^m = 1$, then find the least integral value of m . 2

Sol. Consider $\frac{1+i}{1-i} = \frac{(1+i)(1+i)}{(1-i)(1+i)} = \frac{(1+i)^2}{1-i^2} = \frac{1+i^2+2i}{2} = \frac{2i}{2} = i$

$\therefore \left(\frac{1+i}{1-i}\right)^m = 1 \Rightarrow (i)^m = 1$. Least integral value of $m = 4$

8. Find the coefficient of x^6y^3 in the expansion of $(x + 2y)^9$. 2

Sol. Given $(x + 2y)^9$

The $(r + 1)$ th term of the expansion $(x + 2y)^9$ is given by

$$T_{r+1} = {}^9C_r x^{9-r} (2y)^r = {}^9C_r \cdot 2^r \cdot x^{9-r} y^r$$

Comparing the indices of x and y in $x^6 \cdot y^3$ and in T_{r+1} , we get $r = 3$

$$T_4 = {}^9C_3 \cdot 2^3 \cdot x^6 y^3$$

\Rightarrow Coefficient of $x^6 y^3$ is ${}^9C_3 \cdot 2^3 = \frac{9 \cdot 8 \cdot 7}{6} \times 8 = 672$.

9. (i) Write the contrapositive of the statement: 1+1

‘If you are born in India, then you are a citizen of India.’

(ii) Write the converse of the statement:

‘If a number n is even then n^2 is even.’

Sol. (i) If you are not a citizen of India then you are not born in India.

(ii) If n^2 is even then n is even.

10. Four cards from a pack of 52 cards are drawn at random. Find the probability that all four cards are of same suit. 2

Sol. Total outcomes = ${}^{52}C_4$

Favourable outcomes for all four cards of same suit = (4 spades) + (4 clubs) + (4 diamonds) + (4 hearts)

$$= 4 \times {}^{13}C_4$$

\therefore Probability = $\frac{4 \times {}^{13}C_4}{{}^{52}C_4}$.

11. Find the derivative of $f(x) = x^2 \sin x + \sin^2 x$ with respect to x . 2

Sol. Consider $f(x) = x^2 \sin x + \sin^2 x$

$$f'(x) = \frac{d}{dx} (x^2 \sin x) + \frac{d}{dx} (\sin x)^2$$

$$= x^2 \cdot \cos x + \sin x \cdot 2x + 2 \sin x \cdot \cos x$$

$$= x^2 \cos x + 2x \sin x + \sin 2x$$

12. Find the ratio in which YZ-plane divides the line segment joining the points P(-2, 4, 7) and Q(3, -5, 8). 2

Sol. Let YZ-plane divides the line segment joining the points P(-2, 4, 7) and Q(3, -5, 8) in the ratio $k : 1$.

\therefore Point of division $\left(\frac{3k-2}{k+1}, \frac{-5k+4}{k+1}, \frac{8k+7}{k+1}\right)$.

If this point lies on YZ-plane, then

$$\frac{3k-2}{k+1} = 0 \Rightarrow 3k - 2 = 0 \Rightarrow k = \frac{2}{3}$$

\therefore Ratio is $\frac{2}{3}:1$ or $2:3$ (internally).

SECTION – ‘C’

13. Solve the following system of inequalities graphically:

4

$$x + 2y \leq 10$$

$$x + y \geq 1$$

$$x - y \leq 0$$

$$x \geq 0, y \geq 0$$

Sol. Consider equation $x + 2y = 10$ corresponding to inequation $x + 2y \leq 10$

Some points on the line $x + 2y = 10$, are

x	0	10	6
y	5	0	2

Put $(0, 0)$ in $x + 2y \leq 10$

$$\Rightarrow 0 \leq 10, \text{ true}$$

We shade the portion containing $(0, 0)$.

Consider equation $x + y = 1$ corresponding to inequation $x + y \geq 1$

Some points on the line $x + y = 1$, are

x	0	1	-1
y	1	0	2

Put $(0, 0)$ in $x + y \geq 1 \Rightarrow 0 \geq 1$, false

So, we shade the portion which does not contain $(0, 0)$.

Consider equation $x - y = 0$ corresponding to inequation $x - y \leq 0$

Some points on the line $x - y = 0$, are

x	0	1	2
y	0	1	2

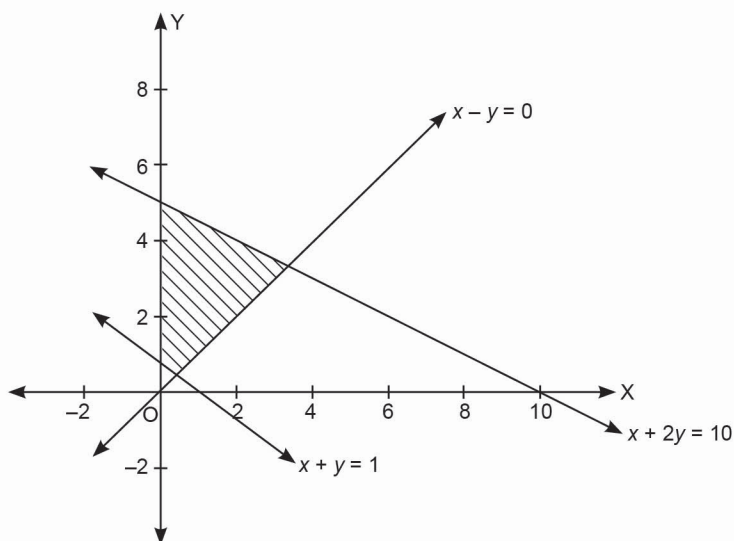
Put $(1, 2)$ in $x - y \leq 0$

$$1 - 2 \leq 0 \Rightarrow -1 \leq 0, \text{ true}$$

We shade the portion containing $(0, 0)$.

$$x \geq 0, y \geq 0 \Rightarrow \text{Ist quadrant}$$

Plotting the graph from above information we get shaded portion as graphical solution.



14. Solve the following equation $\tan^2 \theta + (1 - \sqrt{3}) \tan \theta - \sqrt{3} = 0$

4

Sol. Consider equation $\tan^2 \theta + (1 - \sqrt{3}) \tan \theta - \sqrt{3} = 0$

$$\Rightarrow \tan^2 \theta + \tan \theta - \sqrt{3} \tan \theta - \sqrt{3} = 0$$

$$\Rightarrow \tan \theta (\tan \theta + 1) - \sqrt{3} (\tan \theta + 1) = 0$$

$$\begin{aligned} \Rightarrow & (\tan \theta - \sqrt{3})(\tan \theta + 1) = 0 \\ \Rightarrow & \tan \theta - \sqrt{3} = 0 & \text{or} & \tan \theta + 1 = 0 \\ \Rightarrow & \tan \theta = \sqrt{3} & \text{or} & \tan \theta = -1 \\ \Rightarrow & \tan \theta = \tan \frac{\pi}{3} & \text{or} & \tan \theta = -\tan \frac{\pi}{4} = \tan\left(-\frac{\pi}{4}\right) \\ \Rightarrow & \theta = n\pi + \frac{\pi}{3}, n \in Z & \text{or} & \theta = n\pi - \frac{\pi}{4}, n \in Z \end{aligned}$$

15. Find the derivative of $x \tan x$ with respect to x from first principle of derivative. 4

Sol. Consider $f(x) = x \tan x$

$f(x+h) = (x+h)\tan(x+h)$, where h is small increment in x .

From first principle,

$$\begin{aligned} f'(x) &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \\ &= \lim_{h \rightarrow 0} \frac{(x+h)\tan(x+h) - x \tan x}{h} \\ &= \lim_{h \rightarrow 0} \frac{x[\tan(x+h) - \tan x] + h \tan x}{h} \\ &= x \cdot \lim_{h \rightarrow 0} \frac{\tan(x+h-x)[1 + \tan(x+h)\tan x]}{h} + \lim_{h \rightarrow 0} \tan x \\ & \qquad \qquad \qquad \{ \tan A - \tan B = \tan(A-B)(1 + \tan A \tan B) \} \\ &= x \cdot \lim_{h \rightarrow 0} \frac{\tan h}{h} \cdot [1 + \tan(x+h)\tan x] + \tan x \\ &= x \cdot 1 \cdot (1 + \tan^2 x) + \tan x = x \sec^2 x + \tan x. \end{aligned}$$

16. Two students Mohit and Mamata appeared in the examination. The probability that Mohit will qualify the examination is 0.05 and the Mamata will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. Find the probability that: 4

(i) both Mohit and Mamata will not qualify the examination.

(ii) at least one of them will not qualify the examination.

(iii) write one importance of examination.

Sol. A : Mohit B : Mamata

$$P(A) = 0.05, \quad P(B) = 0.10, \quad P(A \cap B) = 0.02$$

$$\begin{aligned} (i) \quad P(\overline{A \cap B}) &= P(\overline{A \cup B}) = 1 - P(A \cup B) = 1 - [P(A) + P(B) - P(A \cap B)] \\ &= 1 - [0.05 + 0.10 - 0.02] = 1 - 0.13 = 0.87 \end{aligned}$$

$$(ii) \quad P(\overline{A \cup B}) = P(\overline{A \cap B}) = 1 - P(A \cap B) = 1 - 0.02 = 0.98$$

(iii) Examination is a tool to judge oneself.

17. Find the equation of the circle with radius 5 whose centre lies on x -axis and passes through the point (2, 3). 4

Or

Find the equation of the ellipse, with major axis along the x -axis and passing through the point (4, 3) and (-1, 4).

Sol. Centre lies on the x -axis. Let centre be $(h, 0)$

radius = 5

$$\therefore \text{Circle is } (x - h)^2 + (y - 0)^2 = (5)^2$$

$$\Rightarrow (x - h)^2 + y^2 = 25 \quad \dots(i)$$

Circle passes through the point $(2, 3)$

$$\therefore (2 - h)^2 + (3)^2 = 25 \Rightarrow (2 - h)^2 = 16 \Rightarrow 2 - h = \pm 4$$

$$\Rightarrow h = 2 \mp 4 \Rightarrow h = -2, 6$$

Substituting in (i) , we get

$$\text{Equation of circle as } (x + 2)^2 + y^2 = 25 \Rightarrow x^2 + y^2 + 4x - 21 = 0$$

$$\text{or equation of circle as } (x - 6)^2 + y^2 = 25 \Rightarrow x^2 + y^2 - 12x + 11 = 0.$$

Or

$$\text{Let ellipse be } \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \quad (a > b) \quad \dots(i)$$

Since ellipse pass through the points $(4, 3)$ and $(-1, 4)$

$$\therefore \frac{16}{a^2} + \frac{9}{b^2} = 1 \quad \dots(ii)$$

$$\text{and } \frac{1}{a^2} + \frac{16}{b^2} = 1 \quad \dots(iii)$$

On multiplying equation (iii) by 16, we get

$$\frac{16}{a^2} + \frac{9}{b^2} = 1 \quad \dots(ii)$$

$$\frac{16}{a^2} + \frac{256}{b^2} = 16 \quad \dots(iv)$$

$$-\frac{247}{b^2} = -15 \Rightarrow b^2 = \frac{247}{15}$$

Putting in (iii) , we get

$$\frac{1}{a^2} + \frac{16 \times 15}{247} = 1 \Rightarrow \frac{1}{a^2} = 1 - \frac{240}{247} = \frac{7}{247} \Rightarrow a^2 = \frac{247}{7}$$

$$\therefore \text{From } (i), \text{ ellipse is } \frac{7x^2}{247} + \frac{15y^2}{247} = 1 \Rightarrow 7x^2 + 15y^2 = 247$$

18. Find the square root of $-8 - 6i$.

4

Or

If $x + iy = \sqrt{\frac{a + ib}{c + id}}$, prove that $(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$

$$\begin{aligned} \text{Sol. } \pm \sqrt{-8 - 6i} &= \pm \sqrt{-8 - 2 \times 3 \times i} = \pm \sqrt{-9 + 1 - 2 \times 3 \times i} \\ &= \pm \sqrt{9i^2 + 1 - 2 \times 3 \times i} = \pm \sqrt{(3i)^2 + (1)^2 - 2 \times 3 \times i} \\ &= \pm \sqrt{(1 - 3i)^2} = \pm (1 - 3i) \end{aligned}$$

Square roots are $\pm(1 - 3i)$.

Alternate Method:

Let $x + iy = \sqrt{-8 - 6i}$

$\Rightarrow (x + iy)^2 = -8 - 6i$

$\Rightarrow (x^2 - y^2) + 2xyi = -8 - 6i$

$\Rightarrow \left. \begin{aligned} x^2 - y^2 &= -8 \\ 2xy &= -6 \end{aligned} \right\}$

...(i)

Also, $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$
 $= (-8)^2 + (-6)^2 = 64 + 36 = 100$

$\Rightarrow x^2 + y^2 = 10$ (only positive) ... (ii)

From (i) and (ii), we get

$$x^2 + y^2 = 10$$

$$x^2 - y^2 = -8$$

$$2x^2 = 2 \Rightarrow x^2 = 1 \Rightarrow x = \pm 1$$

From (i),

$$2xy = -6 \Rightarrow xy = -3$$

when $x = 1, y = -3$, root is $1 - 3i$

when $x = -1, y = 3$, root is $-1 + 3i$

\therefore Square roots are $\pm(1 - 3i)$.

Or

Consider $x + iy = \sqrt{\frac{a + ib}{c + id}}$

On squaring both sides, we get $(x + iy)^2 = \frac{a + ib}{c + id}$

$\Rightarrow |(x + iy)^2| = \left| \frac{a + ib}{c + id} \right|$

$\Rightarrow |x + iy|^2 = \frac{|a + ib|}{|c + id|}$

$\Rightarrow (\sqrt{x^2 + y^2})^2 = \frac{\sqrt{a^2 + b^2}}{\sqrt{c^2 + d^2}}$

$\Rightarrow x^2 + y^2 = \frac{\sqrt{a^2 + b^2}}{\sqrt{c^2 + d^2}}$

Again squaring both sides, we get

$$(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$$

$$\left[\begin{array}{l} \text{As (i) } |z^n| = |z|^n \\ \text{(ii) } \left| \frac{z_1}{z_2} \right| = \frac{|z_1|}{|z_2|} \end{array} \right]$$

19. Find the term independent of x in the expansion of $\left(\frac{\sqrt{x}}{\sqrt{3}} + \frac{\sqrt{3}}{2x^2}\right)^{10}$.

4

Sol. Given $\left(\frac{\sqrt{x}}{\sqrt{3}} + \frac{\sqrt{3}}{2x^2}\right)^{10}$

We have
$$\begin{aligned} T_{r+1} &= {}^{10}C_r \left(\frac{\sqrt{x}}{\sqrt{3}}\right)^{10-r} \left(\frac{\sqrt{3}}{2x^2}\right)^r \\ &= {}^{10}C_r \cdot \left(\frac{1}{\sqrt{3}}\right)^{10-r} (\sqrt{3})^r \cdot x^{5-\frac{r}{2}} \cdot \left(\frac{1}{2}\right)^r \cdot x^{-2r} \\ &= {}^{10}C_r \cdot (\sqrt{3})^{2r-10} \left(\frac{1}{2}\right)^r \cdot x^{5-\frac{5r}{2}} \end{aligned}$$

For a term independent of x , we have

$$5 - \frac{5r}{2} = 0 \Rightarrow r = 2$$

$$\therefore T_{2+1} = {}^{10}C_2 \cdot (\sqrt{3})^{-6} \cdot \left(\frac{1}{2}\right)^2 \cdot x^0 = \frac{10 \times 9}{2} \times \frac{1}{27} \times \frac{1}{4} = \frac{5}{12}.$$

20. A boy has 3 library tickets and 8 books of his interest in the library. Of these 8 books he does not want to borrow Mathematics Part-II unless Mathematics Part-I is also borrowed. In how many ways can he choose the three books to be borrowed?

4

Sol.

	8 Books		
	Maths (I)	Maths (II)	⑥
(i)	1	0	2
(ii)	1	1	1
(iii)	0	0	3

$$\begin{aligned} \text{Total ways} &= {}^1C_1 \times {}^1C_0 \times {}^6C_2 + {}^1C_1 \times {}^1C_1 \times {}^6C_1 + {}^1C_0 \times {}^1C_0 \times {}^6C_3 \\ &= 15 + 6 + 20 = 41. \end{aligned}$$

21. How many numbers greater than 10,00,000 can be formed by using the digits 1, 2, 0, 2, 4, 2, 4? 4

Sol. Given digits are 1, 2, 0, 2, 4, 2, 4

$$\text{Total numbers formed} = \frac{7!}{3!2!} = \frac{7 \times 6 \times 120}{6 \times 2} = 420$$

$$\text{Total numbers starting with '0'} = 1 \times \frac{6!}{3!2!} = 60$$

\therefore Total numbers greater than 10,00,000 are $420 - 60 = 360$.

22. Let $A = \{1, 2, 3, \dots, 20\}$. Define a relation R from A to A by $R = \{(a, b) : a - 2b = 0, a, b \in A\}$. Depict the relation using roster form. Write domain and range of the relation.

4

Sol. Given $A = \{1, 2, 3, \dots, 20\}$

and relation $R = \{(a, b) : a - 2b = 0, a, b \in A\}$

\therefore Relation $R = \{(2, 1), (4, 2), (6, 3), (8, 4), (10, 5), (12, 6), (14, 7), (16, 8), (18, 9), (20, 10)\}$

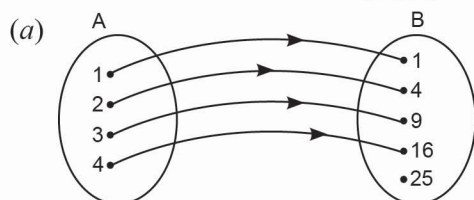
Domain: $\{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}$

Range: $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

23. Let $A = \{1, 2, 3, 4\}$, $B = \{1, 4, 9, 16, 25\}$ and R be a relation defined from A to B as $R = \{(x, y) : x \in A, y \in B \text{ and } y = x^2\}$.
- (a) Draw arrow diagram of R . 1
- (b) Find domain of R . 1
- (c) Find range of R . 1
- (d) Write co-domain of R . 1

Sol. Given $A = \{1, 2, 3, 4\}$ and $B = \{1, 4, 9, 16, 25\}$

$$R = \{(x, y) : x \in A, y \in B, y = x^2\}$$



- (b) Domain: set A
- (c) Range : $\{1, 4, 9, 16\}$
- (d) Co-domain : set B

SECTION – ‘D’

24. Using principle of mathematical induction for all $n \in \mathbb{N}$ prove that $x^{2n} - y^{2n}$ is divisible by $x + y$. 6

Sol. Let $P(n) : x^{2n} - y^{2n}$ is divisible by $(x + y)$

$$P(1) : x^2 - y^2 \text{ is divisible by } (x + y)$$

$\Rightarrow (x - y)(x + y)$ is divisible by $(x + y)$, true.

Let $P(k)$ be true

$$x^{2k} - y^{2k} \text{ is divisible by } (x + y)$$

$$\Rightarrow x^{2k} - y^{2k} = (x + y)\lambda, \quad \lambda \in \mathbb{N}$$

$$\Rightarrow x^{2k} = y^{2k} + (x + y)\lambda \quad \dots(i)$$

To show $P(k + 1)$ is true

$$\Rightarrow x^{2(k+1)} - y^{2(k+1)} \text{ is divisible by } (x + y)$$

$$\Rightarrow x^{2k}x^2 - y^{2k} \cdot y^2$$

$$\Rightarrow [y^{2k} + (x + y)\lambda]x^2 - y^{2k} \cdot y^2$$

$$\Rightarrow x^2 \cdot y^{2k} + (x + y)\lambda x^2 - y^{2k} \cdot y^2$$

$$\Rightarrow y^{2k}(x^2 - y^2) + (x + y)\lambda x^2$$

$$\Rightarrow (x + y)[(x - y)y^{2k} + \lambda x^2] = (x + y)\lambda', \text{ where } \lambda' = [(x - y)y^{2k} + \lambda x^2]$$

$$\Rightarrow x^{2(k+1)} - y^{2(k+1)} \text{ is divisible by } (x + y).$$

Hence, $P(k)$ is true $\Rightarrow P(k + 1)$ is true, $P(1)$ is also true. So, statement is true for all $n \in \mathbb{N}$ by the principle of mathematical induction.

25. Find mean deviation about median for the following data: 6

C.I.	0–10	10–20	20–30	30–40	40–50	50–60
Frequency	8	10	10	16	4	2

Sol. Table for mean deviation about median

C.I.	f_i	c.f.	x_i	$ x_i - 27 $	$f_i x_i - 27 $
0 – 10	8	8	5	22	176
10 – 20	10	18	15	12	120
20 – 30	10	28	25	2	20
30 – 40	16	44	35	8	128
40 – 50	4	48	45	18	72
50 – 60	2	50	55	28	56
	50				572

$$N = 50, \frac{N}{2} = 25$$

Median class: 20 – 30

$$\begin{aligned} \therefore \text{Median} &= l + \frac{\left(\frac{N}{2} - C\right)}{f} \times h \\ &= 20 + \left(\frac{25 - 18}{10}\right) \times 10 \\ &= 20 + 7 = 27 \end{aligned}$$

$$\begin{aligned} \text{Mean deviation} &= \frac{\sum f_i |x_i - 27|}{\sum f_i} \\ &= \frac{572}{50} = 11.44. \end{aligned}$$

26. Find the equation of lines passing through the point (2, 2) such that the sum of their intercepts on the axes is 9. 6

Or

Show that the equation of a line passing through $(a \cos^3 \theta, a \sin^3 \theta)$ and perpendicular to the line $x \sec \theta + y \operatorname{cosec} \theta = a$ is $x \cos \theta - y \sin \theta = a \cos 2\theta$.

Sol. Let intercepts be a and $9 - a$.

$$\therefore \text{Equation of line is } \frac{x}{a} + \frac{y}{9-a} = 1 \quad \dots(i)$$

Lines passing through the point (2, 2)

$$\therefore \frac{2}{a} + \frac{2}{9-a} = 1$$

$$\Rightarrow 2(9-a) + 2a = a(9-a)$$

$$\Rightarrow 18 - 2a + 2a = 9a - a^2 \Rightarrow a^2 - 9a + 18 = 0$$

$$\Rightarrow (a-3)(a-6) = 0 \Rightarrow a-3 = 0 \text{ or } a-6 = 0$$

$$\Rightarrow a = 3, 6$$

From (i),

$$\text{when } a = 3, \text{ line is } \frac{x}{3} + \frac{y}{6} = 1 \Rightarrow 2x + y - 6 = 0$$

$$\text{when } a = 6, \text{ line is } \frac{x}{6} + \frac{y}{3} = 1 \Rightarrow x + 2y - 6 = 0$$

Or

Given line is $x \sec \theta + y \operatorname{cosec} \theta = a$

$$\text{Slope of line} = -\frac{\sec \theta}{\operatorname{cosec} \theta} = -\frac{\sin \theta}{\cos \theta}$$

Slope of perpendicular line = $\frac{\cos \theta}{\sin \theta}$ (\because if lines are perpendicular, product of their slopes is -1)

\therefore Equation line passing through $(a \cos^3 \theta, a \sin^3 \theta)$ and having slope $\frac{\cos \theta}{\sin \theta}$ is

$$y - a \sin^3 \theta = \frac{\cos \theta}{\sin \theta}(x - a \cos^3 \theta)$$

$$\Rightarrow y \cdot \sin \theta - a \sin^4 \theta = x \cdot \cos \theta - a \cos^4 \theta$$

$$\begin{aligned}\Rightarrow x \cos \theta - y \sin \theta &= a \cos^4 \theta - a \sin^4 \theta \\ &= a(\cos^4 \theta - \sin^4 \theta) \\ &= a(\cos^2 \theta + \sin^2 \theta)(\cos^2 \theta - \sin^2 \theta)\end{aligned}$$

$$\Rightarrow x \cos \theta - y \sin \theta = a \cos 2\theta$$

27. If a and b are the roots of $x^2 - 3x + p = 0$ and c, d are the roots of $x^2 - 12x + q = 0$, where a, b, c, d form a G.P. Prove that: $(q + p) : (q - p) = 17 : 15$ 6

Or

Find the sum of first x terms of the series: $3 + 7 + 13 + 21 + 31 + \dots$

Sol. a and b are the roots of the equation $x^2 - 3x + p = 0$

$$\Rightarrow a + b = 3 \quad \dots(i)$$

$$\Rightarrow ab = p \quad \dots(ii)$$

c and d are the roots of the equation $x^2 - 12x + q = 0$

$$\Rightarrow c + d = 12 \quad \dots(iii)$$

$$\Rightarrow cd = q \quad \dots(iv)$$

$$\frac{q + p}{q - p} = \frac{cd + ab}{cd - ab} \quad \dots(v) \quad [\text{from (ii) and (iv)}]$$

a, b, c, d are in G.P. Let common ratio be r

\therefore numbers are $a, b = ar, c = ar^2, d = ar^3$

From (i) and (iii)

$$\frac{c + d}{a + b} = \frac{12}{3} \Rightarrow \frac{ar^2 + ar^3}{a + ar} = 4 \Rightarrow \frac{ar^2(1 + r)}{a(1 + r)} = 4$$

$$\Rightarrow r^2 = 4 \quad \dots(vi)$$

From (v),

$$\frac{q + p}{q - p} = \frac{ar^2 \cdot ar^3 + a \cdot ar}{ar^2 \cdot ar^3 - a \cdot ar} = \frac{a^2 r(r^4 + 1)}{a^2 r(r^4 - 1)}$$

$$\Rightarrow \frac{q + p}{q - p} = \frac{r^4 + 1}{r^4 - 1} = \frac{16 + 1}{16 - 1} = \frac{17}{15} \quad [\text{from (vi)}]$$

$$\Rightarrow (q + p) : (q - p) = 17 : 15.$$

Or

Let $S_x = 3 + 7 + 13 + 21 + 31 + \dots + (x \text{ terms})$

$$S_x = \begin{array}{cccccccc} 3 & + & 7 & + & 13 & + & 21 & + & \dots & + & (x \text{ terms}) \\ \hline \end{array}$$

$$0 = 3 + 4 + 6 + 8 + 10 \quad \dots - x \text{ terms}$$

$$x\text{th term} = 3 + [4 + 6 + 8 + 10 + \dots + (x - 1) \text{ terms}]$$

$$a_x = 3 + \frac{x-1}{2}[2 \times 4 + (x-1-1)2]$$

$$= 3 + \frac{x-1}{2}[8 + 2x - 4] = 3 + (x-1)(2+x)$$

$$a_x = 3 + x^2 + x - 2 = x^2 + x + 1$$

$$\begin{aligned} \therefore S_x &= \sum a_x = \sum x^2 + \sum x + \sum 1 = \frac{x(x+1)(2x+1)}{6} + \frac{x(x+1)}{2} + x \\ &= \frac{x}{6}[2x^2 + 3x + 1 + 3x + 3 + 6] = \frac{x}{6}(2x^2 + 6x + 10) = \frac{x}{3}(x^2 + 3x + 5). \end{aligned}$$

28. In a survey of 5,000 people it was found that 2,250 people read English newspaper, 1,750 read Hindi newspaper and 875 read Hindi and English newspaper. Find: **6**

(i) number of people who do not read English as well as Hindi newspaper.

(ii) number of people who read only English newspaper.

Sol. E : English newspaper, H : Hindi newspaper

$$\begin{aligned} n(E \cup H) &= n(E) + n(H) - n(E \cap H) \\ &= 2250 + 1750 - 875 = 3125 \end{aligned}$$

(i) Number of people who do not read English as well as Hindi newspaper

$$n(\bar{E} \cap \bar{H}) = n(U) - n(E \cup H) = 5000 - 3125 = 1875.$$

$$\begin{aligned} \text{(ii)} \quad n(\text{only English}) &= n(E \cap \bar{H}) = n(E) - n(E \cap H) \\ &= 2250 - 875 = 1375. \end{aligned}$$

29. Prove that: $\sin A \sin(60^\circ - A) \sin(60^\circ + A) = \frac{1}{4} \sin 3A$. **6**

Or

If $\sin(y + z - x)$, $\sin(z + x - y)$, $\sin(x + y - z)$ are in AP. Prove that $\tan x$, $\tan y$, $\tan z$ are also in AP.

Sol.

$$\begin{aligned} \text{LHS} &= \sin A \sin(60^\circ - A) \sin(60^\circ + A) \\ &= \sin A [\sin^2 60^\circ - \sin^2 A] \quad [\because \sin(A+B) \sin(A-B) = \sin^2 A - \sin^2 B] \\ &= \sin A \left[\left(\frac{\sqrt{3}}{2} \right)^2 - \sin^2 A \right] = \sin A \left[\frac{3}{4} - \sin^2 A \right] \\ &= \frac{1}{4} [3 \sin A - 4 \sin^3 A] = \frac{1}{4} \sin 3A = \text{RHS} \end{aligned}$$

Or

$\sin(y + z - x)$, $\sin(z + x - y)$, $\sin(x + y - z)$ are in AP

$$\Rightarrow \sin(z + x - y) - \sin(y + z - x) = \sin(x + y - z) - \sin(z + x - y)$$

$$\begin{aligned} \Rightarrow 2 \cos\left(\frac{z + x - y + y + z - x}{2}\right) \sin\left(\frac{z + x - y - y - z + x}{2}\right) \\ = 2 \cos\left(\frac{x + y - z + z + x - y}{2}\right) \sin\left(\frac{x + y - z - z - x + y}{2}\right) \end{aligned}$$

$$\Rightarrow 2 \cos z \cdot \sin(x - y) = 2 \cos x \cdot \sin(y - z)$$

$$\Rightarrow \frac{\sin(x - y)}{\cos x} = \frac{\sin(y - z)}{\cos z}$$

$$\Rightarrow \frac{\sin x \cos y - \cos x \sin y}{\cos x} = \frac{\sin y \cos z - \cos y \sin z}{\cos z}$$

$$\Rightarrow \tan x \cos y - \sin y = \sin y - \cos y \tan z$$

$$\Rightarrow \tan x - \tan y = \tan y - \tan z \quad (\text{on dividing throughout by } \cos y)$$

$$\Rightarrow 2 \tan y = \tan x + \tan z \Rightarrow \tan x, \tan y, \tan z \text{ are in AP.}$$

EXAMINATION PAPER_2017

[NCT]

Time Allowed: 3 Hours]

[Maximum Marks: 90

General Instructions:

- (i) This question paper has three parts A, B and C. All questions are compulsory.
 - (ii) Marks for questions are indicated against each.
 - (iii) Question nos. 1 to 3 and 13 to 14 are very short answer questions carrying one mark each. Answer to them should be in one sentence or one word each.
 - (iv) Question nos. 4 to 8 and 15 to 18 are short answer type questions carrying three marks each. Answer to them should not normally exceed 60 words each.
 - (v) Question nos. 9 and 19 to 20 are also short answer questions carrying four marks each. Answer to them should not normally exceed 70 words each.
 - (vi) Question nos. 10 to 12 and 21 to 23 are long answer questions carrying six marks each. Answer to them should not normally exceed 100 words each.
 - (vii) In the Section 'C', there are two questions based on Open Text Material carrying 5 marks each. Answer to them should not normally exceed 100 words each.
 - (viii) Open Text Material is attached with section C.
-

SECTION-A

1. Which central tendency is also known as central point of variable? [1]

Ans. Median

2. What is exclusive series? [1]

Ans. Exclusive series refers to a series where the upper class limit is excluded and the lower class limit is included in a class interval.

3. Price of top 30 shares of Bombay Stock Exchange increased, which of these will increase? [1]

(a) WPI (b) CPI (c) Inflation rate (d) Sensex

Ans. (d) Sensex

4. Distinguish between discrete variable and continuous variable. [3]

Basis	Discrete Variable	Continuous Variable
(a) Meaning	It refers to variable that assumes a finite number of isolated values.	It refers to a variable which assumes infinite number of different values.
(b) Values	Values are obtained by counting.	Values are obtained by measuring.
(c) Classification	Non-overlapping	Overlapping
(d) Example	Number of Students in a Class	Height, weight, etc.

(any three)

5. Write three merits of tabular presentation of data. [3]

Ans. The three merits of tabular presentation of data are:

- (a) In case of large quantity of data, tabular presentation helps in accommodating any volume of data for one or more variables.
- (b) Tabulated data can be presented through diagrams, which enable quicker comprehension.
- (c) Data presented through tables, having rows and columns, facilitates quick comparisons.

6. Average marks of 26 students of section A of Class XI is 73 and average marks of 24 students of section B of class XI is 86. Find out the average marks of class XI. [3]

Ans. Combined Mean (\bar{X}_1 and \bar{X}_2) =
$$\frac{N_1\bar{X}_1 + N_2\bar{X}_2}{N_1 + N_2}$$

$$= \frac{26 \times 73 + 24 \times 86}{26 + 24}$$

$$= \frac{1898 + 2064}{50} = \frac{3962}{50} = 79.24$$

\therefore Average marks of Class XI = 79.24

7. Find out Pasche's Price Index from the following data : [3]

Item	Base year		Current year	
	Price	Quantity	Price	Quantity
A	10	8	20	10
B	35	6	40	9
C	30	20	32	25
D	40	5	44	6

Ans.

Item	Base year		Current year		p_1q_1	p_0q_1
	Price (p_0)	Quantity (q_0)	Price (p_1)	Quantity (q_1)		
A	10	8	20	10	200	100
B	35	6	40	9	360	315
C	30	20	32	25	800	750
D	40	5	44	6	264	240
					$\Sigma p_1q_1 = 1624$	$\Sigma p_0q_1 = 1405$

$$\begin{aligned}\text{Paasche's Price Index (P}_{01}) &= \frac{\Sigma p_1q_1}{\Sigma p_0q_1} \times 100 \\ &= \frac{1,624}{1,405} \times 100 = 115.58\end{aligned}$$

∴ Paasche's price index of 115 is interpreted as a price rise of 15%. Using current period weights, the price is said to have risen by 15%.

8. Salary of Rahul was ₹ 10,000 in base year. Current year's CPI is 225 and his salary is ₹ 21,000/-. Can he maintain same living standard as base year? Give reasons. [3]

Or

Absolute measure or relative measure, which measure of dispersion you will prefer to use? Why? Give reason.

Ans. When salary of Rahul was ₹ 10,000 in base year, current year's salary is ₹ 21,000 and current year's CPI is 225, then it implies that the cost of living standard has risen by 125% whereas his salary has increased by 110%, therefore there is a gap of 15%. So, he cannot maintain same living standard as the base year, as he has been compensated by less than 15%.

Or

Out of the two, absolute or relative measures of dispersion, I will prefer to use relative measure of dispersion because of the following reasons.

- Sometimes absolute measure may give misleading ideas about the extent of variation especially when the averages differ significantly.
- Absolute measure gives the answer in the units in which original values are expressed.

To overcome these problems, relative measure of dispersion can be used. Since, relative measure is free from the units in which the values have been expressed, they can be compared even across different groups having different units of measurement.

9. Calculate median from the following data:

[4]

Mid-value	5	15	25	35	45
Frequency	4	8	16	7	5

Or

Calculate coefficient of Quartile Deviation from following data:

X : 12, 8, 16, 17, 9, 24, 20, 18, 16, 15, 25

Ans.

Mid-Value	Class Interval	Frequency (f)	Cumulative Frequency (c.f.)
5	0-10	4	4
15	10-20	8	12
25	20-30	16	28
35	30-40	7	35
45	40-50	5	40
		$\Sigma f = 40$	

$$\begin{aligned} \text{Median} &= \left(\frac{N}{2}\right)^{\text{th}} \text{ item} \\ &= \left(\frac{40}{2}\right)^{\text{th}} \text{ item} = 20\text{th item, which lies in class } 20 - 30. \end{aligned}$$

$$\begin{aligned} \text{Median} &= l_1 + \frac{\frac{N}{2} - c.f.}{f} \times i \\ &= 20 + \frac{20 - 12}{16} \times 10 \\ &= 20 + \frac{8}{16} \times 10 = 20 + 5 = 25 \end{aligned}$$

OR

X
8
9
12
15
16
16
17
18
20
24
25

Q₁

Q₃

$$Q_1 = \left(\frac{n+1}{4}\right)^{\text{th}} \text{ item} = \left(\frac{11+1}{4}\right)^{\text{th}} \text{ item}$$

$$= \left(\frac{12}{4}\right)^{\text{th}} \text{ item} = \text{Value of 3}^{\text{rd}} \text{ item} = 12$$

$$Q_3 = 3\left(\frac{n+1}{4}\right)^{\text{th}} \text{ item} = 3 \times \frac{12}{4}$$

$$= 3 \times 3 = \text{value of 9}^{\text{th}} \text{ item} = 20$$

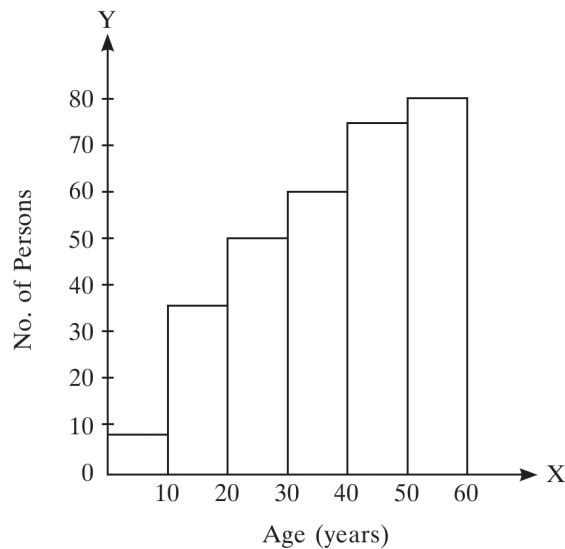
$$\text{Coefficient of Quartile Deviation} = \frac{Q_3 - Q_1}{Q_3 + Q_1} = \frac{20 - 12}{20 + 12}$$

$$= \frac{8}{32} = 0.25$$

10. Use Histogram to represent the following data and locate the mode: [6]

Age (years)	less than 10	less than 20	less than 30	less than 40	less than 50	less than 60
No. of persons	8	22	40	60	75	80

Ans. Histogram



Note: Graphically mode cannot be located but it will lie in the class less than 60 because it has the highest frequency. So, it is the modal class.

11. Calculate Karl Pearson's coefficient of correlation from following data: [6]

X	24	22	25	27	23	26
Y	18	14	22	20	19	24

Or

Calculate Rank coefficient of correlation from following data:

X	12	10	8	10	11	9	15
Y	16	20	24	20	18	22	20

Ans.

X	Y	x = (X - \bar{X})	y = (Y - \bar{Y})	x²	y²	xy
24	18	-0.5	-1.5	0.25	2.25	0.75
22	14	-2.5	-5.5	6.25	30.25	13.75
25	22	0.5	2.5	0.25	6.25	1.25
27	20	2.5	0.5	6.25	0.25	1.25
23	19	-1.5	-0.5	2.25	0.25	0.75
26	24	1.5	4.5	2.25	20.25	6.75
$\Sigma X = 147$	$\Sigma Y = 117$			$\Sigma x^2 = 17.5$	$\Sigma y^2 = 59.5$	$\Sigma xy = 24.5$

$$\bar{X} = \frac{\Sigma X}{N} = \frac{147}{6} = 24.5$$

$$\bar{Y} = \frac{\Sigma Y}{N} = \frac{117}{6} = 19.5$$

$$\begin{aligned} \text{Karl Pearson's coefficient of correlation } (r) &= \frac{\Sigma xy}{\sqrt{\Sigma x^2} \cdot \sqrt{\Sigma y^2}} \\ &= \frac{24.5}{\sqrt{17.5} \cdot \sqrt{59.5}} = \frac{24.5}{4.18 \times 7.71} \\ &= \frac{24.5}{32.22} = 0.76 \end{aligned}$$

Or

X	Y	R_x	R_y	D = R_x - R_y	D²
12	16	2	7	-5	25.00
10	20	4.5	4	0.5	0.25
8	24	7	1	6.0	36.00
10	20	4.5	4	0.5	0.25
11	18	3	6	-3.0	9.00
9	22	6	2	4	16.00
15	20	1	4	-3	9.00
					$\Sigma D^2 = 95.50$

$$r_s = 1 - \frac{6 \left[\Sigma D^2 + \frac{1}{12}(m^3 - m) + \frac{1}{12}(m^3 - m) + \dots \right]}{n^3 - n}$$

$$\begin{aligned}
&= 1 - \frac{6 \left[95.50 + \frac{1}{12} (2^3 - 2) + \frac{1}{12} (3^3 - 3) \right]}{7^3 - 7} \\
&= 1 - \frac{6 \left[95.50 + \frac{1}{12} \times (8 - 2) + \frac{1}{12} (27 - 3) \right]}{343 - 7} = 1 - \frac{6 \left[95.50 + \frac{1}{12} \times 6 + \frac{1}{12} \times 24 \right]}{336} \\
&= 1 - \frac{6 \left[95.50 + \frac{1}{2} + 2 \right]}{336} = 1 - \frac{6 \left[191 + \frac{1}{2} + 2 \right]}{336} = 1 - \frac{6 \left[\frac{196}{2} \right]}{336} \\
&= 1 - \frac{6[98]}{336} = 1 - \frac{588}{336} = 1 - 1.75 = (-) 0.75
\end{aligned}$$

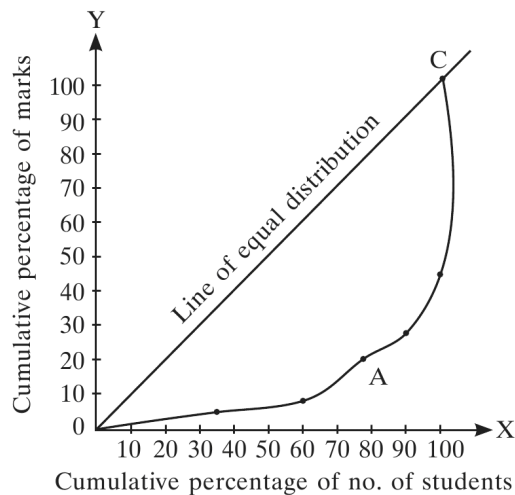
12. Draw a Lorenz curve from the following data and comment:

6

Marks	5-15	15-25	25-35	35-45	45-55
No. of students	7	5	4	2	2

Ans.

Marks	No. of students (f)	Cumulative frequency	Cumulative percentage of frequency	Mid-points of marks (x)	Cumulative mid-points of marks	Cumulative percentage of mid-points of marks
5-15	7	7	35	10	10	2.86
15-25	5	12	60	20	30	8.57
25-35	4	16	80	30	60	17.14
35-45	2	18	90	40	100	28.57
45-55	2	20	100	50	150	42.86
$\Sigma f = 20$					350	100.00



OAC denotes the Lorenz Curve

Inference: As the curve OAC is farther from the line of equal distribution, the greater is the variability present in the given distribution.

SECTION-B

13. What is the meaning of ‘economic planning’? [1]

Ans. Economic planning refers to a process of development which will open out new opportunities to the people for a richer and more varied life, so as to raise their living standards.

14. Mention any two measures taken under privatisation. [1]

Ans. The two measures taken under privatisation are:

- (a) Withdrawal of the government from ownership and management of public sector companies
- (b) Outright sale of public sector companies

15. What is import substitution policy? Why it was introduced in India? [3]

Ans. Import substitution policy aimed at replacing or substituting imports with domestic production. For example, instead of importing vehicles from abroad, the industries were encouraged to produce them in India itself.

It was introduced in India because the government wanted to protect the domestic industries from foreign competition. It was assumed that if domestic industries are protected, they will learn to compete in the course of time.

16. Explain ‘Income and Employment generation’ based strategy for poverty alleviation. [3]

Ans. While dealing with the ‘Income and Employment Generation’ based strategy policy-makers thought that income and employment for the poor could be raised through the creation of additional assets and by means of work generation.

This could be achieved through specific poverty alleviation programmes, which are based on the perspective of the Five Year Plans.

Expanding self-employment programmes and wage employment programmes, such as Rural Employment Generation Programme (REGP), *Pradhan Mantri Rozgar Yojana* (PMRY) and National Food for Work Programme are considered as the major ways of addressing poverty.

17. Write any two differences between human capital formation and human development. [3]

Ans.

Basis	Human Capital Formation	Human Development
(a) Meaning	It is the stock of a nation's skill and expertise at a particular point of time.	It is the overall development and well-being of a nation's human capital.
(b) End	It considers human beings and improvement in productivity as the end.	It considers human beings as the end itself, <i>i.e.</i> , it considers the welfare in human beings as the end.
(c) Motive of investment	It aims at improving the efficiency and productivity.	It aims at improving the overall welfare.

(any two)

18. Define disinvestment. Why India followed disinvestment policy? [3]

Or

What is organic farming? Mention any two advantages of organic farming in India.

Ans. **Disinvestment** refers to a situation when the government sells off a part of its share of investment of public sector undertakings to the private people.

India followed disinvestment policy as a remedial measure to improve production and managerial efficiency, as well as to facilitate modernisation.

Or

'Organic farming' is a whole system of farming that restores, maintains and enhances the ecological balance.

The two advantages of organic farming are:

- (a) It offers a means to substitute costlier agricultural inputs with locally produced organic inputs that are cheaper and thereby generate good returns on investment.
- (b) On account of organic farming requiring more labour input than conventional farming, it turns out to be an attractive proposition for India.

19. Explain 'Modernisation' as aim of five-year plans. [4]

Or

What is unemployment? Explain any three consequences of unemployment in India.

Ans. **'Modernisation'** as aim of Five Year Plans refers to the adoption of new technology by the producers to increase the output of goods and services. This adoption of new technology by the farmers and producers of factory output is known as "modernisation".

However, it does not refer only to use of new technology but also to the changes in social outlook such as recognition of the rights of women to be same as men. This is to enable the use of the talents of women in the modern society.

Or

Unemployment refers to a situation in which all those who, owing to lack of work, are not working, but either seek work through employment exchanges, intermediaries, friends or relatives or by making application to prospective employers or express their willingness or availability for work under the prevailing condition of work and remuneration.

The consequences of unemployment in India are:

- (a) Unemployed are not able to meet their financial obligations. So, this may lead to a decline in their standard of living.
- (b) Unemployment hampers the economic as well as the social status of society. Precious time lost in unemployment can never be compensated.
- (c) Underemployment is one of the serious consequence of unemployment. As on losing jobs people are compelled to take up jobs which do not fit their skills, experience and qualifications.

20. Write any four effects of inflation.

[4]

Ans. The effects of inflation are:

- (a) Effect on economic development
- (b) Effect on foreign investment
- (c) Wage spiral
- (d) Adverse effect on the people with fixed income
- (e) Adverse Balance of Payments
- (f) Speculation and hoarding
- (g) Corruption and Moral degradation (any four)

21. What is sustainable development? Suggest any four strategies for sustainable development.

[6]

Ans. ‘Sustainable development’ is development that meets the need of the present generation without compromising the ability of the future generations to meet their own needs.

The four strategies for sustainable development are:

- (a) **Use of non-conventional sources of energy.** In India the use of LPG and Gobar gas in rural areas and the use of CNG as fuel in urban areas, wind power, solar power along with the mini hydel power plants which are environment-friendly can generate enough power to meet local demand.

(b) **Traditional Knowledge and Practices** have been more a component of the environment and not its controller. With the sudden onslaught of the western system of treatment, the traditional treatment systems like Ayurveda, Unani, Tibetan and folk systems were ignored. But these are in great demand again for treatment of chronic health problems.

(c) **Biocomposting:** Farmers had over a period of last five decades totally neglected the use of compost and completely switched over to chemical fertilisers, which adversely affected the productive land and water bodies.

But now in large number, the farmers have again started using compost made from organic wastes of various kinds. Earthworms can convert organic matter into compost faster.

(d) **Biopest Control:** Due to the green revolution more and more use of chemical pesticides for higher yield led to the contamination of food products, like milk, meat and fish, soil, water bodies and even ground water were polluted with pesticides.

Thus, efforts are being made to bring in better methods of pest control like the ones based on plant products like Neem trees are proving quite useful. Also, there is widespread awareness about various animals and birds which help in controlling pests. Like snakes are one of the prime group of animals which prey upon rats and various other pests. Owls, peacocks and lizards also play an important role in preying upon vermin and pests.

22. Why did India adopt new economic policy in 1991? Explain any four causes. [6]

Ans. India met with an economic crisis in 1991, due to a number of causes. Some of them were:

(a) Inefficient management of the Indian economy in 1980's. The government was not able to generate sufficient revenue from internal sources such as taxation.

(b) In the late 1980's, government's expenditure was greater than its revenue by huge amount.

(c) Prices of many essential goods rose sharply.

(d) Foreign exchange reserves declined to a level that was not adequate to finance imports for more than two weeks. There was also not sufficient foreign exchange to pay the interest needed to be paid to international lenders.

So, on account of the above causes and pressure from international organisations like the World Bank and IMF, India adopted a New Economic Policy in 1991.

23. Explain any four challenges faced by Indian health sector. [6]

Or

Explain any four importance of industries for a developing country like India.

Ans. The four challenges faced by Indian health sector are:

- (a) Due to the unequal distribution of health care services across rural and urban sector, most of the health care service centres being confined to urban areas, it is a big challenge for this sector to reduce this inequality.
- (b) Large number of communicable diseases like HIV, dengue fever, bird flue, etc, are posing a big threat to our society.
- (c) Health care is becoming expensive day by day and it is beyond the reach of the millions. The private sector in India has grown independently without any major regulation.
- (d) Upkeep and maintenance of the government health care centres is very poor.

Or

The importance attached to industries for a developing country like India is large because of the following reasons:

- (a) Most of the industries in India (small scale and cottage) are labour intensive, so they generate more employment per unit of production.
- (b) The above industries make use of local resources and thus utilize them fully.
- (c) Several important industries (large scale industries) had to be developed very rapidly to ensure economic development. But these required a lot of capital or investment and had a longer gestation period.
- (d) So in order to prevent the concentration of economic power in the hands of the few (private sector), it was essential that public sector be given a leading role in the industrial development of the country.

SECTION-C (OTBA)

24. Why India started 'Make in India'? What are the constrains in achieving its objectives? [5]

25. FDI has increased inequality in India and failed to reach to poor. What are the reasons behind it? [5]

Note: OTBA has been deleted from the syllabus by the CBSE for the forthcoming examinations.