# **INSTRUCTION TO CANDIDATES**

#### Read the following instructions carefully before you answer the questions.

- 1. Answers are to be bubbled only on the separate carbonless answer sheet provided to you. After examination detach the carbonless copy from original OMR & Keep carbonless copy with you till the declaration of result
- 2. Please write your centre code & Seat NO. very clearly (Only one digit in one block) on question paper. Before writing your seat, no. ascertained it with Hall Ticket. Please see that no block is left blank or unfilled

#### Example

# CENTER CODE 2 1 0 2

SEAT NO 3 9 2 0 2 1 0 2 1 2 3

- 3. Please ensure that you have received Scholastic Aptitude Test Answer Sheet
- 4. Total number of questions are 100 for this paper. All questions carry one mark each.
- 5. All questions are compulsory.
- 6. For each question there are four options given in question paper. Check for correct answer and bubble correct option from four circles given in answer sheet by Black/Blue pen. Please do not write any answers on questions papers.
- 7. Start answering from first question one after till last question.
- 8. If you do not know the answer to any question, do not spend much 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 try them again.
- **9.** Utilize the allotted time for solving the questions in best possible way. The rough work is to be done in box given under each page.
- 10. Do not write anything except Center Code, Seat NO. and rough work anywhere in this booklet

1. Observe the columns I and II, match them and select the correct alternative from the given options.

	I.			II
Α.	Motion of earth around sun		(i)	Nuclear force
в.	Motion of stone tied to a string and whirled ir	n a circle	(ii)	Electromagnetic force
C.	Motion of electron around nucleus		(iii)	Gravitational force
D.	Motion of blades of fan		(iv)	Tension
(1)	A-(i), B-(ii), C-(iv), D-(iii)	(2)	A-(ii),	B-(iii), C-(i), D-(iv)
(3)	A-(iv), B-(i), C-(iii), D-(ii)	(4)	A-(iii)	, B-(iv), C-(i), D-(ii)
Hoat	is a form of energy			

2.	Heat	is a form of	energy.		
	(1)	Potential		(2)	Kinetic
	(3)	Chemical		(4)	Elastic

3. If mass of a planet is 25 times mass of earth and radius of the planet is 125 times radius of earth then escape velocity of an object from the plant  $(V_P)$  is \_\_\_\_\_\_ times the escape velocity from earth  $(V_E)$ .

(1)	$\frac{1}{\sqrt{5}}$	(2)	√5
(3)	$\frac{1}{5}$	(4)	5

4. Equal masses of iron, water, aluminium and mercury at same initial temperatures is heated uniformly for 5 mins. If the temperatures obtained are

 $T_1$  – mercury,  $T_2$  – aluminium,  $T_3$  – water,  $T_4$  – iron, then choose the correct alternative.

(1)	$T_1 < T_4 < T_2 < T_3$	(2)	$T_1 > T_4 < T_2 > T_3$
(3)	$T_1 > T_4 > T_2 > T_3$	(4)	$T_1 < T_4 > T_2 < T_3$

5. If approximate refractive index of sapphire is 1.8, then approximate decrease is velocity of light, when light enters sapphire is \_\_\_\_\_\_.

(1)	40%	(2)	45%
(3)	50%	(4)	55%

6. If an incident ray making an angle of  $10^{\circ}$  with the horizontal is to be reflected perpendicular to the horizontal, by an inclined plane mirror, then inclination of the plane mirror ( $\theta$ ) should be \_\_\_\_\_\_.



ł

**7.** A ray of light follows the path as shown in figure as it travels though different media. Choose the correct relation regarding refractive indices from the given alternatives.



- 8. The main objective of \_\_\_\_\_\_ satellite launched by COEP [College of Engineering, Pune] orbiting at a height of \_\_\_\_\_\_ is to provide point-to-point messaging services.
  - (1) Samarpan, 550 km
  - (3) Swayam, 515 km

- (2) Sampoornam, 540 km(4) Sayam, 500 km
- (4) Say
- **9.** The position-time details travelled by a particle are as shown in figure. The initial velocity and acceleration of the particle is \_\_\_\_\_\_ respectively.



10. In which of the following circuits ammeter shows deflection?



11. In partial reflection and refraction of light from surface of glass slab, if angle of incidence  $\angle i = 43^{\circ}$  and angle of refraction  $\angle r = 25^{\circ}$ , then the reflected ray and refracted ray are deviated from the incident ray by \_\_\_\_\_ and \_\_\_\_\_ respectively.



**12.** Three bulbs of 100 W each, a fan of 1500 W and an electric iron of 1100 W are daily operated for 5 hours, 7 hours and 2 hours respectively. What will be the total electrical consumption expenses of these appliances for the month of April. The electrical company charges Rs. 5 unit.

(1)	Rs. 1500	(2)	Rs. 1080
(3)	Rs. 2130	(4)	Rs. 2080

**13.** In the circuit diagram shown in figure potential difference across  $3\Omega$  resistance is 10V. Match the following two columns.



	Potential difference across resistances		Resistances
(i)	65 V	(1)	6Ω
(ii)	40 V	(2)	4Ω
(iii)	15 V	(3)	8Ω
(iv)	10 V	(4)	AB

	(1) (3)	(i) $-4$ , (ii) $-3$ , (iii) $-2$ , (iv) $-1$ (i) $-2$ , (ii) $-1$ , (iii) $-4$ , (iv) $-3$	(2) (4)	(i) $-3$ , (ii) $-4$ , (iii) $-3$ , (iv) $-2$ (i) $-1$ , (ii) $-2$ , (iii) $-1$ , (iv) $-4$
14.	As pe	r Dalton's sign, the symbol of hydrogen element is	s repres	ented by
	(1)	$\odot$	(2)	©
	(3)	•	(4)	$\oplus$
15.	What CH <sub>3</sub> (	is the IUPAC name of the following compound? $CH_2_2C(CH_3)_3$		
	(1)	2, 2-Dimethyl butane	(2)	2-Methyl butane
	(3)	2, 2-Dimethyl pentane	(4)	2-Methyl pentane
16.	Extrac	ction of gold metal is done by method.		
	(1)	Froth floatation method	(2)	Leaching method
	(3)	Magnetic separation method	(4)	Hydraulic separation method
17.	Comp	arative atomic radius of beryllium is		
	(1)	Be > Li	(2)	B > Be
	(3)	Li > Be	(4)	Be < N
18.	Identi	fy the oxidation process from the following		
	(A)	$Zn \rightarrow Zn^{++}$	(B)	$Fe^{3+} \rightarrow Fe^{2+}$

	(C) $Zn^{++} \rightarrow Zn$	(C) $Fe^{2+} \rightarrow Fe^{3+}$	
	(1) 1&3	(2) 2 & 4	
	(3) 2 & 3	(4) 1 & 4	
40			
19.	How many covalent bonds are present in propyn		
	(1) $(3)$ $(3)$ $(3)$	(2) 7 (4) 5	
20.	The substance in molten sate in diluted in wa	ter and cooled to $50^\circ$ C results into precipitation of aluminit	Jm
	hydroxide. The substance is		
	(1) Na <sub>2</sub> O	(2) $AI_2O_3$	
	(3) NaAlO <sub>2</sub>	(4) SiO <sub>2</sub>	
21.	Actual atomic mass of Sr is 87.6. What is the ave	rage atomic mass of Sr. according to Dobereiner's triad?	
	(1) 88.7	(2) 87.2 (4) 88.0	
	(3) 00.2	(4) 88.0	
22.	Oxidation product of methyl alcohol is		
	(1) acetic acid	(2) methyl amine	
	(3) formic acid	(4) ethyl acetate	
22	Which of the following is not on everyle of here		
23.	(1) CHO	(2) CHO	
	(1) $C_2 = C_6 C_6$	$(2) C_4 \Pi_8 O$	
	(3) $C_4 H_{10} O$	(4) $C_3H_8O$	
24	From the given diagram, identify the element $(Y)$	and 'V'?	
24.	From the given diagram, identity the element $\lambda$ Group $\rightarrow$	13 14 15 16 17 18	
	$Period \downarrow$		
	II		
		Si	
	IV	'x' As	
	V	'y' Te	
	VI		
	(4) Or and Or		
	$(1)  Ga and Sn \\ (3)  Ga & Sb$	(2)  Ge & PO $(4)  Sh & Po$	
25.	Reddish coloured poisonous gas is produced wh	en copper reacts with nitric acid, the gas is	
	(1) NO <sub>2</sub>	(2) NO	
	(3) N <sub>2</sub> O	(4) $N_2O_2$	
26	How many atoms are present in a mole of $Ca(H)$	() $()$ $()$ $()$ $()$ $()$ $()$ $()$	
20.	now many atoms are present in a more of Ca(m	50 <sub>3</sub> ) <sub>2</sub> :	
	(1) $5 \times 6.02 \times 10^{23}$	(2) $7 \times 6.02 \times 10^{23}$	
	(3) $9 \times 6.02 \times 10^{23}$	(4) $11 \times 6.02 \times 10^{23}$	
27.	Carbon dating method developed by Willard Li	by is based upon the radioactive decay of naturally occurring	ng
	carbon	<b>c</b> 11	
		$(2) \qquad \qquad$	
	(3) $C^{6}$	(4) $C^{22}$	
~~			
28.	in which of the following cells a cell plate is cytokinesis?	ionned exactly along midline of the cell and thus completi	ng
	(1) blood cells	(2) muscle cells	
	(3) nerve cells	(4) cells in the root of onion	
20	Identify the members in embryo-sec of flowers by	fore fertilization occurs	

Identify the members in embryo-sac of flowers before fertilization occurs. (1) one haploid egg cell and one haploid male gamete

- (2) two haploid male gametes and two haploid polar nuclei
- (3) one haploid egg cell and two haploid polar nuclei
- (4) one haploid male gamete and two haploid polar nuclei
- 30. What is indicated in clause 49A of Wildlife Protection Act, 1972?
  - Ban on use of articles prepared from skin or organs of wild animals (1)
  - (2) Compulsion for disclosure of stock of artifacts made from rare wild animals
  - (3) Ban on trading of rare wild animals.
  - (4) Completely ban on migration of rare animals
- 31. 'Molai Jungle' is in which state?
  - Meghalaya (1)
  - Arunachal Pradesh (3)

- (2) Assam (4)
  - Nagaland

32. Identify pelvic fin in the given figure.



33. \_ is most clever animal among all non-chordates and which can change its colour.

(1) Octopus (3)

(1)

(3)

А

С

- (2) Lizard (Chameleon) Snail (4) Balanoglossus
- 34. Which is effective antibiotics against tuberculosis?
  - Cephalosporins (2) neomycin (1) (3)streptomycin (4) rifamycin

35. Glucose and fructose syrup can be obtained from cornflour by action of enzymes obtained from \_\_\_\_\_ and

- (1) Brevibacterium and Corynebacterium
- Saccharomyces cerevisine and Candida (3)
- (2) Hansenula and lacto-bacillus brevis
- (4) bacillus and Streptomyces

36. From the following pairs of living organisms which pair is used for freshwater fishery?

- Rohu, Catla Shrimp, Lobsters (1) (2)
- (3) Rohu, lobsters (4) Catla, lobsters

37. Consumption of tobacco products lead to which disease in human beings?

- tuberculosis (2) AIDS (1) (4) cancer of the lungs leprosy
- (3)
- 38. Identify action plan from the following pre-disaster management.
  - Participation of preferably local people saved from the disaster in arranging help of victims. (1)
    - Quick establishments of help centre. (2)
    - (3) Categorization of the help material received from control centre, delivering the material to victims.
  - (4) Increasing awareness about disaster management among the general public.
- 39. Amongst the following which disease spread through bacteria?
  - Hepatitis Pneumonia (1) (2)
    - (3) Influenza (4) Chicken pox
- 40. Identify the odd pair of hormone and its function from the following
  - Gibberellins-helps in elongation in stem (1)
- Cytokinins-help in cell division (2)
- (3) Abscisic acid-production of flowers (4)
- - Auxin-help in enlargement of cells

41.	Annales School gave a new direction to history writing. Identify the newly recognised aspect which was stated by Annales School			
(1) History is only about political events				
	(2)	Great leaders and their accordingly politics		
	(3)	Study of trade technology means of communicati	ion	
	(4)	Study of kings and wars		
42.	Who a	rgued that the prevailing practices of arranging his	storical	events in a chronological order is not right?
	(1)	Michel Foucault	(2)	Karl Marx
	(3)	Leopold Von Ranke	(4)	Friedrich Hegel
43.	Ishwa	rdas Nagar, Bhimsen Saxena were the histories o	f	's times.
	(1)	Jahangir	(2)	Aurangzeb
	(3)	Shahjahan	(4)	Akbar
44.	Identif	y the style of painting which influenced Maratha st	tyle of p	painting.
	(1)	Art style	(2)	Varlı Kala
	(3)	Rajput Kala	(4)	Classical Art
45.	The te	mples built in the Hemadpanti style and places of	it are g	iven below. Identify the wrong pair.
	(1)	Verul – Kallash	(2)	Mumbai – Ambreshwar
	(3)	Nasnik – Gondesnwar	(4)	Hingoli – Aundha Naghath
46.	Newsp	paper began to publish articles about	the nat	tionwide situations, books in the native languages
		e politics in other countries.	(2)	Kapari
	(1)	Doophondhu	(Z) (4)	Nesali Indu Brakash
	(3)	Deenbanditu	(4)	
47.	Who v	vas the editor of the periodical name 'Pragati' (192	29)?	
	(1)	Pandit Narendra Sharma	(2)	Balshastri Jambhekar
	(3)	Traymbak Shankar Shejwalkar	(4)	Gopal Hari Deshmukh
48.	Identif	y the correct option from the alternatives given be	low	The Original Original
	(I) (ii)	Patan at Gujrat	(a) (b)	The Capital Complex
	(II) (:::)	Hampi Chandigarh	(d)	Chhau Dance Roni ki Vov
	(III) (iv)		(C) (d)	Croup of Monumente
	(IV) (1)	(i) $-d$ (ii) $-a$ (iii) $-b$ (iv) $-c$	(u) (2)	(i) $-c$ (ii) $-d$ (iii) $-a$ (iv) $-b$
	(1)	(i) - b, (ii) - c, (iii) - d, (iv) - c	(2) (4)	(i) = 0, $(ii) = 0$ , $(iii) = 0$ , $(iv) = 0$
	(0)	(1) - 0, (1) - 0, (10) - 0, (10) - 0	(+)	(1) - a, (1) - b, (11) - c, (10) - a
49.	Identif	y the wrong pair related to the movie and its direct	tions.	
	(1)	Bal Shivaji – Prabhakar Pe	endhari	kar
	(Z)	Dhanyale Sahlaji Dhanaji – Dhankar D. Pa	alli orkor	
	(3) (4)	Baji Prabhu Deshpande – Dadasaheb T	Torane	
50		ashama waa launahad in 1070 1071 in Ma	horoph	
50.	(1)	Scheme was launched in 1970-1971 in Mai	narashi (2)	Ia. Nutritious dist
	(1)	To supply more electricity for numps	(Z) (4)	Ruleo Polio Vaccination
	(3)	To supply more electricity for pumps	(4)	
51.	Which	game was not mentioned in the ancient Indian lite	erature	and in the EPICS?
	(1)	dice (dyut)	(2)	horse and the charlot races
	(3)	boxing	(4)	Cness
52.	Identif	y the name of the book which has description of fl	ying do	lls?
	(1)	Kathasaritsagar	(2)	Kitchak Vadh
	(3)	Harshacharit	(4)	Manasollas

53. Observe the picture and identify the name of the cave, where this sculpture is carved.

	(1) (3)	Ajanta Panhalaje	(2) (4)	Gharapuri Verul
54.	Ident	ify first nuclear reactor of India functioning	g on atomic ener	rgy.
	(1)	Dhruv	(2)	Apsara
	(3)	тагари	(4)	Zallina
55.	Whic	h five year plan consisted of measures to	lay the foundati	on of plannes economic development?
	(1)	second	(2)	third
	(3)	fourth	(4)	first
56.	Ident	ify the well known play of Shakespeare o	n which Marathi	play 'Natsamrat' was styled?
	(1)	Hamlet	(2)	King Lear
	(3)	Julius Ceaser	(4)	Romeo-Juliet
57.	Whic	h provision is not included in the basic str	ructure of the co	nstitution?
011	(1)	Federal structure of constitution	(2)	Promotion of unity and integrity of the nation
	(3)	Sovereignty of the nation	(4)	Supremacy of parliament
58.	After	which reform the farmers' movement bec	ame more active	e and effective?
	(1)	tenancy laws	(2)	laws related to titling of the lands
	(3)	debt relief	(4)	green revolution
59.	Choo (1) (2) (3) (4)	se the wrong option which is not mention Establish international peace and secur Foster respect for international law Discourage settlement of international of Maintain justice and honourable relation	ed in Article 51 o rity disputes by arbit n between nation	of the Indian constitution. ration ns
60.	Acco	rding to you, which two conditions among	the options are	violating code of conduct?
	(1)	The candidate distributes items of hous	sehold use	
	(2)	Promise made to resolve the water pro	blem if elected	am to vote
	(4)	To appeal on the basis of caste and rel	igion to get supp	port
	(1)	1 and 2	(2)	1 and 4
	(3)	2 and 3	(4)	3 and 4
61.	Who	is known as 'Waterman of India'?		
	(1)	Shree Anna Hajare	(2)	Sardar Vallabhbhai Patel
	(3)	Dr. Rajendra Sinh Rana	(4)	Shree Sundarlal Bahuguna
62.	Whic	h organ of the United Nation passes the a	annual budget of	United Nation as in function?
	(1)	General Assembly	(2)	Security Council
	(3)	Economic and Social Council	(4)	Trustship Council
63.	The i leade	dea of party less democracy is put forth or who does not support the concept of pa	n by the followin arty less democra	ng leaders. Choose the wrong option. Name of acv.
	(1)	Mahatma Gandhi	(2)	Lokmanya Tilak
	(3)	Vinoba Bhave	(4)	Jaiprakash Narayan
64.	Choo	se the number of percentage which has b	peen raised to in	crease representation of women in politics
	(1)	33%	(2)	50%

Name of the

## (3) 60%

65. In the above diagram wave cut platform has been shown with letter \_\_\_\_\_



- 66. Increase in the \_\_\_\_\_ is an indicator of development of that society of a country.
  - (1) Life expectancy (2) Sex ratio
  - (3) Density

(4) Population

67. Match the appropriate pair of a region and its major forest type shown with his code letters in the outline map of India.



Π.

IV.

- I. Himalayan Forest
- III. Thorny shrubs forest
- (1) A II, B IV, C I, D III
- (3) A I, B II, C III, D IV

(2) A - IV, B - III, C - II, D - I(4) A - III, B - I, C - IV, D - II

Deciduous forest

Evergreen forest

- 68. \_\_\_\_\_ from the Western Rajasthan is considered as the most dry part in India.
  - (1) Jaisalmer

(3)

Jodhpur

(2)	Ajmer
(4)	Jaipur

- 69. Identify the wrong statement from the statements given below;
  - (1) Brazil is fifth in the world with respect to area.
  - (2) The density of population in Brazil is around 230 persons per sq. km.
  - (3) According to census 2011 population of India was 121 crores.
  - (4) According to census 2011 India's density of population is 382 persons per sq. km

70. In India about \_\_\_\_\_ present of passengers are carried by road.

(1)	75%	(2)	65%
(3)	85%	(4)	80%

- 71. In which direction of Brazil, there is no sea coast?
  - (1)
     East
     (2)
     West

     (3)
     South
     (4)
     North
  - (3) 30000

# 72. Identify the correct option for correct pairs:

	Column A		Column B
(1)	Pantanal	(i)	Pink dolphins
(2)	Looks like a lion	(ii)	Condors
(3)	Fish variety	(iii)	Anacondas

	(4)	Huge sized bird	(iv)	Golden tamrin
	(1)	A - iii, B - iv, C - i, D - ii	(2)	A - iv, B - iii, C - ii, D - i
	(3)	A – ii, B – i, C – iii, D – iv	(4)	A – i, B – ii, C – iv, D – iii
	Which	one of the following is not a major trading partr	ner of B	razil?
	(1)	Pakistan	(2)	Germany
	(3)	India	(4)	Canada
	What	type of tourism is developing in Brazil?		
	(1)	Historical	(2)	Cultural
	(3)	Eco-tourism	(4)	Professional
	Choos	se the correct order of mountain ranges from So	uthern	Himalayan ranges to Northern Himalayan rang
	(1)	Lesser Himalyas – Sivaliks – Himadri	(2)	Sivaliks – Himadri – Lesser Himalayas
	(3)	Himadri – Lesser Himalayas – Sivaliks	(4)	Sivaliks - Lesser Himalayas – Himadri
	India i	s located in the hemispheres of the	earth.	
	(1)	Southern and Eastern	(2)	Northern and Eastern
	(3)	Northern and Western	(4)	Southern and Western
	(1)	World Trde Organization (W.T.O)	(2)	ASEAN
	(3)	APEC	(4)	OPEC
ı		is the most urbanized state in India.		
	(1)	Maharashtra	(2)	Gujarat
	(3)	Goa	(4)	Kerala
	Identif	y the wrong pair:		
	River	Tributary		
	(1)	Ganga – Yamuna	(2)	Sindhu – Satluj
	(3)	Krishna – Tungabhadra	(4)	Tapi – Bhima
•	Which	letter indicates the surface waves in the given	diagram	1?
		Le contraction de la contracti	-forrwhy	
	(1)	P	(2)	S
	(3)	М	(4)	L

81. Arpita has some coins of Rs. 1 and Rs. 2. The total number of coins that she is 50. The total amount that she has is Rs. 75. Find the number of coins that she has of Rs. 1 and Rs. 2 respectively.

5, 8

- 35 and 15 (2) 35 and 20 (1) (3) 15 and 35
  - (4) 25 and 25
- One root of the quadratic equations  $x^2 bx + 6 = 0$  and  $x^2 6x + c = 0$  is equal. The ratio of the remaining roots 82. is 3:4. If all the roots are positive integers find the values of b and c respectively.
  - (1) 3, 4 (2)

	(3)	1, 6			(4)	8, 5			
83.	Spee upstre	d of the boat in eam. Find the s	still water is peed of the w	6 km/hr. The time ater current.	e required	to go dowr	nstream in half c	of the time require	ed to go
	(1)	5 km/hr			(2)	4 km/hr			
	(3)	3 km/hr			(4)	2 km/hr			
84.	The s of the	um of the 3 <sup>rd</sup> a A.P.	nd 8 <sup>th</sup> term of	an A.P. is 7 and	the sum o	f the 7 <sup>th</sup> ter	m and 14 <sup>th</sup> term	is –3. Find the 1	0 <sup>th</sup> term
	(1)	-1			(2)	+1			
	(3)	0			(4)	2			
85.	A bag taken	A bag contains 5 red and some blue balls. One ball is taken out of the bag a random. The probability that the balls taken out is blue is double of the probability that the ball drawn is red. Find the total number of balls in the bag.							the balls bag.
	(1)	15			(2)	10			
	(3)	5			(4)	20			
86.	n is a	n is an odd number. Which of the following statement is $(n - 1)$ is a new provide the following statement is $(n - 1)$ .				(			
	(1)	(2'' + 1) is div	isible by 5		(2)	(2"+1) i	s divisible by 3		
	(3)	(2 <sup>n</sup> – 1) is div	isible by 5		(4)	(2 <sup>n</sup> – 1) i	s divisible by 3		
87.	The fi term.	rst term in an A	A.P. is 1. Com	mon difference is	3. If the s	sum of the	n terms in the A	A.P. is 2380, find	the 40 <sup>th</sup>
	(1)	117			(2)	118			
	(3)	119			(4)	120			
88.	Find t	he probability th	hat a leap yea	r has 53 Sundays					
	(1)	4			(2)	3			
	( )	7				7			
	(3)	2			(4)	$\frac{1}{2}$			
		1				1			
89.	Obse	rve the followin	g frequency c	listribution table. I	t shows th	e distance	s travelled by 25	50 public transpo	rt buses
	Dist	ance in (km)	200-210	210-220	220-2	230	230-240	240-250	
	No.	of buses	40	60	80		50	20	
	(1)	225			(2)	217.80			
	(3)	223.125			(4)	230			
90.	lf a+	$b = 2\sqrt{3}$ , and a	ab = 3, then a	$a^{4} + b^{4} = 7$ .					
	(1)	14			(2)	16			
	(3)	18			(4)	20			
91.	In ∆ I	MNP seg.QR    \$	Seg. NP.						
	lf 3.2	QN = 5.3 QM a	and $QR = 6.4$	,then NP = ?					
	(1)	11.7			(2)	17			
	(3)	10.4			(4)	15.9			
92.	lf poir	nt P(x, y) is equ	idistant from p	points Q(-2, 5) and	l R(6, -1) t	hen find b r	elation between	x and y.	
	(1)	4x - 3y = 2			(2)	x - 3y = 2	2		
	(3)	4x + 3y = -2			(4)	2x-3y =	= 2		
93.	From	the information	given below	find out which triar	ngles can	not be cont	inue. Choose th	e correct alternat	ive.
	(A)	PQ = 6.2  cm	; $(PR+QR)^2$	= 81 cm					
	(B)	$AB = 13\sqrt{3}cm$	n; BC = 11√2o	cm; AC = $5\sqrt{7}$ cm					
	(C)	XY = 0.2 m ;	YZ = 0.21 m ;	XZ = 0.29 m					
	(C)	MN + NP = 4	; NP + PM = 8	; $MN + PM = 6$					

(1)	Only B and C	(2)	Only A and C
(2)	Only A and D	(C)	Only B and D

- A storm broke a tree and the treetop rested  $13\sqrt{6}$  m from the base of the making an angle 45° with the horizontal. 94. Find the height of the tree.
  - $13\sqrt{3}(2+\sqrt{2})m$  $26\sqrt{2}+13\sqrt{3}m$ (2) 26√6 m (1) 5 (3)

$$26\sqrt{3}$$
 m (4)  $26\sqrt{2} + 13\sqrt{2}$ 

In  $\triangle PQR$ , Seg. QS is the bisector of  $\angle PQR$ . If PQ = x;  $QR = \left(2x + \frac{5}{3}\right)$ ;  $PS = \left(x - \frac{3}{5}\right)$ ;  $RS = \left(2x + \frac{3}{2}\right)$ . Find \*95.

the value of x. Choose the correct alternative.

(1)

(3)



96. In an isosceles triangle length of one of the side of the congruent sides is 17 cm and the length of non-congruent side is 16 cm. Find distance between the vertex opposite to non-congruent side and the centroid.

	(1) (3)	10 cm 9 cm	(2) (4)	8 cm 6 cm
97.	lf sir	$h\theta + \cos\theta = \frac{3}{2}$ then $\sin\theta \cdot \cos\theta = ?$		
	(1)	1	(2)	$\frac{2}{3}$
	(3)	5 8	(4)	0

98. P is the centre of two concentric circles having radius 3 cm and 5 cm. Two tangents are drawn from point A which is outside the circle. Tangent AM touches the smaller circle at point M and tangent AN touches the bigger circle at point N. If AM = 13 cm then AN = ?



In the adjacent figure Seg. AM  $\perp$  Seg. BC Seg. BN  $\perp$  Seg. SAC. If BC = 7 cm; AM =  $14\sqrt{3}$  cm, then BN = ? 99.



2√3cm (3)

- (4) 4 cm
- WPQRS is a square, PQ =  $7\sqrt{3}$  cm with centre R and radius RS, Sector R QAS is drawn. Find the area of the 100. shaded portion.



- (1)
- (3)

# MAHARASHTRA NATIONAL TALENT SEARCH EXAMINATION, STAGE 1 2020-21

	SCHULASTIC APTITUDE TEST (SAT)							
QUES	ANS KEY	QUES	<b>ANS KEY</b>	QUES	<b>ANS KEY</b>	QUES	<b>ANS KEY</b>	
1	4	26	4	51	3	76	2	
2	3	27	1	52	1	77	4	
3	1	28	4	53	2	78	3	
4	3	29	3	54	2	79	4	
5	2	30	3	55	4	80	4	
6	2	31	2	56	2	81	4	
7	1	32	2	57	4	82	2	
8	3	33	1	58	4	83	4	
9	Figure not clear	34	4	59	3	84	1	
10	1	35	4	60	2	85	1	
11	2	36	1	61	3	86	2	
12	3	37	3	62	1	87	2	
13	1	38	4	63	2	88	3	
14	1	39	2	64	1	89	3	
15	3	40	3	65	3	90	3	
16	2	41	3	66	1	91	2	
17	3	42	1	67	2	92	1	
18	4	43	2	68	1	93	3	
19	1	44	3	69	2	94	2	
20	2	45	1	70	3	95	4	
21	4	46	2	71	2	96	1	
22	3	47	3	72	1	97	3	
23	2	48	2	73	1	98	2	
24	3	49	4	74	3	99	4	
25	1	50	1	75	4	100	4	

# SCHOLASTIC APTITUDE TEST (SAT)



By Geometry  $\theta = 40^{\circ}$ 

- 7. 1 By using  $\mu \sin i = \text{constant}$ , we can say that  $\mu_1 > \mu_2, \mu_3 > \mu_2, \mu_3 = \mu_4, \mu_5 < \mu_4$
- **8.** 3
- 9. Figure not clear
- **10.** 1
- 11.



3

Appliance	Quantity	Watt	Time per day	Bill for April
Bulb	3	100	5 hours	$\frac{3\times100\times5}{1000}\times30\times5=225$
Fan	1	1500	7	$\frac{1 \times 1500 \times 7}{1000} \times 30 \times 5 = 1575$
Iron	1	1100	2	$\frac{1\times1100\times2}{1000}\times30\times5=330$

Total = 1575 + 225 + 330 = 2130

**13.** 1



 $\begin{array}{l} \mathsf{AB} \rightarrow \mathsf{65V} \\ \mathsf{8\Omega} \rightarrow \mathsf{40V} \\ \mathsf{4\Omega} \rightarrow \mathsf{15V} \\ \mathsf{6\Omega} \rightarrow \mathsf{10V} \end{array}$ 

14.

1

Symbol of hydrogen as per Dalton's sign of element is a dot in a circle use

**15.** 3

$$\begin{array}{c}
 5 \\
 5 \\
 CH_3 \\
 -CH_2 \\
 -CH_2 \\
 -CH_2 \\
 -CH_3 \\
 -CH_3 \\
 -CH_3
\end{array}$$

2, 2 - Dimethyl pentane

**16.** 2

Extraction of gold metal is done by leaching method  $4Au(s) + 8CN^{-}(aq) + 2H_{2}O(aq) + O_{2}(g) \rightarrow 4[Au(CN)_{2}](aq) + 40H^{-}(aq)$   $2[Au(CN)_{2}]^{-}(aq) + Zn(s) \rightarrow 2Au(s) + [Zn(CN)_{4}]^{2-}(aq)$ 

**17.** 3

Li > Be is correct option

## **18.** 4

Oxidation means loss of electron (1)  $Zn \rightarrow Zn^{2+} + 2e^{-}$ 

(2)  $Fe^{2+} \rightarrow Fe^{3+} + e^{-}$ 

19.

1

2

Propyne structure 8 bonds

20.

 $AI_2O_3 + 3H_2O \rightarrow 2AI(OH)_3$ 

# **21.** 4

Average atomic mass of Sr according to Dobereiner's triad was 88.

# **22.** 3

 $\begin{array}{c} CH_{3}OH & [O] \\ \hline \kappa_{2}Cr_{2}O_{7} \end{array} \xrightarrow{HCOOH} \\ from ic acid \end{array}$ 

#### **23.** 2

 $\begin{array}{l} \text{Homologous series} \\ \text{C}_{2}\text{H}_{6}\text{O} \ , \ \text{C}_{3}\text{H}_{8}\text{O} \ , \ \text{C}_{4}\text{H}_{10}\text{O} \end{array}$ 

# **24.** 3

 $X = Ge \ and \ Y = Sb$ 

# 25. 1 $Cu(s) + 4HNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + 2NO_2(g) + 2H_2O(1)$

# **26.** 4

 $Ca(HCO_3)_2$ No of atoms in its mole =  $11 \times N_A$ 

=  $11 \times 6.022 \times 10^{23}$  atom

C<sup>14</sup> is used in carbon dating method

## **28.** 4

Cells in the root of onion show formation of cell plate exactly along the midline of the cell, completing cytokinesis. Plant cells perform cytokinesis by cell plate formation whereas animal cells perform cytokinesis by cleavage method.

# **29.** 3

One haploid egg cell and two haploid polar nuclei are found in the embryo – sac of angiospermic flower before fertilization.

# **30.** 3

As per wildlife protection Act 1972, Clause 49A trading of rare animals has been completely banned.

## **31.** 2

'Moloi' Jungle is situated in Assam state

#### 32. 2 B denotes Pelvic fin

## 33.

1

Octopus is most clever animal among all non-chordates. It can change its colour.

## **34.** 4

Rifamycin, which is obtained from gram-positive bacterium *Amycolatopsis mediterranei* is effective against tuberculosis.

#### **35.** 4

Bacillus and Streptomyces

## **36.** 1

Rohu and Catla are used for freshwater fishery

# **37.** 3

Consumption of tobacco products lead to cancer of the lungs in human beings

#### **38.** 4

Increasing awareness about disaster management among the general Public throgh training programmes, mass media etc.

#### **39.** 2

Pneumonia disease is caused by bacteria - Streptococcus pneumonic

#### **40.** 3

Abscisic acid is a growth retarding hormone. It acts as general plants growth inhabitor by slowing down plant growth.

#### **41.** 3

Annales school gave a new direction to history writing. It was recognised now that history is not only about the political events, kings, great leaders and accordingly politics, diplomacy and wars but also about the climate, local people, agriculture, trade, technology, means of communication, social divisions and their collective psychology, etc. in the historical times.

## 42.

1

The French historian of the twentieth century, Michel Foucault brought forth a new concept in historiography. He, in his book, 'Archaeology of Knowledge', argued that the prevailing practice of arranging historical events in a chronological order is not right.

#### **43.** 2

Ishwardas Nagar, Bhimsen Saxena, Khafi Khan and Niccolao Manucci were among the historians of Aurangzeb's times whose accounts are important sources of Mughal history.

**44.** 3

The Maratha style was influenced by the Rajput and European styles of painting.

45.

The Ambreshwar temple at Ambarnath near Mumbai, Gondeshwar temple at Sinnar near Nashik, Aundha Nagnath temple in the Hingoli district are a few finest examples of the Hemadpanti style.

46.

2

Kesari began to publish articles about the nationwide situations, books in the native languages and the politics in England.

## **47.** 3

'Pragati', now a defunct journal, was started (1929) and edited by Tryambak Shankar Shejwalkar.

#### **48.** 2

Patan at Gujarat- Rani ka Vav, Hampi- Group of Monuments, Chandigarh- The Capital Complex, West Bengal-Chhau Dance

#### **49.** 4

Bal Shivaji, the movie made by Prabhakar Pendhakar, Dinakar D. Patil made a movie entitled, *Dhanya te Santaji Dhanaji*, Bhalaji Pendharkar made a movie entitled *Bajirao Mastani*, Baburao Painter also created historical movies like *Kalyancha Khajina*, *Bajiprabhu Deshapande* and *Netaji Palkar*.

#### 50.

1

3

In 1970-1971, the State also started 'Rural Water Supply Scheme' for sinking wells and providing piped water.

#### 51.

The ancient Indian literature and epics mention various games such as games of dice (*dyut*), wrestling, Horse and Chariot races and chess.

#### **52.** 1

Kathasaritsagara has very interesting descriptions of games and toys. There are descriptions of flying dolls.

**53.** 2

#### 54.

2

4

2

In 1956, the Department of Atomic Energy set up 'Apsara', a nuclear reactor functioning on atomic energy.

#### 55.

First Five Year Plan consisted of measures to lay the foundations of planned economic development.

## 56.

The renowned author-poet Vishnu Waman Shirwadkar, also known as Kusumagraj wrote *Natasamrat*, a play styled after Shakespeare's well known play, 'King Lear'.

# **57.** 4

The basic structure of the constitution generally includes following provisions.

- 1. Republican and democratic form of government
- 2. Federal structure of the Constitution.
- 3. Promotion of unity and integrity of the nation
- 4. Sovereignty of the nation
- 5. Secularism and supremacy of the constitution

#### **58.** 4

After the Green Revolution, the farmers movement became more active and effective

# 59.

3

- Art 51 of the Indian Constitution:
- 1. Promote international peace and security.
- 2. Maintain just and honourable relations between nations.
- 3. Foster respect for international law and treaty obligations in the dealings of organised people with one another.
- 4. Encourage settlement of international disputes by arbitration.
- **60.** 2

The candidate distributes items of household use and To appeal on the basis of caste and religion to get support are the two conditions that is violation of Code of Conduct.

- **61.** 3
  - Dr. Rajendrasinh Rana also known as 'Waterman of India' has brought Water revolution in Rajasthan

**62.** 1

#### **63.** 2

Mahatma Gandhi, Vinoba Bhave and Jayprakash Narayan put forth the idea of partyless democracy.

## 64.

1

Many countries in the world have made efforts to increase representation of women. From this perspective, changes are taking place in India as well. The 73rd and 74<sup>th</sup> amendment reserved 33% of seats for women in local self-governing institutions.

**65.** 3



#### 66.

1

1

Increase in life expectancy is an indicator of development of that society

```
67. 2
```

## 68.

The Jaisalmer in Western Rajasthan is driest part of India. It receives less than 120mm of rainfall annually.

# **69.** 2

- 1. Brazil with a population of around 19 crores, according to Census 2010, it ranks 5th in the world . It is also the fifth in the world with respect to area.
- 2. The density of population is around 23 persons per sq.km.
- 3. India's population is around 121 crores according to Census 2011
- 4. India's average population density is 382 persons per sq.km. as per 2011 Census.

#### **70.** 3

As compared to Brazil, India has a denser network of transport. About 85 per cent of passenger and 70 per cent of freight traffic are carried by roads every year

#### **71.** 2

In West direction Brazil has no sea coast.

#### 72.

1

1

Pantanal- Anacondas, Looks like lion- Golden Tamrin, Fish Variety- Pink Dolphins, Huge bird Size- Condors

# 73.

Brazil major trading partners are Germany, USA, Canada, Italy, Argentina and Saudi Arabia and India

#### **74.** 3

Ecotourism is developing at a faster rate in Brazil.

#### 75.

Shiwalik, Lower Himalaya and Himadri are mountian ranges from Southern Himalyan ranges to Northern Himalayan Ranges

## 76.

2

India is located in Northern and Eastern Hemisphere

The logo is of OPEC- Organisation of Petroleum Exporting Countries

# **78.** 3

Goa is the most urbanized state of India

# **79.** 4

Ganga tributary is Yamuna, Sindhu tribitary is Satluj, Krishna tributary is Tungabhadra and Bhima.

#### 80.

4

L Waves are produced directly on the surface.



# **81.** 4

Let the number of Rs. 1 coins = x Rs. 2 coins = y x + y = 50 ...(i) x + 2y = 75 ...(ii) From (i) and (ii), y = 25, x = 25

# **82.** 2

 $\begin{aligned} x^2 - bx + 6 &= 0, & \text{Roots are } \alpha, \beta_1 \\ x^2 - 6x + c &= 0, & \text{Roots are } \alpha, \beta_2 \\ \text{Roots} \\ \beta_1 &= 3k, & \beta_2 &= 4k \\ 3\alpha k &= 6 \Rightarrow \alpha k &= 2 \\ 4\alpha k &= c \Rightarrow \alpha k &= \frac{c}{4} \\ &\Rightarrow c &= 8 \\ \therefore b &= 5 \qquad [\alpha &= +2] \end{aligned}$ 

# **83.** 4

Assume speed of stream = xkm/hr Downstream time =  $\frac{d}{x+6}$ Upstream time =  $\frac{d}{6-x}$   $\frac{2d}{x+6} = \frac{d}{6-x} \Rightarrow 6 = 3x$ x = 2

# 84.

1

$$\begin{array}{ll} a_3+a_8=7 & \Rightarrow a+2d+a+7d=7 \\ & \Rightarrow 2a+9d=7 & \dots(i) \end{array}$$
 Also,  
$$a_7+a_{14}=-3 & \\ 2a+19d=-3 & \dots(ii) \end{array}$$
 From (ii) and (i),

$$10d = -10d = -1a = \frac{7+9}{2} = 8∴ a10 = a + 9d = 8 - 9 = -1$$

Let Blue balls = x Total balls = x+5 P(B) = 2 · P(R)  $\frac{x}{x+5} = \frac{2.5}{x+5}$ x = 10 Total = 15

# 86.

2

 $\begin{array}{rll} 2^n+1 &=& 2^n+1^n=\;(2+n)\big(2^{n-1}+2^{n-2}+\ldots +1\big)\\ &=& 3K\\ \text{Divisible by }3\end{array}$ 

# 87.

2  

$$a = 1; d = 3$$
  
 $S_n = \frac{n}{2}(2a + (n-1)d)$   
 $2380 = \frac{n}{2}[2 \times 1 + (n-1)3]$   
 $4760 = 2n + 3n^2 - 3n$   
 $4760 = 3n^2 - n$   
 $3n^3 - n - 4760 = 0$   
 $n = 40$   
 $a_{40} = 1 + (40 - 1)3 = 1 + 117 = 118$ 

# **88.** 3

In leap year Remaining days = {SM, MT, TW, W, ThF FSa, SaS} n(S) = 7Probability of 53<sup>rd</sup> Sunday =  $\frac{2}{7}$ 

# **89.** 3

$$\frac{N}{2} = \frac{250}{2} = 125$$
  
Median 
$$= L + \left(\frac{N}{2} - cf}{f}\right) \times h$$
$$= 220 + \left[\frac{125 - 100}{80}\right] \times 10$$
$$= 220 + 3.125$$
$$= 223.125$$

# **90.** 3

$$(a+b)^2 = 4 \times 3 = 12$$
  
 $a^2 + b^2 = 12 - 2ab = 12 - 6 = 6$   
 $(a^2 + b^2) = 6^2$   
 $a^4 + b^4 + 2a^2b^2 = 36$   
 $a^4 + b^4 = 36 - 2 \times 9 = 36 - 18 = 18$ 

$$\frac{QN}{QM} = \frac{5.3}{3.2} \qquad ...[By BPT]$$
$$\frac{QR}{NP} = \frac{3.2}{5.3 + 3.2}$$
$$NP = \frac{6.4 \times 8.5}{3.2} = 17$$

 $(x+2)^{2} + (y-5)^{2} = (x-6)^{2} + (y+1)^{2}$  $\Rightarrow 16x - 12y = 37 - 29 \Rightarrow 4x - 3y = 2$ 

**93.** 3

Only (1) and (2) Sum of any two sides triangle is always greater than its third side.

**94.** 2

$$y = 13\sqrt{6} m$$
  

$$x^{2} = (13\sqrt{6})^{2} \times 2$$
  

$$x = 13\sqrt{6} \cdot \sqrt{2}$$
  

$$x + y = 13\sqrt{2} + 13\sqrt{6}$$
  

$$= 13\sqrt{3}(\sqrt{2} + 2)$$

\***95.** 4

By angle bisector theorem

$$\frac{x}{2x + \frac{5}{3}} = \frac{x - \frac{3}{5}}{2x + \frac{3}{2}}$$
$$\frac{3}{2}x + \frac{6}{5}x - \frac{5}{3}x = -1$$
$$x = \frac{-30}{31}$$

Sides cannot be negative. Bonus marks should be there.

**96.** 1

$$AD = \sqrt{17^2 - 8^2}$$

$$AD = 15$$

$$AG = \frac{2}{3} \times 15 = 10 \text{ cm}$$

$$3$$

$$(\sin\theta + \cos\theta)^2 = \frac{9}{4}$$

 $2\sin\theta\cos\theta = \frac{5}{4}$  $\sin\theta\cos\theta = \frac{5}{8}$ 

98.

2

97.

$$AP = \sqrt{169 + 9} = \sqrt{178}$$
$$AM = \sqrt{178 - 25} = \sqrt{153}$$

**99.** 4

$$\frac{BN}{AM} = \frac{BC}{AC} \quad \dots \left[ \Delta BNC \sim \Delta AMC \right]$$
$$BN = \frac{8\sqrt{3} \times 7}{14\sqrt{3}} = 4$$

Area of shaded region =  $(7\sqrt{3})^2 - \frac{1}{4} \times \frac{22}{7} \times (7\sqrt{3})^2$ = 49×-115.5 = 31.5cm<sup>2</sup>