# MAT-1

# NTSE(I)/19-20

# राष्ट्रीय प्रतिभा खोज परीक्षा ( प्रथम स्तर ) 2019-20 NATIONAL TALENT SEARCH EXAMINATION ( Stage-I ) 2019-20



### MENTAL ABILITY TEST (For Students of Class X)

Time : 120 Minutes Max. Marks : 100 (For Candidate with benchmark disabilities Time : 2 Hours 30 Minutes )

#### INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open the question booklet.

- 1. Answers are to be given on a separate answer sheet (OMR sheet).
- 2. Please write your **Roll Number** as allotted to you in the admission card very clearly on **the test-booklet** and darken the appropriate circles on the **answer sheet** as per instructions given.
- 3. There are 100 questions in this test. All are compulsory.
- 4. Please follow the instructions given on the answer sheet for marking the answers.
- 5. If you do not know the answer to any question, do not waste time on it and pass on to the next one. Time permitting, you can come back to the questions, which you have left in the first instance and attempt them.
- Since the time allotted for this question paper is very limited, you should make the best use of it by not spending too much time on any one question.
- 7. Rough work can be done on the given Blank Pages at the back of the booklet but not on the answer sheet/loose paper.
- 8. Every correct answer will be awarded one mark. There will be no negative marking.
- 9. Please return the Answer sheet (OMR) only to the invigilator after the test.
- Hindi version of the question paper will be considered as final in case of any dispute arising out of variation in translated version.

PLEASE TURN OVER THE PAGE AND START YOUR WORK.

### बौद्धिक योग्यता परीक्षा ( कक्षा x के विद्यार्थियों के लिए )

समय : 120 मिनट पूर्णांक : 100 ( विशेष योग्यजन के लिए समय : 2 घंटे 30 मिनट ) परीक्षार्थियों के लिए निर्देश

प्रश्न पुस्तिका खोलने से पहले निम्न निर्देशों को थ्यान से पढिए।

- उत्तर एक अलग उत्तर-पत्रक (ओ० एम० आर० शीट) में देने हैं।
- कृपया अपना रोल नम्बर जैसा कि आपके प्रवेश पत्र पर दिया गया है, निर्देशानुसार टेस्ट पुस्तिका पर बहुत स्पष्ट लिखिये और उत्तर-पत्रक पर दिये गये गोलों को काला करें।
- इस परीक्षा, में 100 प्रश्न हैं। सभी प्रश्न अनिवार्य हैं।
- कृपया उत्तर चिहित करने के लिए उत्तर-पत्रक पर दिये गये निर्देशों को ध्यान से समझ कर उनकी अनुपालना कीजिए।
- यदि आप किसी प्रश्न का उत्तर नहीं जानते हैं तो उस पर बहुत समय न गंवाइये और अगले प्रश्न पर बढ़ जाइये। यदि बाद में समय मिले तो जिन प्रश्नों को आपने पहले छोड़ दिया था, उन पर वापस आकर उनके उत्तर दीजिए।
   क्योंकि इस प्रश्न पत्र के लिए निर्धारित समय बहुत सीमित
- है, इसलिए इसका अधिकतम उपयोग कोजिये और किसी प्रेश्न पर बहुत समय न लगाइये।
- रफ कार्य पुस्तिका के अंत में दिये गये रिक्त पृष्ठों पर किया जा सकता है किन्तु उत्तर-पत्रक/अलग कागज . पर नहीं।
- प्रत्येक सही उत्तर का एक अंक प्रदान किया जाएगा। इसमें ऋणात्मक अंकन नहीं होगा।
- कृपया परीक्षा के बाद केवल उत्तर-पत्रक (ओ० एम० आर०) ही निरीक्षक को लौटाइए।
- अनुवादित विवरण में अन्तर से उठे किसी भी विवाद की स्थिति में प्रश्न-पत्र के हिन्दी अनुवाद को निर्णायक माना जाएगा।

कृपया पृष्ठ पलटिये और अपना कार्य आरम्भ कीजिए।

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# NATIONAL TALENT SEARCH EXAMINATION-2019-20, RAJASTHAN

# MENTAL ABILITY TEST (MAT)\_ PAPER & HINTS & SOLUTION

**Instruction :** In each of the Question Nos. 1 to 8 a letter series is given with one term missing shown by question mark (?). This term is one of the four alternatives given under it. Find the correct alternative.



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		NATION	AL TALENT SEA	RCH EXAMINATION	N-  03.11.2019	RAJASTHAN   MAT
6.	PBA, QDC, RFE, ? (1) SHG	(2) OAB	(3) T	JI	(4) ULK	
Sol.	<b>(1)</b> P <u>BA</u> , Q <u>DC</u> ,	R <u>F E</u> , SHG				
7.	PERPENDICULAR (1) PENDICUL	, ERPENDICULA, (2) PENDIC	RPENDICUL, ? (3) E	NDIC	(4) PENDIC	U
Sol.	<b>(4)</b> <u>P</u> ERPENDIC	J L A <u>R</u> , <u>E</u> R P E N	I D I C U L <u>A</u> , <u>R</u>	PENDICU <u>L</u> , '	?	
8.	ST, ND, RD, TH, ? (1) TH	(2) VW	(3) R	W	(4) ST	
Sol.	(1) ST-Last two letters ND-Last two letters RD-Last two letters TH- Last two letters TH-Last two letters	of first of second of third of fourth of fifth				
Instruc	tion: In each of the question mark (?).	e Question Nos. 9 This term is one of	to 16 a number the four alternat	series is given wit ives given under it	h one term n . Find the co	nissing shown by rrect alternative.
9.	5, 16, 51, 158, ? (1) 1452	(2) 483	(3) 4	81	(4) 1454	
Sol.	(3) 16, 51, 15 3+1 ×3+3 ×3+5	3, 481 ×3 +7				
10.	198, 194, 185, 169, (1) 92	? (2) 136	(3) 1	44	(4) 112	
Sol.	(3)	100 0				
	-4 -9 -1	6 -25				
11.	11, 29, 55, ?, 131 (1) 110	(2) 81	(3) 8	9	(4) 78	
Sol.	(3) $11 \ 29 \ 55 \ 89 \ 18 \ 26 \ 34 \ 8 \ 8 \ 8 \ 8 \ 8 \ 8 \ 8 \ 8 \ 8 \ $	131 42				
12.	589654237, 896542 (1) 58965	237, 8965423,9654 (2) 65423	·23, ? (3) 8	9654	(4) 96542	
Sol.	(4) 589654237896 Skip first digit	Skip last g digit c	3 965423 Skip first Skip ligit digit	96542 Jast		

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Neither conclusion I nor II follows

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23.	In a coded lang language, REN (1) %×#\$	guage, BRA IT will be wi (2	IN is written as * itten as ) %#×\$	%÷#× and TIER is (3) %+×\$	written as \$#+% ; ; (4) +×%	then is the same coded
Sol.	<b>(3)</b> Direct coding R-%, E-+, N-×,	Т-\$				
24.	In a coded lan language, DIE (1) 9257	iguage, TILI T will be writ (2	E is written as 7 tten as ) 9527	235 and DEAL is v (3) 9725	written as 9543; th (4) 927	nen in the same coded 5
Sol.	<b>(1)</b> Direct coding D-9, I-2, E-5, T	-7				
25.	In a Coded Ian written as (1) 3152181	guage, ZEB (2	BRA is written as ) 1182153	2652181 ; then in t (3) 31822151	he same coded lar (4) 302	nguage, COBRA will be 181
Sol.	(1)					
	COBRA $\rightarrow$ 3 1	5 2 18 1				
26.	In coded langu LAMB will be w (1) 28	uage, E is w vritten as (2	vritten as 5 and I ) 26	HOTEL is written as (3) 7	s 12 ; then in the (4) 10	same coded language,
Sol.	(3)					
	$E = 5H + 0 + T + E -= 8 + 15 + 20 += \frac{60}{5} = 12LAMB = 12 + 1$	+ L + 5 + 12 + 13 + 2 =	$\frac{28}{7} = 4$			
27.	How many tria	ngles are th	e in the figure giv	ven below :		
Sol.	(1) 10 (1) (10 Triangle)	(2	) 8	(3) 11	(4) 12	
	A F D	E I H	B G C			
	(1) ∆AEI	(2) ∆EIB	(3) ∆BIG	(4) ∆AFI	(5) ∆FID	(6) ∆DIH
	(7) AAIB	(δ) ΔAID	(9) ∆ADB	(10) ∆CDB G Tower, A-46 & 52, IPIA, N	Near City Mall, Jhalawar F	Road, Kota (Raj.)- 324005
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Sol. (1)



29. How many hexagons are there in the following figure ?



(2) FKEHMGF

**Instructions :** In Questions No. 30 to 33, find the correct mirror image of the given figure, when mirror is placed on right side of the figure.

### 30. Question-Image

(1) DJCELFD



Sol. (3)

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31. Question-Image Answer-Image (4) (1) (2)(3)Sol. (4) 32. PRAYER REAPER (E) PRAYER (2) REYARP (1) REYARP (4) Sol. (2) 33. 12698 (1) 17698 86921 (2) 12698 (E) (4) 12968 Sol. (3) 34. Which of the answer-figures will complete the matrix figure ? Question-Image 2 Answer-Image (1) (2) Sol. (3) 35. How many numbers from 1 to 50 are there which are prime ? (1) 10 (2) 20 (3) 15 (4) 18 Sol. (3) 36. If it was Sunday on 1<sup>st</sup> January, 2006 then what was the day on 1<sup>st</sup> January, 2007 ? (3) Tuesday (4) Saturday (1) Sunday (2) Monday Sol. (2) Non leap year (1 odd day) Instruction : In each of the Question Ns. 37 to 42, three alternatives are alike in a certain way but the rest one is different. Select the odd one. 37. (1) Bengaluru (2) Nagpur (3) Bhopal (4) Ranchi Sol. (2) Not capital of any state.





**Instruction :** The following questions are based on the diagram given below. Study the diagram carefully and answer the questions based upon it.

In the diagram

- (i) Rectangle represents males.
- (ii) Triangle represents educated.
- (iii) Circle represents urban, and
- (iv) Square represents civil servants.



**44.** How many among the following are educated males, who are not an urban resident ? (1) 10 (2) 4 (3) 11 (4) 9

Sol. (3)

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45.	How many the follow (1) 2	ving are neither civil servan (2) 3	t nor educated but are u (3) 6	rban and not a male ? (4) 10
Sol.	(2)			
46.	How many among th (1) 6	ne following are female, urb (2) 7	an resident and also a ci (3) 10	ivil servant ? (4) 14
Sol.	(3)			
47.	How many among th (1) 4	ne following are educated m (2) 2	nale who hail from urban (3) 5	area ? (4) 11
Sol.	(1)			
48.	How many among th uneducated ? (1) 10	ne following are only a civil (2) 8	servant but neither male	e not urban oriented and (4) 9
Sol. 49.	(3) Arrange the following 1. Probation 4. Appointment (1) 5, 6, 2, 3, 4, 1	g in a meaningful sequence 2. Interview 5. Advertisement (2) 5, 6, 3, 2, 4, 1	<ul> <li>3. Selection</li> <li>6. Application</li> <li>(3) 5, 6, 4, 2, 3, 1</li> </ul>	(4) 6, 5, 4, 2, 3, 1
Sol.	(1)			
50.	Arrange the following 1. Jaipur 4. India (1) 1, 2, 3, 4, 5	g in a meaningful sequence 2. Universe 5. Asia (2) 1, 3, 4, 5, 2	e : 3. Rajasthan (3) 1, 4, 3, 5, 2	(4) 1, 3, 5, 2, 4
Sol.	(2)			
51.	As kandla is related (1) Karntaka	to Gujrat, in the same way (2) Goa	Kochin is related to whic (3) Chennai	h of the following ? (4) Kerala
Sol.	(4) Kandla is related to Kochin is related to	Gujarat. Kerala.		
52.	As India is related to (1) Rawalpindi	New Delhi, in the same wa (2) Peshawar	ay Pakistan is related to ( (3) Lahore	which of the following ? (4) Islamabad
Sol.	<b>(4)</b> New Delhi is capital So Islamabad is cap	of India ital of Pakistan.		
53.	As Rupee to India, in (1) Turkey	n the same way Yen is relat (2) Bangladesh	ted to which of the follow (3) Japan	ing ? (4) Pakistan
Sol.	(3) Rupee is currency of Yen is current of Jap	f India ban.		

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54.	If A > B , B > C and C > D (1) A > C (2	), then which of the follo 2) A > D	owing conclusion is defir (3) B > D	nitely wrong ? (4) D > A
Sol.	(4) Wrong conclusion is D > A	4		
Questi	ons (55 - 59) Instructions : In each of for '=' β stands for '>' ; γ fo	the questions No. 55 to or '<' and $\delta$ for ' $\neq$ '.	o 59. Choose the correc	t alternative assuming $\alpha$ stands
55.	If $6x \alpha 5y$ and $2y \beta 3z$ , the (1) $2x \beta 3z$ (2)	en 2) 4x β 3z	(3) 2x γ z	(4) 4x α 3z
Sol.	(2) 6x = 5y  and  2y > 3z $\frac{6x}{5} = y \text{ and } y > \frac{3}{2}z.$ so, $\frac{6x}{5} > \frac{3}{2}z$ from here $4x > 5z$ If $4x > 5z$ then $4x$ is also g 4x > 3z $4x \beta 3z.$	greater than 3z.		
56.	If ax $\gamma$ by, bx $\alpha$ cz and b <sup>2</sup> $\alpha$ (1) ax $\beta$ cy (2)	α ac, then 2) ay α cz	(3) y γ z	(4) y β z
Sol.	(4) $ax < by, bx = cz \cdot b^2 = ac$ $\frac{b}{c} = \frac{z}{x}, \frac{b}{c} = \frac{a}{b}$ from here $\frac{z}{x} = \frac{a}{b}$ ax = bz Now a	x < by		
	∴ bz < by z < y =	⇒yβz		
57.	If baxy $\alpha$ c <sup>2</sup> z, bx $\beta$ ay and (1) ax <sup>2</sup> $\beta$ cz (2	$b^2 \alpha$ ac, then 2) a <sup>2</sup> x <sup>2</sup> β cz	(3) b <sup>2</sup> x β c <sup>2</sup> z	(4) bx <sup>2</sup> $\beta$ c <sup>2</sup> z
Sol.	(1) $abxy = c^{2} z \dots (1)$ $bx > ay \dots (2)$ $b^{2} = ac \dots (3)$ from equation (1) $ay = \frac{c^{2}z}{bx}$ Put in equation (2) $bx > \frac{c^{2}z}{bx}$ $b^{2} x^{2} > c^{2}z$ From euqaiton (3) $acx^{2} > c^{2}z$ $ax^{2} > cz \Rightarrow ax^{2} \beta cz$			
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		NATIONAL TALEN	T SEARCH EXAMINATIO	N-  03.11	.2019   RAJASTHAN   MAT
58.	If bcy $\gamma$ ax, cy $\alpha$ bz and a <sup>2</sup> (1) cx $\alpha$ abz (2)	γ bc, then ) cx γ abz	(3) cx δ abz	(4) c <sup>2</sup> x	γ a²z
Sol.	(3) bcy < ax(1) cy = bz(2) $a^2 < bc$ (3) from equation (1) & (2) $b^2 z < ax$ (4) multiply equation (3) & (4) $a^{2b^2z} < abcx$ abz < cx so $abz \# cx \Rightarrow cx \delta abz$				
59.	If $a^2x \alpha$ byz, $czx \alpha b^2y$ and (1) $abc \alpha xyz$ (2)	$c^2 z \alpha$ axy, then abc $\beta$ xyz	(3) abc δ xyz	(4) abc	γ xyz
Sol.	(1) $a^{2}x = byz$ , $czx = b^{2}y$ , $c^{2}z = a^{2}x = byz$ $b^{2}y = czx$ $c^{2}z = axy$ after multiplying all equation $a^{2}b^{2}c^{2}xyz = abc x^{2}y^{2}z^{2}$ so $abc = xyz$ $abc \alpha xyz$	= axy on			
Questi	on (60 - 63)				
Instruc	ction : Read the information (i) A \$ B means A is mothe (ii) A $\neq$ B means A is fathe (iii) A @ B means A is hus (iv) A % B means A is dau	e given below to answe er of B. r of B. band of B. ghter of B.	er the questions that follo	sw :	
60.	If P @ Q \$ M ≠ T, then wh (1) Maternal grandfather (3) Paternal grandfather	at relationship is of P	with T ? (2) Maternal grandmoth (4) Paternal grandmoth	ner er	
Sol.	(3) P @ Q \$ M ≠ T P <sup>+</sup> ← Q <sup>-</sup>   M <sup>+</sup>   T P is grandfather of T.				
61.	Which of the following exp (1) H \$ D @ F $\neq$ R (2)	ressions indicates tha ) R % D @ F \$ H	t 'R is the sister of H' ? (3) R \$ D @ F ≠ H	(4) H %	6 D @ F \$ R
Sol.	(2) From option (2) R % D @ F \$ H D <sup>+</sup> ← F <sup>-</sup>   R <sup>-</sup> H So R is sister of H.				
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62.	If G \$ M @ K, then how is (1) Mother in law (2	K related to G ? 2) Daughter	(3) Daughter in law	(4) Noi	ne of these
Sol.	(3) G \$ M @ K D <sup>+</sup> M <sup>+</sup> ⇐ K <sup>-</sup> K is daughter in law of G.				
63.	Which of the following exp (1) $H \neq R \ D \ N$ (3) $N \ F @ D \ H$	pression indicates H is	the brother of N ? (2) N % F @ D \$ H ≠ R (4) N % F @ D % H		
Sol.	(2) From option (2) N % F @ D \$ H $\neq$ R F <sup>+</sup> $\longrightarrow$ D <sup>-</sup>   N <sup>-</sup> H <sup>+</sup> R So H is brother of N.				
64.	If $2x + y = 35$ and $3x + 4y$	= 65, then $\frac{x}{y}$ =			
	(1) 30 (2	2) 2	(3) 5	(4) 3	
Sol.	(4) $2x + y = 35 \dots (1)$ $3x + 4y = 65 \dots (2)$ subtract 4 times of equation (3x + 44) - 4 (2x + y) = 65 -5x = -75 x = 15 Put value of x in equation 2(15) + y = 35 y = 5 So $\frac{x}{y} = \frac{15}{5} = 3$	on (1) from equation (2 5 – 4 × 35 (1)	2)		
65.	If $4P = (47)^2 - (43)^2$ , then (1) 360 (2)	P = ? 2) 90	(3) 4 <sup>2</sup>	(4) Noi	ne of these
Sol.	(2) $4p = (47)^2 - (43)^2$ 4P = (47 + 43) (47 - 43) $4P = 90 \times 4$ P = 90 (2.572) <sup>3</sup>	- (2.428) <sup>3</sup>			
66.	Value of $\frac{(3.572)^2}{(3.572)^2 - 3.572}$	$\frac{+(2.428)^{2}}{\times 2.428 + (2.428)^{2}}$ is	(2) 6	(4) No	an of these
Sal	(1) 17.12 (2	2) 7	(3) 0	(4) NOI	ie of these
301.	$\frac{(3.572)^3 + (2.428)}{(3.572)^2 - 3.572 \times 2.428 + \therefore a^3 + b^3 = (a + b) (a^2 - ab - b^2)$	<sup>3</sup> - (2.428) <sup>2</sup> + b <sup>2</sup> )			
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	sonance ting for better tomorrow	NATIO	NAL TALEN	T SEARCH EXA	MINATION	I-  03.11.201	9   RAJASTHAN   MAT
	$\frac{(3.572+2.4)}{(3.572+2.4)}$	$\frac{(3.572)^2}{(3.572)^2} - \frac{(3.572)}{(3.572)^2} - \frac{(3.572)}{(3.572)^2} - \frac{(3.572)^2}{(3.572)^2} - \frac{(3.572)^2}{(3.572)$	$(2.428) + (2.428)^2$	$(428)^2$ = 6			
67.	The surface	area of a cube is 150 so	q. cm.What	is the length of	its diagon	al (in cm) ?	
	(1) $\frac{5}{2}$	(2) $\frac{5\sqrt{3}}{2}$		(3) 5 $\sqrt{2}$		(4) 5 √3	
Sol.	<b>(4)</b> Surface area Side = 5	a of cube = $6 \times (side)^2$ =	150				
	length of dia	gonals = $\sqrt{3} \times \text{side} = 5$	5√3				
68.	The averge ( (1) 18	of three numbers is 20. (2) 20	lf two of the	numbers are 1 (3) 19	6 and 22,	then the thir (4) 22	rd is
Sol.	(4) Let third num $\frac{16+22+x}{3}$ 38 + x = 60 x = 22.	nber is x so = 20					
69.	Of which nur (1) 4135	mber is 10608049 a squ (2) 3009	are ?	(3) 13263		(4) 3257.	
Sol.	<b>(4)</b> √10608049	= 3257.					
70.	Identify the r	missing term (?) :					
		6 13 4	7 3 ?	42         13           39         16           28         11	E		
	(1) 1	(2) 0		(3) 5		(4) 7	
Sol.	(4) $6 \times 7 = 42 \text{ and } 6 + 7 = 13$ $13 \times 3 = 39 \text{ and } 13 + 3 = 16$ $4 \times x = 28 \text{ and } 4 + x = 11$ so $x = 7$ .						
71.	The two pos having digit	itions of a single dice ar 4 ?	e given belo	bw. Which digit $ \begin{array}{c} 2 \\ 5 \\ 4 \\ II \end{array} $	will be at t	he face opp	osite to the face
	(1) 1	(2) 2		(3) 3		(4) 6	

**Sol.** (3) 5 1 3

5	2	4

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		NATIONAL TALEN	T SEARCH EXAMINATION	N-  03.11	.2019   RAJASTHAN   MAT
72.	How many smaller cubes of (1) 3 (2)	of 1 cm side can be fo ) 6	rmed with a solid cube c (3) 9	of 3 cm s (4) 27	side ?
Sol.	(4) Volume of solid cube = (3) Volume of smaller cube =	<sup>3</sup> = 27 (1) <sup>3</sup> = 1			
	No. of smaller cube = $\frac{27}{1}$ =	= 27			
73.	How many times the hour	hand and the minute h	nand of a clock are at rig	ht angle (4) 44	e in a day ?
Sol.	(4) (1)	<i>y</i> .c	(0)	(.)	
74.	If 1 + 4 = 9,2 + 8 = 18 and	3 + 6 = 15, then 7 + 8	=		
	(1) 32 (2	2) 41	(3) 23	(4) 30	
Sol.	<b>(3)</b> 2 <sup>nd</sup> no. × 2 + 1 <sup>st</sup> no.				
Instruc	tion : Study the following in Eight people E,F,G,H,J,K, of a different profession Lawyer, Professor and Sc K. The scientist is an imm E. Only one person is sitt Engineer. M is second to other. Neither G nor J is a second to the right of the	nformation carefully an L and M are sitting an : Chartered Account ientist but not necessa ediate neighbour of K ing between the Engin the right of K. H is th in Engineer. The Final Columnist. The Profes	nd answer the questions ound a circular table fac- tant, Columnist, Doctor arily in the same order. . There are only three po- neer and E. The Colum e Scientist G and J are ncial Analyst is to the im- essor is an immediate r	given b cing the r, Engir F is sitt eople be nist is tr immed mediate	elow : centre. Each of them is neer, Financial Analyst, ing second to the left of etween the scientist and the immediate right of iate neighbours of each e left of F. The lawyer is ar of the Engineer. G is
	second to the right of the C	Chartered Accuntant.			
75.	Who is sitting second to th (1) Lawyer (2	ne right of E ? :) G	(3) Engineer	(4) F	
Sol.	(2)				
		K Engg Proj. Sci Colum Doct C.A E Lawyer J	G G H F G		
76.	Who amongst the following (1) F (2	g is the Professor ? ) L	(3) M	(4) K	
Sol.	(4)				
77. Sol	Three of the following four a group. Which of the follo (1) Chartered Accountant (3) Engineer-J (3)	are alike in a certain w wing does not belong - H	way based on the given in the group? (2) Doctor - M (4) Financial Analyst- L	arrange	ment and hence form
301.	Profession - Names (sits o	pposite)			
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			NATIONAL TAL	LENT SEARCH EX	AMINATION-  03.1	1.2019   RAJASTHAN   MAT
78.	What is the position (1) Third to the left (3) Second to the left	n of L w eft	ith respect to the s	scientist? (2) Second to (4) Third to th	o the right ne right	
Sol.	(2)				-	
79.	Which of the follow (1) The Lawyer is s (2) E is an immedia (3) H sits exactly be (4) Only four peopl	ing stat econd ate neig etween e sit be	ement(s) is/are tru to the left of the Do hbour of the Finar F and the Financia tween the Column	ue according to the octor ncial Analyst al Analyst ist and F.	e given arrangem	ent?
Sol.	(1)					
80.	If 381A is divisible (1) 5	by 9 the (2) (	en the value of the 6	smallest natural r (3) 7	number A is (4) 9	
Sol.	<b>(2)</b> 3 + 8 +1 + 6 = 18 (	divisible	e by a)			
81.	The average of firs (1) 3	t five m (2) \$	ultiples of 3 is	(3) 12	(4) 15	
Sol.	(2) 3,6,9,12,15 ⇒ mea = 9	in= <u>3+</u>	$\frac{6+9+12+15}{5}$			
82.	If $81^{y} = \frac{1}{27^{x}}$ , then	the val	ue of x in terms of	y is		
	(1) $\frac{3y}{4}$	(2)	$-\frac{3y}{4}$	(3) $\frac{4y}{3}$	(4) -	<u>4y</u> 3
Sol.	(4) $(3)^{4y} = \frac{1}{1}$					
	$(3)^{-3} = \frac{3^{3x}}{3^{3x}}$ 4y = -3x					
	$x = -\frac{4y}{3}$					
83.	If $\frac{10a^2 + ab}{ab} = \frac{10}{10a^2}$	then a	: b is			
	3ab – b² 1 (1) 2 : 3	(2)	2:5	(3) 3 : 4	(4) 3 :	7
Sol.	(2) $10a^2 + ab = 30ab - 10a^2 + 10b^2 - 29ab$	- 10b² ) = 0				
	$10\left(\frac{a}{b}\right)^2 + 10 - 29$	$\left(\frac{a}{b}\right) = 0$	)			
	Let $=\frac{a}{b} = x$					
	$10x^{2} - 29x + 10 = 0$ $10x^{2} - 25x - 4x + 10$ 5x (2x - 5) - 2 (2x - 5) = 0 (5x - 2) (2x - 5) = 0	) 0 = 0 -5) = 0 )				
	$X = \frac{2}{5}, \frac{5}{2}$					
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			NATIONAL TALEN	IT SEARCH EXAMINA	TION-  03.11.2019   RAJASTHAN   MAT
84.	If $\sqrt{5+\sqrt[3]{x}} = 3$ (1) 125	3, then the value (2) 64	of x is	(3) 27	(4) 9
Sol.	(2) <b>5</b> + $\sqrt[3]{x} = 9$ $\sqrt[3]{x} = 4$ X = 64				
85.	The least Co (HCF). The s (1) 134	mmon Multiple (I sum of HCF and (2) 128	_CM) of the two n LCM is 403. If one	umbers is 12 times th number is 93, then t (3) 124	eir Highest Common Factor he other is (4) None of these
Sol.	(3) HCF = x LCM = 12x 13x = 403 x = 31 HCF × LCM x × 12x = 93 y = 124	= 93 × y × y			
86.	If one intege would be the (1) 7	r is greater than a sum of those tw (2) 8	another integer by o integers?	3 and the difference (3) 9	of their cubes is 117, then what (4) 11
Sol.	(1) Let the two ii $(x + 3)^3 - x^3 = x^3 + 9x^2 + 27$ $9x^2 + 27x - 9x^2 + 3x - 10$ $(x + 5) (x - 2)x^2 + 3x - 10$ $(x + 5) (x - 2)x^2 = -5, 2$ So, the number of the sum	nteger are x, x + 3 = 117 $(x + 27 - x^3 = 117)$ (0 = 0) = 0 (b) = 0 ber are 2, 2 + 3 = n = 2 + 5 = 7	3 , 5		
87.	How many fo (1) 4	our digit numbers (2) 12	can be formed us	ing 7, 5, 0, 2 only on (3) 9	ce in a number ? (4) 18
Sol.	(4) 7,5,0,2 Thousand pla Hundred place Ten place ca Unit place ca ∴ Total way	ace can be filled ce can be filled in the filled in 2 was an be filled in 1 w rs = $3 \times 3 \times 2 \times 1$	in 3 ways a 3 ways ays ays = 18		
88.	The greatest the digits is (1) 6570	: four digit even i (2) 7	number that can t 560	be formed using the (3) 7650	digits 7,0,6,5 without repeating (4) 7065
Sol.	(3) Greatest fou	r digit number us	ing 7,0,6,5 in 7650	)	

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#### NATIONAL TALENT SEARCH EXAMINATION-| 03.11.2019 | RAJASTHAN | MAT|

**89.** A person covers half of his journey at 30 km/hr and the remaining half at 20 km/hr. The average speed for the whole journey is

	(1) 24 km/hr	(2) 28 km/hr	(3) 32 km/hr	(4) None of these	
Sol.	(1)				
		$2 \times 30 \times 20$ 1200			

Average speed =  $\frac{2 \times 30 \times 20}{30 + 20} = \frac{1200}{50} = 24$ 

### Questions (90 - 94)

Sol.

**Instruction :** The pie-chart represented below shows the spending by a family in various items during the year 1999. Study the pie-chart carefully and answer the following questions.

Per cent of money spent by the family on various items during 1999.



**90.** If the total amount spent during the year 1999 was Rs. 46,000. Then the amount (in rupes) spent on food was.



Amount spent on food = 23% of 46,000 =  $\frac{23}{100} \times 46,000 = 10,580$ 

- 91.If the total amount spent during the year 1999 was Rs. 46,000, then how much money (in rupees) was<br/>spent on clothing and housing together?<br/>(1) 11,500(2) 1,150(3) 10,000(4) 15,000
  - I. (1) Amount spent on clothing and housing = (10 + 15)% of  $46,000 = \frac{23}{100} \times 46,000 = 11,500$
- 92. If the total expenditure of the family for the year 1999 was Rs. 46,000, then the savings (in rupees) of the family was
  (1) 1,500
  (2) 15,000
  (3) 6,900
  (4) 3,067

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# 

98.

3:11::7:? (1) 22

(2) 29

Sol.	(3)					
	Amount spent on saving	$g = 15\%$ of 46,000 = $\frac{15}{100}$	$- \times 46,000 = 6,900$			
93.	According to the pie-cha (1) Food	art , the maximum amount (2) Housing	nt was spent on which it (3) Clothing	em? (4) Others		
Sol.	<b>(1)</b> Maximum amount spen	t on food i.e, 23% of tota	l expenditure.			
94.	The ratio of the total am education was (1) 5 : 2	ount of money spent on (2) 2 : 5	housing to the total amo	ount of money spent on (4) 5 : 4		
Sol.	(4)					
	Ratio of amount spent of	on housing to education =	$= \frac{15\% \text{ of } 46000}{12\% \text{ of } 46000} = \frac{15}{12} = \frac{4}{2}$	54		
95.	The sum of three numb and third be 5 : 8, then	ers is 98. If the ratio betw	veen first and second be	2:3 and that between second		
	(1) 30	(2) 20	(3) 58	(4) 48		
Sol.	(1) Let three numbers be a, b and c a: b = 2: 3 b: c: 5: 8 $\therefore a: b: c = 10: 15: 24$ 10x + 15x + 24x = 98 x = 2 Second Number = $15 \times 2 = 30$					
Questions (96 -100) Instruction : In each of the following questions, there is a certain relationship between two given numbers on left side of (::) and one number is given on the right sides (::) while another number is to be found from the given alternatives, having the same relationship with the number as the numbers of the given pair bear. Choose the correct alternative.						
96.	21 : 3 : : 574 : ? (1) 23	(2) 82	(3) 97	(4) 113		
Sol.	(2) 21:3 ::574:2 21÷7=3 574÷7=82					
97.	42 : 20 : : 64 : ? (1) 31	(2) 32	(3) 33	(4) 34		
Sol.	(1) 42:20::64:2 $(42 \div 2) - 1 = 20$ $(64 \div 2) - 1 = 31$					

Sol.	(4) 3 : 11 : 7 : ? 3 <sup>2</sup> + 2 = 11 7 <sup>2</sup> + 2 = 51		
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(3) 18

(4) 51

99.	42 : 56 :: 72 : ? (1) 81	(2) 90	(3) 92	(4) 100
Sol.	(2) 42:56:72:? 42=6×7 56=7×8 72=8×9 90=9×10			
100.	9 : 80 : : 100 : ? (1) 901	(2) 1009	(3) 9889	(4) 9999
Sol.	(4) 9:80::100:? 9 <sup>2</sup> -1=80 100 <sup>2</sup> -1=9999			

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