

Mathematics (Standard)

Model Question Paper — Paper 1

1**3 hours**

Time allowed

80

Maximum marks

38

Questions

5

Sections A-E

No

Calculator

General Instructions

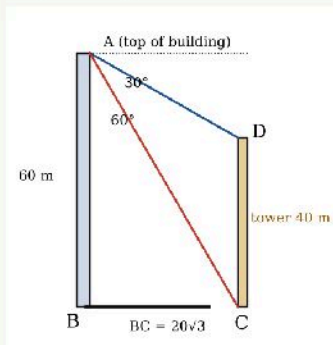
- All questions are compulsory. The paper has five sections: **A, B, C, D and E.**
- Section A:** Q.1-18 are MCQs and Q.19-20 are Assertion-Reason questions, 1 mark each.
- Section B:** Q.21-25 are Very Short Answer questions, 2 marks each. **Section C:** Q.26-31 are Short Answer questions, 3 marks each.
- Section D:** Q.32-35 are Long Answer questions, 5 marks each. **Section E:** Q.36-38 are case-study based questions, 4 marks each.
- There is no overall choice. Internal choice is given in 2 questions of Section B, 2 of Section C, 2 of Section D and in the 2-mark part of each case study.
- Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.

Section A Multiple choice and Assertion-Reason questions

20 × 1 = 20

- The LCM of 12 and 18 is [1]
 (A) 6 (B) 36
 (C) 72 (D) 216
- The sum of the zeroes of the polynomial $2x^2 - 8x + 6$ is [1]
 (A) 4 (B) -4
 (C) 3 (D) -3
- The pair of equations $3x + 2y = 5$ and $6x + 4y = k$ has infinitely many solutions if $k =$ [1]
 (A) 5 (B) 12
 (C) 10 (D) 15
- The quadratic equation $x^2 + kx + 9 = 0$ has equal roots. The value of k is [1]
 (A) 3 (B) -6
 (C) 6 (D) ± 6
- The 10th term of the A.P. 3, 7, 11, 15, ... is [1]
 (A) 37 (B) 39
 (C) 43 (D) 40
- The distance of the point $(6, -8)$ from the origin is [1]
 (A) 2 (B) 14
 (C) 10 (D) $\sqrt{20}$

34. Let the building be $AB = 60$ m and the tower $CD = h$ m, with BC the distance between them. From A , the angle of depression of the bottom C is 60° : $\tan 60^\circ = \frac{60}{BC} \Rightarrow BC = \frac{60}{\sqrt{3}} = 20\sqrt{3} \approx 34.6$ m.
- The angle of depression of the top D is 30° : $\tan 30^\circ = \frac{60-h}{BC} \Rightarrow 60-h = \frac{20\sqrt{3}}{\sqrt{3}} = 20 \Rightarrow h = \boxed{40 \text{ m}}$.
- Distance between building and tower = $\boxed{34.6 \text{ m}}$.



35.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
f	4	8	12	16	10	6	4
cf	4	12	24	40	50	56	60

$N = 60$, $\frac{N}{2} = 30 \Rightarrow$ median class 30-40 ($l = 30$, $cf = 24$, $f = 16$, $h = 10$). Median = $30 + \frac{30-24}{16} \times 10 = \boxed{33.75}$.

Modal class 30-40 ($f_1 = 16$, $f_0 = 12$, $f_2 = 10$). Mode = $30 + \frac{16-12}{32-12-10} \times 10 = \boxed{34}$.

Section E – Solutions

36. (i) $HS = \sqrt{(6-2)^2 + (4-1)^2} = \sqrt{25} = \boxed{5 \text{ km}}$.
- (ii) $\left(\frac{2+6}{2}, \frac{1+4}{2}\right) = \boxed{(4, 2.5)}$.
- (iii)(a) $L = \left(\frac{1(6)+4(2)}{5}, \frac{1(4)+4(1)}{5}\right) = \boxed{\left(\frac{14}{5}, \frac{8}{5}\right)}$.
- (iii)(b) Slope of $HS = \frac{4-1}{6-2} = \frac{3}{4}$; slope of $HM = \frac{7-1}{10-2} = \frac{3}{4}$. Equal slopes with common point $H \Rightarrow$ collinear. ■
37. AP: $a = 500$, $d = 100$.
- (i) $a_{10} = 500 + 9(100) = \boxed{\text{₹}1400}$.
- (ii) $500 + (n-1)100 = 2000 \Rightarrow n = \boxed{16}$, the 16th month.
- (iii)(a) $S_{12} = \frac{12}{2}[1000 + 11(100)] = 6 \times 2100 = \boxed{\text{₹}12,600}$.
- (iii)(b) $\frac{n}{2}[1000 + (n-1)100] = 16100 \Rightarrow n^2 + 9n - 322 = 0 \Rightarrow (n-14)(n+23) = 0 \Rightarrow \boxed{n=14}$ months.