BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL

MID-TERM EXAMINATION 2023-24

MATHEMATICS (041)

Class : XI SC
Date : 11/09/23
Admission No:

MARKING SCHEME

Duration: **3 Hrs**
Max. Marks: **80**
Roll No. :

1. C) (A∪B)-(A∩B) 1
2. B) B⊆ A 1
3. C) ∅ 1
4. C) 2f(x) 1
5. C) R-$\left\{-\frac{1}{2}, 1\right\}$ 1
6. C) 3 1
7. D) none of these 1
8. C) tan3x 1
9. C) $\frac{\sqrt{3}}{2}$ 1
10. B) 0 1
11. A) $\frac{\pi}{4}$ 1
12. B) 2i 1
13. B) -5$< x <$ 5 1
14. D) 69760 1
15. B) 1956 1
16. C) 7200 1
17. D) 7920 1
18. B) -1365 1
19. D 1
20. A 1
21. A-B ={3,6,15,18,21} 2
22. X=3, Y=-1,
    OR x=$\pm$5 2
23. Sin $\frac{\pi}{12}$ = sin ($\frac{\pi}{4}$ - $\frac{\pi}{6}$) = $\frac{1}{\sqrt{2}}$ x$\frac{\sqrt{3}}{2}$ - $\frac{1}{\sqrt{2}}$x$\frac{1}{2}$ =$\frac{\sqrt{3}-1}{2\sqrt{2}}$.
    OR
    tan$\frac{13\pi}{12}$ = tan ($\pi + \frac{\pi}{12}$) = tan $\frac{\pi}{12}$ = $\frac{\sqrt{3}-1}{\sqrt{3}+1}$ 2
24. 4x4x4x4x4= 4^5 2
25. n=9, no. of terms = n+1 =9+1=10. 2
26. A'∩B' = (A∪B)' = n(U)-n(A∪B) = 700-400=300. 3
27. $|x-3| >$0, 0≤ $|x-3| <$ ∞, f(x) =$[0, \infty)$.
    OR
    (1,4), (1,5), (2,4), (2,5), (3,4),(3,5), (4,5). 3
28. $\frac{2sin4xcosx}{2cos4x\ cosx}$ = $\frac{sin4x}{cos4x}$ = tan4x,
    OR

cot (570°)= cot (540° +30°)= cot 30° = $\sqrt{3}$ 3

29. $i^9+i^{19}= i+i^3=i-i=0$.

OR

(x+iy) (2-3i) = 4+i

(2x+3y) – (3x-2y) i= 4+i

On comparing x=5/13, y=14/13. 3

30. ${}^9P_5 +5. {}^9P_4 = {}^{10}P_r = \frac{9!}{4!} +5 \frac{9!}{5!} = \frac{10!}{(10-r)!}$ = 5! = (10-r)! = r=5. 3

31. $T_{17} = {}^{50}C_{16}\, 2^{34}$ x a^{16},

$T_{18}= {}^{50}C_{17}\, 2^{33}$ x a^{17} ,

a= $\frac{50!}{34!16!}$ x$\frac{33!x17!}{50!}$ X 2

$\frac{34}{34}$ =1. 3

32. It is given that 65 students offered Physics (40-x)+x+(20-x)+8 = 65 , x=3

i) Offered Math = 15+(10-x) +x+40-x =62

ii) Offered statistics = 12+(10-x) +x+(20-x) =39 5

iii) Offered any of three subjects = 99, there for did not offered any of three subject =100-1=99.

33. $(\cos x+\cos y)^2 + (\sin x-\sin y)^2$ = 1+1+2cosx cosy -2sinxsiny = 2+2$[\cos(x+y)]$ =2$[1+\cos(x+y)]$ = $2\cos^2(x+y/2)$. 5

OR

LHS: cot4x(sin5x+sin3x) = cot4x(2sin4xcosx) = 2cos4xcosx

RHS: cotx(sin5x-sin3x) = cotx(2sinxcos4x) = 2cos4x cosx.

34. $\frac{5x-2}{3} - \frac{7x-3}{5} > \frac{x}{4}$ = $\frac{25x-10-21x+9}{15} > \frac{x}{4}$ = 16x-15x >4 = x>4, x∈(4,∞)

OR

5x-3< 3x+1 = 2x<4, x<2

I) x∈ $(-\infty, 2)$ ii) x= 1,0,-1,-2,-3,-4,… iii) x=1 5

35. i) ${}^{52}C_4$ = 270725 , ii) 4. ${}^{13}C_4$ =2860 , iii) 13^4 5

36. i) 8 ways, ii) 1000 ways, ii) 720 ways 1+1+2

37. i) a=6, b= 0 , ii) x=-6, y=8 , iii) AxB ≠ BxA 1+1+2

38. i) 10+0+3+5 = 18 , ii) 0+3=3, iii) 3 1+1+2