## MAHARAJA RANJIT SINGH AFPI – 2013

## \*\*\* MATHEMATICS \*\*\*

- **Q.1** The value of y which satisfies  $\frac{x}{a} = \frac{y}{b}$  and ax + by = $a^2 + b^2$ , is:
- (1) b

(3) a

- **Q.2** If  $x = 1 \sqrt{2}$ , then the value of  $x \frac{1}{x}$  will be
- (1)2

(3) 3

- (4)  $3\sqrt{2}$
- Q.3 If the diameter of a protractor is 17, then its perimeter
- $(1)\frac{306}{7}$
- $(3)\frac{392}{7}$
- $(4)\ 300$
- Q.4 The value of  $\left(\sqrt[6]{27} \sqrt{6\frac{3}{4}}\right)^2$  is:  $(1)\frac{3}{4}$   $(2)\frac{3}{2}$   $(3)\frac{\sqrt{3}}{4}$   $(4)\frac{\sqrt{3}}{2}$

- **Q.5** Write whether  $\frac{2\sqrt{45} + 3\sqrt{20}}{2\sqrt{5}}$  on simplification gives:
- (1) None of these
- (2) Two decimal places
- (3) Three decimal place (4) Four decimal places
- Q.6 What is the distance between the points (acos25°, 0) and  $(0, a\cos 65^{\circ})$ ?
- (1) 2a
- (2) a
- (3) 3a
- (4) 5a
- **Q.7** If  $\frac{37}{13} = 2 + \frac{1}{x + \frac{1}{y + \frac{1}{z}}}$ , where x, y & z are natural
- numbers. Then value of x, y and z?
- (1) 3, 7, 1
- (2) 1, 5, 2
- (3) 3, 7, 5
- (4) 2, 7, 5
- **Q.8** The diameter of the driving wheel of a bus is 140 cm. How many revolutions per minute must the wheel make in order to keep a speed of 66 km per hour?
- (1) 200
- (2)250
- (3)210
- (4) 240
- **Q.9** Solve the following equation
- $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1, \frac{x}{a}\sin\theta \frac{y}{b}\cos\theta = 1$ (1)  $x^2 + y^2 = a^2 + b^2$  (2)  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2$ (3)  $a^2x^2 + b^2y^2 = 1$  (4)  $x^2 y^2 = a^2 b^2$

- Q.10 Study the following carefully
- N5@D2K%1PMA9F7E1@W3\$16#USTH4\*J

How many such numbers are there in the above arrangement each of which is immediately preceding by a consonant and immediately followed by a symbol?

- (1) None
- (2) Three
- (3) Two
- (4) One
- Q.11 Without actually calculating the cubes, find the value of  $55^3 - 25^3 - 30^3$ .
- (1) 12340
- (2) 124750
- (3) 123750
- (4) 12345
- Q.12 If the width of the rectangle is increased by 25% while the length remains constant, the resulting area is what percentage of original area?
- (1) 35%
- (2)65%
- (3) 125%
- (4) 175%
- Q.13 Sachin rent a car for 'd' days. He pays Rs. r/day for each of the first 7 days and half the rate for each additional day. Find the total charges if d > 7?

- (1) r + 2r(d 7) (2) r + r(d 7)(3)  $7r + \frac{r}{2}(d 7)$  (4) 7r r(d 7)
- Q.14 How many times between 3 and 6 o'clock will the hands of a clock coincide?
- (1) 5 times
- (2) 2 times
- (3) 3 times
- (4) 4 times
- **Q.15** The distance between the points (0, 0) and  $(a \cos\theta +$  $b \sin\theta$ ,  $a \sin\theta - b \cos\theta$ ) is:
- $(1)\sqrt{a-b}$
- (2)  $\sqrt{a^2 b^2}$
- (3)  $\sqrt{a^2 + b^2}$
- (4) None of these
- Q.16 On what dates of December 1994 did Wednesday
- (1) 8<sup>th</sup>, 15<sup>th</sup>, 22<sup>nd</sup>, 29<sup>th</sup> (3) 6<sup>th</sup>, 13<sup>th</sup>, 20<sup>nd</sup>, 29<sup>th</sup> (4) 1<sup>st</sup>, 8<sup>th</sup>, 15<sup>th</sup>, 22<sup>nd</sup>

- **Q.17** If  $\alpha$ , s are the zeroes of  $p(x) = 2x^2 5x + 7$ , Write a polynomial with zeroes  $2\alpha + 3s$  and  $3\alpha + 2s$ .

- (1)  $k\left(x^2 + \frac{25}{2}x 41\right)$  (2)  $k\left(x^2 \frac{25}{2}x 47\right)$ (3)  $k\left(-x^2 \frac{25}{2}x 41\right)$  (4)  $k\left(x^2 \frac{25}{2}x + 41\right)$
- Q.18 If a right triangle has hypotenuse 'p' cm and one side of length 'q' cm. If p - q = 1, find the length of third side.
- (1)  $\sqrt{2p+1}$ (3)  $\sqrt{p+2}$

- Q.19 If 'A' is the area of a right angled triangle and 'b' is one of the sides containing the right angle, then the length of the altitude on the hypotenuse is:

- $(1) \frac{Ab}{\sqrt{b^4 + 4A^4}} \\ (3) \frac{2Ab}{\sqrt{b^4 + 2A^2}}$
- **Q.20** ABCD is a trapezium in which AB  $\parallel$  CD, AB = 15 cm, BC = 6 cm, CD = 7 cm and AD = 4 cm. Find  $2 \cos A$  $+3\cos B$ .

1	1 \	Λ
(.	I)	U

(2) 1

### (3) 2

(4) 4

**Q.21** Using the formula A = p + prt, find A, when p =500, r = 0.04 and  $t = \frac{5}{2}$ 

- (1)550
- (2)600
- (3)650
- (4)700

Q.22 If a number 'x' is selected at random from the numbers -3, -2, -1, 0, 1, 2, 3. What is the probability that  $x^2 < 4$ ?

 $(1)^{\frac{1}{7}}$ 

Q.23 Which set of the three letters can be added to the following to form the word?

- BL, REM, TAMAR, BEH, GR, K
- (1) OCK
- (2) AST
- (3) IND
- (4) UEF

Q.24 How many meaningful words can be formed by replacing only the consonants in the word 'BREAK' by the next letter in the English alphabet and keeping the vowels unchanged.

- (1) One
- (2) Four
- (3) Three
- (4) Two

Q.25 Sam walked 30 meters towards west, took a left turn and walked 20 meters. He again took a left turn and walked 30 meters. He then took a right turn and stopped. Towards which direction was he facing when he stopped?

- (1) South
- (2) North
- (3) East
- (4) None of these

Q.26 Pointing to a man in a photograph, Reeta said, "Her mother's only daughter is my mother". How is Reeta related to that man?

- (1) Niece
- (2) Grand-daughter
- (3) Wife
- (4) Sister

**Q.27** If the operation  $\odot$  is defined by  $x \odot y = \sqrt{xy}$  for all positive numbers x and y, then  $(5 \odot 45) \odot 60$  is equal to:

- (1) 30
- (2)45
- (3)60
- $(4)\ 30\sqrt{15}$

Q.28 A number is increased by 25% and then decreased by 20%, the result is what percent of original number?

- (1)75%
- (2) 100%
- (3) 11%
- (4) 125%

**Q.29** Find the value of A?

3	1	4
5	4	7
2	8	A
38	81	74
(2) (		

(1) 3

(2) 6

(3)9

(4)7

**Q.30** The equation  $\sqrt{x+1} - \sqrt{x-1} = \sqrt{4x-1}$  has

- (1) One solution
- (2) No solution
- (3) Two solutions
- (4) More than two solutions

**Q.31** Find the sum of n terms of the series:

$$(1) \frac{n+1}{2}$$

$$(2) \frac{n}{2}$$

$$(3) \frac{n-1}{2}$$

Q.32 Find the relation between a, b and c, such that one root of the quadratic equation  $ax^2 + bx + c = 0$  is double the other.

- $(1) 2a^2 = 9bc$
- (2)  $b^2 = 9ac$
- (3)  $2c^2 = 9ab$
- $(4) 2b^2 = 9ac$

Q.33 Find value of the expression  $\sec^2\theta - \frac{\sin^2\theta - 2\sin^4\theta}{2\cos^4\theta - \cos^2\theta}$ 

- (1)  $sec^2\theta$
- (3)  $\cos^2\theta$
- (4) 0

**Q.34** In  $\triangle$  ABC, BC = 6 cm, AB = 8 cm, angle ABC  $=90^{\circ}$ . The radius of the in-circle of triangle is:

- (1) 1 cm
- (2) 2 cm
- (3) 3 cm
- (4) 4 cm

 $\mathbf{Q.35} \; \pi \; \text{is}$ 

- (1) Ratio of circum-circle and radius
- (2) Ratio of circumference and diameter
- (3) Ratio of area and diameter
- (4) Ratio of area and radius

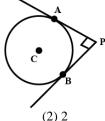
**Q.36** Which one of the following options is true:

- (1) All rectangles are squares.
- (2) All rhombuses are parallelograms.
- (3) All squares are not parallelograms.
- (4) All kites are rhombuses.

O.37 If the H.C.F of 200 and 50 can be expressed in the form  $200 \times 50 + 50Z$ , then find Z.

- (1) 200
- (2) 199
- (3) 199
- (4) 210

Q.38 If two perpendicular tangents are drawn from one external point to a circle of radius 3 cm, angle  $P = 90^{\circ}$ then find the length of tangents.



(1) 1(3)3 (4) 4

**Q.39** If n is a natural number then  $9^{2n} - 4^{2n}$  is always divisible by:

(1) 5

- (2) 13
- (3) Both 5 and 13
- (4) None of these

**Q.40** If the product of zeros of the polynomial P(x) = $ax^3 - 6x^2 + 11x - 6$  is 4, then a = ?

 $(1)\frac{2}{3} \\ (3)\frac{3}{2}$ 

**Q.41** The value of K, for which the system of equations x +2y - 3 = 0 and 5x + Ky + 7 = 0 has no solution.

(1) 3

(2) 6

 $(3)\ 10$ 

(4) 1

Q.42 If A, B, C are the interior of a triangle ABC, Prove that  $\tan \frac{B+C}{2} = ?$ (1)  $\sin \left(\frac{A}{2}\right)$ 

(3)  $\cot\left(\frac{\tilde{A}}{2}\right)$ 

(2)  $\tan\left(\frac{A}{2}\right)$ (4)  $\cos\left(\frac{A}{2}\right)$ 

Q.43 The mean of 'n' observations is x. If the first observation is increased by 1, the second by 2 and third by 3 and so on, then the new mean is:

(1) x + (2n + 1)

(3) x + (x + 1)

**Q.44** If one root of the equation  $4x^2 - 2x + (\lambda - 4) = 0$ be the reciprocal of the other, then  $\lambda$  is:

(1) - 4

(2) - 8

(3) 4

(4) 8

Q.45 The first and last terms of an AP are 1 and 11. If the sum of its term is 36, then the number of term will be:

(1)5

(2) 8

(3)7

(4) 6

Q.46 If four numbers in AP are such that their sum is 50 and the greatest number is 4 times the least, then the numbers are:

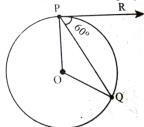
(1) None of these

(2) 4, 10, 16, 22

(3) 3, 7, 11, 15

(4) 5, 10, 15, 20

Q.47 In figure, if PR is tangent to the circle at P, O is the center and angle RPO =  $60^{\circ}$ . Find angle POO?



 $(1) 110^{\circ}$ 

 $(2) 100^{\circ}$ 

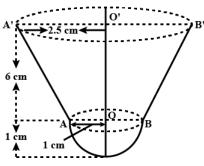
 $(3) 120^{\circ}$ 

 $(4) 90^{\circ}$ 

Q.48 From the well shuffled pack of cards find the probability of getting red clubs.

 $(1)\frac{3}{52}$   $(3)\frac{0}{52}$ 

**Q.49** The shuttle cock used for playing badminton has the shape of a frustum of a cone mounted on a hemisphere as shown in the figure. The external diameter of the frustum are 5 cm and 2 cm, the height of the entire shuttle cock is 7 cm, find its slant height.



(1) 6.2 cm

(2) 6.0 cm

(3) 6.18 cm

(4) 6.34 cm

**Q.50** If  $a\cos\theta - b\sin\theta = c$ ,  $a\sin\theta + b\cos\theta = A$ , find value of A.

 $(1) \pm \sqrt{a^2 + b^2 + c^2}$ 

 $(2) \pm \sqrt{a^2 - b^2 - c^2}$ 

 $(3) \pm \sqrt{a^2 + b^2 - c^2}$ 

(4) None of these

### \*\*\* ENGLISH \*\*\*

**Q.51** Choose the word closet in meaning for **INEBRIATED** 

(1) Inexperienced

(2) Tired

(3) Befuddled

(4) Intoxicated

**Q.52** Choose the word closet in meaning for HEINOUS

(1) Unlawful

(2) Extremely wicked

(3) Punishable

(4) Uncountable

Q.53 Choose the word closet in meaning for DELINEATE

(1) Expand

(2) Portray

(3) Explain

(4) Review

**O.54** Choose the word farthest in meaning for **ADMONITION** 

(1) Warning

(2) Threat

(3) Fear

(4) Request

Q.55 Choose the word farthest in meaning for **TURBULENT** 

(1) Boiling

(2) Tranquil

(3) Disturbing

(4) Comfortable

**Q.56** Choose the word farthest in meaning for FLEDGLING

(1) Young

(2) Expert

(3) Fleeing

(4) Internal

**Q.57** Choose the misspelt word.

(1) Episodic

(2) Gaiety

(3) Harbingar

(4) Intellectual

Q.58 Choose the misspel		(3) Intelligence	(4) Awareness
<ul><li>(1) Soulfull</li><li>(3) Contemporary</li></ul>	(2) Melodic		
(3) Contemporary	(4) Applause	<b>Q.70</b> Complete the sentence using a suitable choice. Fan is related to the air in the same way as stove is related	
Q.59 Choose the misspel	t word.	to	•
(1) Cosmonaut	(2) Heightened	(1) Cook	(2) Kerosene
<ul><li>(1) Cosmonaut</li><li>(3) Peperred</li></ul>	(4) Catapult	(3) Heat	(4) Boil
Q.60 Choose the most su	itable word.	<b>Q.71</b> Complete the sen	ntence using a suitable choice.
A person who hates mank	kind	Storey is related to bu	ailding in the same way as rung is
(1) Iconoclast	(2) Misanthrope	related to	
(3) Miser		(1) Ladder	(2) Floor
	\	(3) Elevator	
Q.61 Choose the most su	itable word.	, ,	. , .
Talking disrespectfully of		<b>Q.72</b> Complete the s	entence using the correct phrasal
		verb.	2
<ul><li>(1) Blasphemy</li><li>(3) Atheism</li></ul>	(4) Apostasy		the interview as his application had
	(1) Tipostasy	been	the merview as ms appreation had
Q.62 Choose the most sur	itable word.	(1) turned out	(2) turned down
Fear of being enclosed in		(3) turned off	(4) turned away
(1) Agoraphobia		(3) turned off	(1) turned away
(3) Xenophobia	(1) Paranoia	O 73 Complete the s	entence using the correct phrasal
(3) Achophobia	( <del>4)</del> 1 aranota	verb.	entence using the correct phrasar
Q.63 Choose the most ap	propriete word		the difference between the
	tunnels and trenches provided	two sisters.	the difference between the
			(2) 1 : :
shelter during the bombar	dments.	(1) brings about	(2) brings in
<ul><li>(1) Seville</li><li>(3) Sedentary</li></ul>	(2) Senile	(3) brings up	(4) brings out
(3) Sedentary	(4) Serpentine		
			entence using the correct phrasal
<b>Q.64</b> Choose the most ap		verb.	
	ing put us in a mood.		ons, it did not rain at all during
(1) Remniscent		October this year.	
(3) Reminiscent	(4) Reminicent	(1) According to	
		(3) Contrary to	(4) Prior to
<b>Q.65</b> Choose the most ap	propriate word.		
Do women	leadership differently than men		tence using the correct connector.
do?		We would be inclined	d to welcome the policy changes,
(1) Undertake	(2) Impose		ade with careful deliberation.
(3) Exercise	(4) Authorize	(1) since	
` '	` '	(3) if	(4) then
Q.66 Choose the meaning	g of the idiom.	(- /	
To have eyes at the back		<b>O.76</b> Complete the sen	itence using the correct connector.
(1) Be double faced	(2) Have a pair of specs		by our thoughts, others
(3) Very wise	(4) Very alert	judge us by our actions	
(3) very wise	(i) very arere	(1) when	(2) because
Q.67 Choose the meaning	r of the idiom	(3) whereas	(4) lest
To give a wide berth to.	g of the idiom.	(3) whereas	( <del>+)</del> lest
(1) Publicity to	(2) Dublishy condomn	O 77 Complete the sen	stance using the correct connector
(3) Keep away from	(2) Publicly condemn		itence using the correct connector.
(5) Keep away Irom	(4) Not sympathies with		accommodation in that place is
0.69.61	6.4 1:	adequate o	
Q.68 Choose the meaning	g of the idiom.	(1) According to	(2) with
Talk a mile a minute.		(3) against	(4) for
(1) Talk a lot			
(2) Chatter continuously	& quickly	Q.78 Choose the option	on which completes the meaning of
(3) Talk nonsense		the sentence.	
(4) Chatter anyway		The white walls creat	the the that the room is
		very large.	
Q.69 Complete the senter	nce using a suitable choice.	(1) illusion	(2) allusion
	wealth in the same way as genius	(3) elusion	(4) exclusion
is related to	, ,		
(1) Capability	(2) Smartness		

**Q.79** Choose the option which completes the meaning of the sentence.

He predicted the earthquake was \_\_\_\_\_.

(1) eminent (2) imminent (3) prominent (4) pertinent

**Q.80** Choose the option which completes the meaning of the sentence.

Do you have \_\_\_\_\_\_ to the library?
(1) access (2) excess
(3) axis (4) permit

**Q.81** The following sentence is divided into four parts (1, 2, 3, 4) one of which might contain an error. Spot the error and mark that part of sentence as answer.

In order to (1)/ conserve valuable petrol, motorists had aught (2)/ check their speedometers while (3)/ driving along the highway (4).

**Q.82** The following sentence is divided into four parts (1, 2, 3, 4) one of which might contain an error. Spot the error and mark that part of sentence as answer.

There have been little (1)/ change in the patient's condition since (2)/ he was moved (3)/ to the intensive care unit (4).

**Q.83** The following sentence is divided into four parts (1, 2, 3, 4) one of which might contain an error. Spot the error and mark that part of sentence as answer.

He told the members (1)/ of the staff that (2)/ each one should carry out (3)/ his task oneself (4).

**Q.84** The following sentence is divided into four parts (1, 2, 3, 4) one of which might contain an error. Spot the error and mark that part of sentence as answer.

He laid (1)/ for an hour (2)/ in an unconscious state until (3)/ a police man picked him up (4).



CONTACT AT +91-9041536379 FOR MAHARAJA RANJIT SINGH ACADEMY'S AFPI ENTRANCE EXAM PREPARATION

RECOMMENDED CADET PARAS DWIVEDI





UNDER THE GUIDANCE OF PRABHJOT SIR & TEAM

# Read the passage and answer the questions 85 to 89 that follow.

The first and decisive step in the expansion of Europe overseas was the conquest of the Atlantic Ocean. That the nation to achieve this should be Portugal was the logical outcome of her geographical position and her history. Placed on the extreme margin of the old classical Mediterranean world and facing the untraversed ocean, Portugal could adapt and develop the knowledge and experience of the past to meet the challenge of the unknown. From the seamen of Genoa and Venice, they had learned the organization and conduct of a mercantile marine and from the share in Mediterranean commerce, at a time when her population was making heavy demands on her resources, Portugal turned southward and westwards for opportunities of trade and commerce. But ocean navigation was not the same as navigating the landlocked Mediterranean. The earliest of the band had neither the benefit of sailing direction nor traditional lore. Even the familiar heavenly constellation had been left behind. The challenge was formidable.

**Q.85** According to the passage, the most important step in the expansion of European power was

- (1) The emergence of Portugal as a power
- (2) The growth of Mediterranean commerce
- (3) The contact of Europeans with Jewish astronomers
- (4) The conquest of the Atlantic ocean

Q.86 The most important advantage that Portugal had, was its

- (1) Geographical location
- (2) Contact with the Arabs
- (3) Contact with Genoa and Venice
- (4) Cultural history

**Q.87** The Portuguese sailors were ready to explore the world by sea because they

- (1) Knew about many countries
- (2) Had rich patrons to finance them
- (3) Were prepared for the hazards of sea voyage
- (4) Were in touch with Seamen from Genoa and Venice

Q.88 Portugal was motivated to pioneer ocean navigation because

- (1) It was encouraged by other European powers
- (2) It faced strong rivals in land-bases trade
- (3) It collaborated with Venetian merchants
- (4) Its limited resources could not support its growing population

**Q.89** The earliest group of Portuguese navigators going across the Atlantic did not find the venture

- (1) Different from land-locked navigation
- (2) More difficult than coastal navigation
- (3) Easy and comfortable
- (4) Challenging and demanding

#### Read the passage and answer the questions 90 - 94 that follow.

One of the most mysterious, best preserved, least known and most remarkable archaeological spectacles in the world is the immense complex of geometrical symbols, giant ground-drawings of birds and animals and hundreds of long, ruler-straight lines, some right across mountains, which stretch over 1200 square miles of the table-lands of Nazca. It was first revealed to modern eyes in 1926 when three explores looked down on thw desert from a hillside at dusk and briefly saw a Nazca line highlighted by the low slanting rays of the sun. It was not until the Peruvian Air Force took aerial photographs in the 1940s that the full magnificence of the panorama was apparent. It was as if a dozen deserted airports were spread out across the plains. Hundreds of what looked like 'landing strip' for aircraft were revealed. Among the many abstract patterns were a giant spider, a monkey, a shark, reptiles and flowers, all drawn on the ground on a huge scale.

archaeological **Q.90** The 'remarkable spectacles' described in the passage are

- (1) Geometrical symbols
- (2) Huge ground drawings
- (3) Nazca table lands
- (4) Deserted airports

Q.91 The initial view of the spectacles was not clear because

- (1) It was seen from a hillside
- (2) It was seen from aircraft
- (3) It was seen in the evening
- (4) It was offset by rays of the sun

### **Q.92** The aerial photographs

- (1) Failed to reveal anything significant about the spectacle
- (2) Revealed a distorted view of the spectacle
- (3) Revealed as much as was all ready known about the
- (4) Revealed the full magnificence of the spectacle

Q.93 In the passage, the spectacle has been compared with

- (1) Out of use airports
- (2) Animals and flowers
- (3) Tablelands
- (4) Hills and mountains

**Q.94** The spectacle presented abstract images of

- (1) Human beings
- (2) Hills and mountains
- (3) Landing strips
- (4) Birds, animals and flowers

**Q.95** Complete the sentence using the correct modal We \_\_\_\_\_ finish the science project before the summer break.

(1) might (2) should (3) ought to (4) can

Q.96 Complete the sentence using the correct modal

The director	be in his room as his fan is on.
(1) will	(2) might
(3) must	(4) can

Q.97 Complete the sentence using the correct verb form I \_\_\_\_\_ you for the last ten years.

(1) know (2) was (3) have known (4) known

**Q.98** Complete the sentence using the correct verb form

By 4 'o' clock I \_\_\_\_\_ all my assignments. (2) will be written (1) had written (3) will be writing (4) would be writing

Q.99 In this sentence the underlined word is used in four different ways. Choose the option in which the usage of the word is incorrect or inappropriate.

### **ISSUE**

- (1) His article appeared in the August issue of the
- (2) The government issued a special stamp on World Health Day.
- (3) The problem came to a successful.
- (4) There were problems of property as he died without an issue.

Q.100 In this sentence the underlined word is used in four different ways. Choose the option in which the usage of the word is incorrect or inappropriate.

### SAVE

- (1) He is saving his strength for the heavy work he will have to do this afternoon.
- (2) Malti saved the little boy from drowning.
- (3) We know nothing about him save that he was in the army.
- (4) I have saved myself of the truth of the report.

