B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

ANNUAL EXAMINATION (2025-26)
MATHEMATICS
ANSWER KEY SET 2

Class: XI | **Time: 3hrs**
Date: 23-02-26 | **Max Marks: 80**
Admission no: | **Roll no:**

General instructions:
1. The Question paper contains- five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 very short (VSA)- type questions of 2 marks each.
4. Section C has 6 short (SA)- type questions of 3 marks each.
5. Section D has 4 long (LA)- type questions of 5 marks each.
6. Section E has 3 source based/case-based questions of 4 marks each

SECTION A (20 × 1 = 20 marks)

Q1. Value of cot 570°
570° − 360° = 210°
cot 210° = cot 30° = √3
☑ **(a)**

Q2. Real value of θ

$$\frac{1+i\cos\theta}{1-2i\cos\theta} \text{ is real} \Rightarrow \cos\theta = 0 \Rightarrow \theta = n\pi + \frac{\pi}{2}$$

☑ **(c)**

Q3.
A = (6, ∞), B = (−∞, 9)
A ∩ B = (6, 9)
Among options, **(7,8)** fits
☑ **(b)**

Q4.
Given line: 3x + y = 3 → slope = −3
Perpendicular slope = 1/3
Line through (2,2):

$$y - 2 = \frac{1}{3}(x-2) \Rightarrow y = \frac{1}{3}x + \frac{4}{3}$$

Intercept = 4/3 (not listed)
☑ **(d) None of these**

Q5.

$$2(2x+3) - 10 < 6(x-2) \Rightarrow x > 4$$

Solution set = (4, ∞)

☑ **(a)**

Q6.

$$y^2 = 8x \Rightarrow 4a = 8 \Rightarrow a = 2$$

Latus rectum = 4a = **8** (not listed)

☑ **(d) None of these**

Q7.

$$f(x) = \frac{1}{2 - \sin 3x}$$

Range:

$$1 \leq 2 - \sin 3x \leq 3 \Rightarrow \frac{1}{3} \leq f(x) \leq 1$$

☑ **(c)**

Q8.

$$\theta = \frac{\text{arc}}{\text{radius}} = \frac{20}{80} = \frac{1}{4}$$

☑ **(a)**

Q9.

$$\frac{d}{dx}\left(\frac{x}{2} + \frac{2}{x}\right) = \frac{1}{2} - \frac{2}{x^2}$$

☑ **(b)**

Q10.

Digits: 3,4,5,6

Each appears 6 times in unit place

Sum = 6(3+4+5+6) = 108

☑ **(b)**

Q11.

Mean = 21.8

Mean deviation = **1.25**

☑ **(a)**

Q12.

$$f(x) = | x - 2 |$$

All given identities are false

☑ **(d)**

Q13.

$$P = \frac{\binom{48}{3}}{\binom{52}{7}} = \frac{1}{7735}$$

☑ **(b)**

Q14.

$$(4 + 4x + x^2)^{20} = (x + 2)^{40}$$

Terms = 41 (not listed)
✔ **(d)**

Q15.

$$\lim_{x\to 2}\frac{x^3-8}{x-2}=\lim(x^2+2x+4)=12$$

✔ **(c)**

Q16.
G.P. between 3 and 96 → ratio = 2
Four GMs: 6, 12, 24, 48
✔ **(a)**

Q17. Point P(1,2,5)
Distances:

- to xy-plane = 5
- to yz-plane = 1
- to zx-plane = 2

Correct set = (5,1,2) → **(d)**

Q18.

$$\sum x^2 = 100(4^2+50^2)=251600$$

✔ **(b)**

● **ASSERTION–REASON**
Q19
Assertion ✘ (September missing)
Reason ✔
✔ **(d)**

Q20
Assertion ✔ (r = 2)
Reason true but unrelated
✔ **(b)**

SECTION B (5 × 2 = 10 marks)
(1 mark for correct method + 1 mark for answer)
Q21
Correct evaluation / proof
✓ Correct working – **1 mark**
✓ Correct result – **1 mark**

Q22
Let third reading = x
Average condition:

$$8.2 \le \frac{8.48+8.35+x}{3} \le 8.5$$

Solving:

$$7.77 \le x \le 8.67$$

✓ Inequality formation – **1 mark**

✓ Final range – **1 mark**

Q23
(a) $A = \{1,3,5,7,9\}$
(b) $B = \{x: x = 2n, n \in N, x < 10\}$
✓ Each part – **1 mark**

Q24
Correct application of binomial theorem
✓ Expansion / calculation – **1 mark**
✓ Correct value (4 d.p.) – **1 mark**

Q25
Relation in roster form:

$$R = \{(x, y): y = x + 1\}$$

Domain = first elements
Range = second elements
✓ Relation – **1 mark**
✓ Domain & Range – **1 mark**

SECTION C (6 × 3 = 18 marks)
(Step marking: 1 + 1 + 1)
Q26
Correct simplification and answer
✓ Each correct step – **1 mark**

Q27
Side reduces by half each time
6th triangle side = $20(1/2)^5 = 0.625$
Perimeter = $3 \times 0.625 = 1.875$cm
✓ Concept – **1 mark**
✓ Calculation – **1 mark**
✓ Final answer – **1 mark**

Q28
(i) Verified
(ii) Verified
✓ Each verification – **1.5 marks**

Q29
Solution:

$$-3 < x \leq 5$$

✓ Solving inequality – **2 marks**
✓ Number line – **1 mark**

Q30
Students playing at least one sport:

$$80 + 42 + 12 - 32 - 32 - 32 + 4 = 94$$

Students playing none:

$$230 - 94 = 136$$

✓ Formula – **1 mark**

✓ Substitution – **1 mark**
✓ Final answer – **1 mark**

Q31
Correct equation of circle / ellipse
✓ Method – **2 marks**
✓ Final equation – **1 mark**

SECTION D (4 × 5 = 20 marks)
(Step marking: 1–1–1–1–1)
Q32
(a) Correct integration – **3 marks**
(b) Final value – **2 marks**

Q33
Combined mean formula used
✓ Formula – **2 marks**
✓ Substitution – **2 marks**
✓ Final SD – **1 mark**

Q34
Correct GP sum formula
✓ Identification – **1 mark**
✓ Formula – **2 marks**
✓ Calculation – **2 marks**

Q35
Each limit:
✓ Standard form – **1 mark**
✓ Evaluation – **1.5 marks**

SECTION E (3 × 4 = 12 marks)
(Each subpart = 1 mark)
Q36
(A) $13/52 = 1/4$
(B) $26/52 = 1/2$
(C) $1/52$

Q37
(A) Slope of BC – **1 mark**
(B) Slope of AC – **1 mark**
(C) Distance AC – **2 marks**

Q38
(A) $\mathrm{P}(6,4) = 360$
(B) $6! = 720$
(C) $2 \times 5! = 240$

**********BEST OF LUCK**********