SCORING KEY/OUTLINE ANSWER AND MARKING SCHEME (2020)
Subject & Paper : **MATHEMATICS (BLIND CANDIDATES)**

Q. No	Key	Marks for each point	Total Marks
1.	C	1	1
2	B	1	1
3	A	1	1
4	C	1	1
5	D	1	1
6	$Sn = \frac{n}{2}[2a + (n-1)d]$	1	1
7	$\tan A = \frac{SinA}{CosA}, CotA = \frac{CosA}{SinA}$	1	1
8	If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are in the same ratio, the triangles are similar.	1	1
9	2:3	1	1
10	$\because 5^2 + 12^2 = 13^2$, the triangle is a right triangle.	1	1
11	0. (1-2) + 1. (2 - k) + 2. (k - 1) = 0 $\therefore$ k = 0	1	1
12	The mode of a data is the value of the variate for which there is maximum frequency.	1	1
13	Events are said to be mutually exclusive if the happening of one forecloses the happening of all others.	1	1
14	$x+y=x+z$ .....(i) $\because x \in R, -x \in R$, Adding - x to both sides of (i) we get, $(-x)+(x+y)=(-x)+(x+z)$ $\Rightarrow (-x+x)+y=(-x+x)+z$ (by associativity) $\Rightarrow 0+y=0+z$ (property of -x) $\Rightarrow y=z$ (property of 0)	1 1	 2

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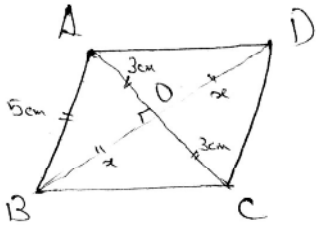
Q. No	Key	Marks for each point	Total Marks
15	For the given AP, $a = 3,\ d = 4$ and $l = 123$	1	
	If n be the number of terms then $a + (n-1)d = l$ $\Rightarrow 3 + (n-1).4 = 123$ $\Rightarrow n = 31$	1	2
16	Coordinates of the mid-point of diagonal AC are $\left(\frac{3+1}{2}, \frac{1+1}{2}\right) i.e. (2,1)$	1	
	Coordinates of the mid-point of diagonal BD are $\left(\frac{0+4}{2}, \frac{2+2}{2}\right) i.e. (2,1)$	1	2
	$\therefore$ AC and BD bisect each other and hence ABCD is a parellelogram.		
17	Median = $l + \frac{\frac{N}{2} - c}{f} \times h$	1	
	Where, l = lower limit of the median class N = total frequency c =Cumulative frequency of the class just before median class. f = frequency of the median class h = width of the median class	1	2
18	Let A: the batsman hits a boundary in a ball he faced. By the given condition, $P(A) = \frac{7}{25}$	1	
	Required probility $= P(\overline{A})$ $= 1 - P(A)$ $= 1 - \frac{7}{25}$ $= \frac{18}{25}$	1	2

Q. No	Key	Marks for each point	Total Marks
19	Book theorem	-	3
20	Here, $\alpha+\beta=-\rho$ and $\alpha\beta=q$	1	
	Now, $=\frac{\alpha^2}{\beta}+\frac{\beta^2}{\alpha}=\frac{\alpha^3+\beta^3}{\alpha\beta}$	1	
	$=\frac{(\alpha+\beta)^3-3x\beta(\alpha+\beta)}{\alpha\beta}$		
	$=\frac{(-\rho)^3-3q(-\rho)}{q}$	1	3
	$=\frac{-\rho^3+3\rho q}{q}$		
21	$(SecA+\tan A)^2 \quad =\left(\frac{1}{CosA}+\frac{SinA}{CosA}\right)^2=\left(\frac{1+SinA}{CosA}\right)^2$	1	
	$=\frac{(1+SinA)^2}{Cos^2A}=\frac{(1+SinA)^2}{1-Sin^2A}$	1	
	$=\frac{(1+SinA)^2}{(1+SinA)(1-SinA)}=\frac{1+SinA}{1-SinA}$	1	3
22	Book Theorem	-	3
23	Let ABCD be a rhombus in which AB=BC=CD=DA=5cm and AC=6cm 	1	
	To find : BD		
	The diagonal AC and BD bisect each other at right angles at the point O, say. In the Right ΔOAB we have AB=5cm, OA=OC= $\frac{1}{2}$AC=3cm and OB=OD=x *(Say)*	1	
	By Pythagoras theorem, $OA^2+OB^2=AB^2$		
	$\Rightarrow 3^2+x^2=5^2$	1	3
	$\Rightarrow x^2=16\Rightarrow x=4cm$		
	$\therefore$ *Length of other diagonal = 2x=8cm*		

24 The given data can be reproduced as follows:

Class	Frequency	Cu. freq
0 - 4	10	10
4 - 8	12	22
8 - 12	18	40
12 - 14	7	47
14 - 18	5	52
18 - 20	8	60
20 - 25	4	64
25 - 30	6	70
	N = 70	

1

Since $\frac{N}{4}$=17.5 lies between the cumulative frequencies 10 and 20

$\therefore$ 4 - 8 is the Q_1 Class 1

$\therefore \quad Q_1 = 4 + \frac{17.5-10}{12} x4 = 6.5$

Again $\frac{3N}{4}$ = 52.5 lies between the cu. frequencies 52 and 60,
therefore 18 - 20 is the Q_3 Class

$\therefore Q_3 = 18 + \frac{52.5-52}{8} x2 = 18.13(nearly)$ 1 3

25 Book Result - 4

26 Table:

$\angle A \downarrow$ Trig. Ratio $\rightarrow$	Sin A	Cos A	tan A	cotA	Sec A	Cosec A
30^0	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$	$\sqrt{3}$	$\frac{2}{\sqrt{3}}$	2
45^0	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1	1	$\sqrt{2}$	$\sqrt{2}$
60^0	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{1}{\sqrt{3}}$	2	$\frac{2}{\sqrt{3}}$

1 1 1 1 4

Q. No	Key	Marks for each point	Total Marks
27	Book article 11.3	-	4
28	Book article 3.10 (or 3.7)	-	5
29	Book Theorems	-	5
30	The given data can be modified as follows:		

Class	Mid Value x_i	Frequency f_i	Cu. Freq.	$u_i = \frac{x_i - 55}{10}$	$f_i u_i$
10 - 20	15	7	7	-4	-28
20 – 30	25	10	17	-3	-30
30 – 40	35	14	31	-2	-28
40 – 50	45	18	49	-1	-18
50 – 60	55	28	77	0	0
60 – 70	65	15	92	1	15
70 – 80	75	12	104	2	24
80 – 90	85	10	114	3	30
90 -100	95	6	120	4	24
		N = 120			-11

1

1

1

$$\textit{Mean} \quad \bar{x} = a + h\bar{u} = 55 + 10 \times \frac{-11}{120} = 54.08 \ (\textit{nearly})$$

1

The model class is $50 - 60$ *with* $f_m = 28, f_1 = 18$ *and* $f_2 = 15$

$$\therefore \textit{Mode} = l + \frac{f_m - f_1}{2f_m - f_1 - f_2} \times h$$

$$= 50 + \frac{28 - 18}{56 - 18 - 15} \times 10 = 54.35 \ (\textit{nearly})$$

1 5

Q. No	Key	Marks for each point	Total Marks
31	Let the speed of the stream be x km/hr and the speed of the steamer in still water be y km/hr. Upstream speed of the steamer = y - x and downstream speed of the steamer = y + x $5hr\,8\min = 5+\frac{8}{60}=\frac{77}{15}hr$ By the given conditions, we have	1	6
	$\frac{50}{y+x}+\frac{45}{y-x}=5 \text{ --------(1)}$	1	
	$and \frac{45}{y+x}+\frac{50}{y-x}=\frac{77}{15} \text{ -------(2)}$ $Putting\ y+x=\frac{1}{u}\ and\ y-x=\frac{1}{v}\ equations(1)\ and(2)\ become$		
	$50u+45v=5 \text{ ----------(3)}$	1	
	$and\ 45u+50v=\frac{77}{15} \text{ ---------(4)}$ $Adding(3)\ and\ (4)\ we\ get$		
	$95(u+v)=\frac{152}{15}\Rightarrow u+v=\frac{152}{15x95} \text{ -----(5)}$	1	
	$Subtracting(3)\ from(4)\ we\ get\ \ 5(v-u)=\frac{2}{25}\ \Rightarrow v-u=\frac{2}{15x5} \text{ ----(6)}$	1	
	$Solving(5)\ \&\ (6)\ we\ get\ \ u=\frac{1}{25}\ and\ v=\frac{1}{15}$		
	$\Rightarrow y+x=25\ and\ y-x=15$ $\therefore\ y=20\ and\ x=5$ $\therefore speed\ of\ the\ stream=5km/hr$ $Speed\ of\ the\ steamer\ in\ still\ water=20km/hr$	1	

Q. No	Key	Marks for each point	Total Marks
32	*Number of installments required to pay the balance* $= \frac{6000}{500} = 12$	1	
	Amount Paid in the 1st installment $= 500 + \frac{12}{100} x6000 = Rs.1220$	1	
	Amount Paid in the 2nd installment $= 500 + \frac{12}{100} x5500 = Rs.1160$		
	Amount Paid in the 3rd installment $= 500 + \frac{12}{100} x5000 = Rs.1100$		
	Amount Paid in the 4th installment $= 500 + \frac{12}{100} x4500 = Rs.1040$	1	
	and so on		
	Thus, the amounts paid in the successive installments from the AP : $1200, 1160, 1040 \ldots\ldots\ldots\ldots$ *to* 12 *terms*.		
	Here $a = 1220$, $d = -60$ *and* $2 = 12$.	1	
	Total amount the man paid for the scooter		
	$= 6000 + \frac{n}{2}[2a + (n-1)d]$		
	$= 6000 + \frac{12}{2}[2x1220 - 11x60]$		
	$= 6000 + 6x1780$		
	$= 6000 + 10680$	1	6
	$= Rs.16680$		

Q. No	Key	Marks for each point	Total Marks
32 (OR)	Let the average speed of the bus be x km/hr and that of the car be y km/hr. By the given conditions, we get $y - x = 12$ ----------(1)	1	
	$and\ \frac{224}{x}-\frac{224}{y}=2\frac{2}{5}$	1	
	$\Rightarrow 224-\frac{y-x}{xy}=\frac{12}{5}$		
	$\Rightarrow \frac{224x12}{xy}=\frac{12}{5}$		
	$\Rightarrow xy=5x224--------(2)$	1	
	Eliminating y from (1) & (2) we get		
	$x(x+12)=1120$		
	$\Rightarrow\ x^2+12x=1120$		
	$\Rightarrow\ x^2+12x+36=1120+36=1156$		
	$\Rightarrow (x+6)^2=34^2$	1	
	$\therefore x+6=34\ (neglecting -ve\ squarroots)$		
	$\therefore\ \ x=28$	1	
	$\therefore\ \ y=x+12=28+12=40$		
	Thus, average speed of the bus = 28km/hr and average speed of the car = 40 km/hr	1	6