

SAMPLE PAPER



TALENT HUNT EXAM

2015

JUNIOR

(Class IX Studying Students)

Science, Mathematics & Mental Ability



Aakash

Medical | IIT-JEE | Foundations

(Divisions of Aakash Educational Services Pvt. Ltd.)

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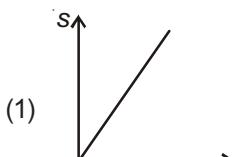
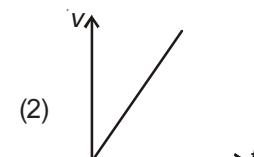
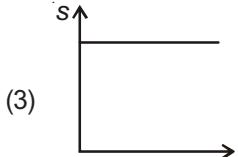
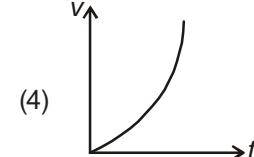
Aakash National Talent Hunt Exam 2015 (Junior)

(For IX Studying)

Time : 2 Hours

MM : 320

SECTION-A : SCIENCE

1. Action and reaction forces
 (1) Act in the same direction
 (2) Act on the same body
 (3) Never cancel each other
 (4) Act at different times
2. A ball when dropped, reaches the ground in 2 s. It was dropped from a height of [Take, $g = 10 \text{ m/s}^2$]
 (1) 10 m (2) 20 m
 (3) 15 m (4) 5 m
3. Which of the following measures the distance travelled by a uniformly accelerated body in time t ? [Symbols have their usual meaning]
 (1) $\frac{(v-u)t}{a}$ (2) $\left(\frac{v+u}{2}\right)t$
 (3) $\frac{2v}{a^2}$ (4) $2(v^2 - u^2)t$
4. A ball of mass 250 g, having initial speed v , moves along a straight path under the action of a constant net force of 8 N. If the ball has speed v after 2.5 s of its journey, then the value of v is
 (1) 20 m/s (2) 40 m/s
 (3) 15 m/s (4) Zero
5. A block of mass 2 kg moving horizontally with velocity 3 m/s hits a vertical wall. If the block comes to rest after hitting it, then the momentum transferred to the wall is
 (1) 2.5 kg m/s (2) 4.5 kg m/s
 (3) 9 kg m/s (4) 6 kg m/s
6. Which of the following graphs corresponds to uniformly accelerated motion? (Symbols have their usual meaning)
 (1) 
 (2) 
 (3) 
 (4) 
7. Which of the following can be best explained by Newton's third law?
 (1) A passenger falls backwards as a bus starts from rest
 (2) A driver bends to one side while driving on a curved road
 (3) A gun recoils when a bullet is fired
 (4) A heavy stone requires stronger push than a lighter one to start from rest
8. If a ball floats in liquid A but sinks in liquid B, then the correct order of their densities is
 (1) Density_A > Density_B > Density_{ball}
 (2) Density_A < Density_{ball} < Density_B
 (3) Density_A < Density_B < Density_{ball}
 (4) Density_A > Density_{ball} > Density_B

Space for Rough Work

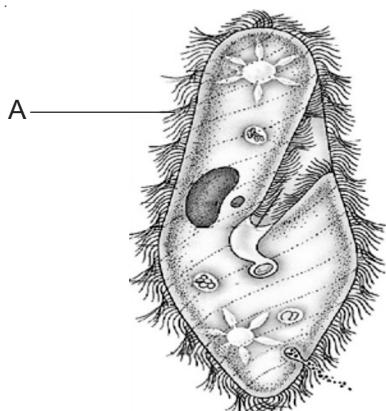
9. A body starts from rest with a uniform acceleration of 1 m/s^2 . The average velocity in the interval of $t = 3 \text{ s}$ to $t = 5 \text{ s}$ is
 (1) 4 m/s (2) 1 m/s
 (3) 0.4 m/s (4) 4 cm/s
10. Which of the following cannot be measured in the same unit as the others?
 (1) Force
 (2) Weight
 (3) Change in momentum per second
 (4) Work done per second
11. Relative densities of two objects *A* and *B* are 7 and 3.5 respectively. The densities of *A* and *B* are in ratio
 (1) $\frac{4}{7}$ (2) $\frac{2}{3}$
 (3) $\frac{2}{1}$ (4) $\frac{1}{2}$
12. Which of the following is true for the values of *G* and *g* on the surface of moon and earth?
 (1) *G* remains the same but *g* changes
 (2) *g* remains the same but *G* changes
 (3) Both *G* and *g* remain same
 (4) Both *G* and *g* changes
13. On addition of salt, if the boiling point of water increases by 10°C , then the boiling point of the resulting solution will become
 (1) 373 K (2) 283 K
 (3) 383 K (4) 110 K
14. Which of the following statements is incorrect regarding evaporation?
 a. Evaporation takes place above the boiling point of the liquid
 b. Rate of evaporation of water is less on a rainy day as compared to a hot day
- c. Evaporation takes place only at the surface of the liquid
 d. Water droplets appear on the outer surface of a glass containing cold water due to evaporation
 (1) Both b & c
 (2) Both b & d
 (3) Both a & c
 (4) Both a & d
15. The compressibility of *Z* is less than that of *Y* and higher than that of *X*. If *X*, *Y* and *Z* are the different states of the same substance, then the kinetic energy in the increasing order will be
 (1) $Y > Z > X$ (2) $Z < Y < X$
 (3) $Y < Z < X$ (4) $X < Z < Y$
16. Find the incorrect match.
- | Mixtures | Separation techniques |
|------------------------|-------------------------|
| (1) Blood | Centrifugation |
| (2) Dye | Chromatography |
| (3) Air | Fractional distillation |
| (4) Petroleum products | Distillation |
17. Which of the following is a homogeneous solution?
 (1) Milk
 (2) Blood
 (3) Tincture of iodine
 (4) Starch solutions
18. If one third of 100 g of 27% aqueous sugar solution is taken in a beaker and 10 g of sugar is added to it, the concentration of the resulting solution will be
 (1) 48.34% (2) 44.38%
 (3) 34.84% (4) 43.84%

Space for Rough Work

19. Which of the following techniques is used to separate a mixture of two miscible liquids having difference of more than 25 K in their boiling points?
- By using separating funnel
 - Evaporation
 - Crystallisation
 - Distillation
20. The ratio by mass of carbon to oxygen in carbon dioxide is
- 8 : 3
 - 3 : 8
 - 4 : 3
 - 3 : 4
21. Which of the following has the highest number of moles?
- 46 g of H_2O
 - 83 g of O_2
 - 18 g of H_2
 - 112 g of N_2
22. The chemical formula of aluminium phosphate is
- $Al_2(PO_4)_3$
 - $Al_3(PO_4)_2$
 - $Al(PO_4)_3$
 - $AlPO_4$
23. The total number of moles of oxygen molecules present in 9.6 g of oxygen gas is
- 0.2
 - 0.3
 - 0.8
 - 1.2
24. Dry ice \xrightleftharpoons{X} carbon dioxide gas
The process 'X' is
- Sublimation
 - Fusion
 - Evaporation
 - Boiling
25. Nuts like walnut and almond are enclosed in a hard covering made up of
- Sclerenchyma
 - Collenchyma
 - Aerenchyma
 - Parenchyma
26. Which of the following is known as "Suicide bag" of a cell?
- Nucleus
 - Lysosome
 - Plastid
 - Ribosome
27. Which of the following are common to both animal cells and plant cells?
- Cell wall
 - Cell membrane
 - Ribosome
 - Chloroplast
 - Mitochondria
- (i), (iii) & (iv)
 - (iii), (iv) & (v)
 - (i), (ii) & (iii)
 - (ii), (iii) & (v)
28. Which of the following organisms does not belong to the class pisces?
- Flying fish
 - Mandarin fish
 - Star fish
 - Climbing perch
29. The tissue present around blood vessels and nerves is
- Areolar connective tissue
 - Tendon
 - Ligament
 - Cartilage
30. *Echinus* and *Holothuria* are placed in the phylum
- Porifera
 - Mollusca
 - Echinodermata
 - Annelida
31. The non-living element of the complex permanent tissue in higher plants that transports food is
- Vessels
 - Xylem fibre
 - Phloem parenchyma
 - Phloem fibre
32. How many organism(s) given in the box has/have three chambered heart?
- Frog, Turtle, White stork, *Draco*, *Hydra*
- One
 - Two
 - Four
 - Three

Space for Rough Work

33.



In the diagram, the function of the part labelled as 'A' is to help in

- (1) Digestion of food (2) Locomotion
 (3) Respiration (4) Excretion

34. The outermost rigid covering of plant cell is made up of

- (1) Chitin (2) Cellulose
 (3) Starch (4) Phospholipids

35. Aerenchyma is essential for aquatic plants because

- (1) It provides buoyancy to the plants to help them float
 (2) It performs photosynthesis
 (3) It is dead and provides support and strength to plants
 (4) It provides flexibility to the plants

36. Which of the following groups of organisms possess the following features?

- a. Cold blooded
 b. Scales on body
 c. Breathe through lungs
 (1) Sparrow, white stork, pigeon and ostrich
 (2) Dog fish, lion fish, angler fish and mandarin fish
 (3) Toad, salamander, tree frog and common frog
 (4) Flying lizard, cobra, turtle and chameleon

SECTION-B : MATHEMATICS

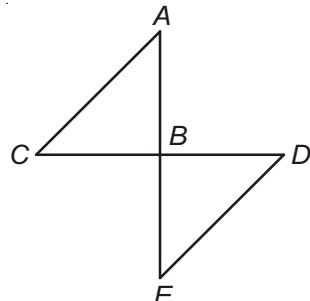
37. If n is a natural number, then which of the following is not always divisible by 2?

- (1) $n^2 - n$
 (2) $n^3 - n$
 (3) $n^2 - 1$
 (4) $n^3 - n^2$

38. If $b + c = -1$ and $bc = -6$, then $b^3 + c^3$ is equal to

- (1) -19 (2) -18
 (3) -21 (4) 19

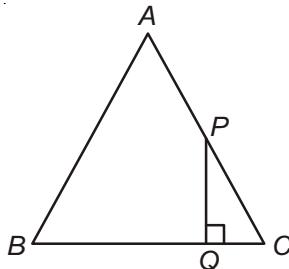
39. In the given figure, if $AB = BD$ and $BC = BE$, then



- (1) $\triangle ABC \cong \triangle EBD$ (2) $\triangle ABC \cong \triangle BED$
 (3) $\triangle ACB \cong \triangle DEB$ (4) $\triangle ACB \cong \triangle EDB$

Space for Rough Work

40. In the given figure, ABC is an equilateral triangle having area ' a '. P is the mid-point of AC from which a perpendicular PQ is drawn on BC . If $\text{ar}(PQC) = b$, then $\frac{b}{a}$ is equal to

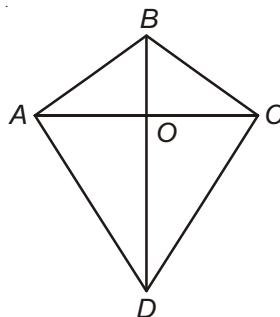


- (1) $\frac{1}{2}$ (2) $\frac{1}{4}$
 (3) $\frac{1}{6}$ (4) $\frac{1}{8}$

41. If $x = 3^{\frac{1}{3}} + 3^{-\frac{1}{3}}$, then $3x^3 - 9x$ equal to

- (1) 9 (2) $3^{\frac{1}{3}} + 3^{-\frac{1}{3}}$
 (3) 10 (4) 0

42. In the given figure, $ABCD$ is a kite with $AD > AB$. If O is the point of intersection of diagonals AC and BD and $OB = OC = \frac{OD}{2} = 2$ cm, then $\text{ar}(ABCD)$ equals



- (1) 6 cm^2 (2) 24 cm^2
 (3) 16 cm^2 (4) 12 cm^2

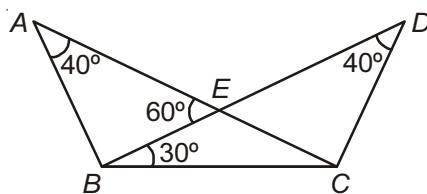
43. If $\left(\frac{x}{y}\right)^4 + \left(\frac{y}{x}\right)^4 = 47$, where x and y are positive real numbers, then $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}}$ is equal to

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

44. If $k^{-1} = \sqrt{x+2} - \sqrt{x+1}$, then k is equal to

- (1) $2x+3-2\sqrt{(x+1)(x+2)}$
 (2) $2x+3+2\sqrt{(x+1)(x+2)}$
 (3) $\sqrt{2x+3}$
 (4) $\sqrt{x+2}+\sqrt{x+1}$

45. In the given figure, by which congruence rule is $\triangle ABC \cong \triangle DCB$?



- (1) RHS (2) SAS
 (3) SSS (4) AAS

46. Which of the following is not true?

- (1) Every rhombus is a kite
 (2) Every rectangle is a parallelogram
 (3) Every square is a rectangle
 (4) Every trapezium is a parallelogram

Space for Rough Work

47. $x^3 - y^3$ is equal to

- (1) $(x + y)(x^2 + y^2 + xy)$
- (2) $(x - y)(x^2 + y^2 - xy)$
- (3) $\left(\frac{3}{x^2} - \frac{3}{y^2}\right)^2$
- (4) $\left(\frac{3}{x^2} + \frac{3}{y^2}\right)\left(\frac{3}{x^2} - \frac{3}{y^2}\right)$

48. Which of the following statements is incorrect?

- (1) A median of a triangle divides it into two triangles of equal areas
- (2) Area of a triangle is double the product of its base and one-fourth of the corresponding altitude
- (3) Triangles on the same base and between the same parallels are congruent to each other
- (4) Two congruent triangles have equal areas but the converse may not be true

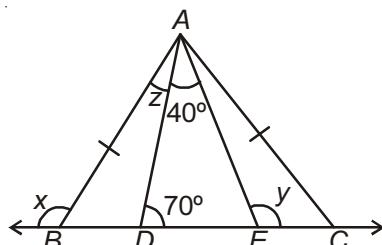
49. If $x = 0.\overline{1234}$, $y = 0.1\overline{234}$ and $z = 0.12\overline{34}$, then which of the following is correct?

- (1) $x > y > z$
- (2) $y < z$
- (3) $z > x$
- (4) $x > z > y$

50. Cube root of $x^3 + 3x^2 + 3x + 1$ is equal to

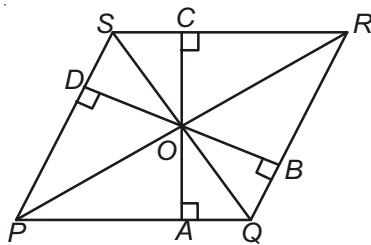
- (1) $x - 3$
- (2) $x - 1$
- (3) $-x + 1$
- (4) $x + 1$

51. In the given figure, if $AB = AC$, then the relation between x , y and z is



- (1) $z = y + x$
- (2) $y = z + x$
- (3) $x = y + z$
- (4) $z = 2x - y$

52. In the given figure, if $PQRS$ is a parallelogram, then $ABCD$ must be a



- (1) Parallelogram
- (2) Rhombus
- (3) Rectangle
- (4) Square

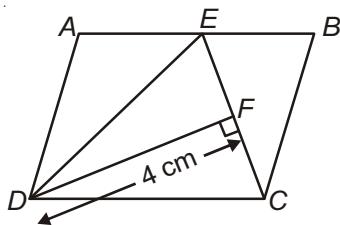
53. If $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$, where a , b and c are non-zero real

numbers, then $\frac{a^2 + b^2 + c^2 - ab - bc - ca}{(a+b+c)^2}$ is equal

- to
- (1) 2
 - (2) -2
 - (3) 1
 - (4) -1

Space for Rough Work

54. In the given figure, if $ABCD$ is a parallelogram of area 16 cm^2 , then the length of EC is

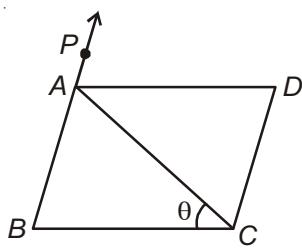


- (1) 4 cm
 (2) $2\sqrt{2}$ cm
 (3) $4\sqrt{2}$ cm
 (4) 8 cm
55. If $a = 125^{-\frac{1}{9}} \left(-5^{\frac{1}{3}} + 125^{\frac{4}{9}} \right)$, then the value of \sqrt{a} is

- (1) 2
 (2) 5
 (3) 3
 (4) -2

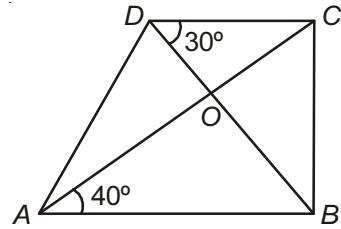
56. $\frac{1-2\sqrt{2}}{1-\sqrt{2}}$ can be written as
- (1) $\sqrt{3}+2$
 (2) $\sqrt{2}+3$
 (3) $2-\sqrt{3}$
 (4) $3-\sqrt{2}$

57. In the given figure, if $CD = AC$, $AD \parallel BC$ and $BA \parallel CD$, then $\angle DAP$ is equal to



- (1) 20
 (2) $90^\circ - \theta$
 (3) $90^\circ + \theta$
 (4) θ

58. In the given figure, if $\text{ar}(OAD) = \text{ar}(OBC)$, then the sum of the measures of $\angle OAD$ and $\angle ADO$ is equal to

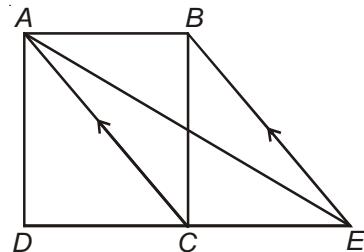


- (1) 70°
 (2) 140°
 (3) 110°
 (4) 120°

59. $ABCD$ is a rectangle having length $(x + 1)$ and breadth $(x - 1)$. If P, Q, R and S are the mid-points of sides AB, BC, CD and DA respectively, then the perimeter of quadrilateral $PQRS$ is

- (1) $\sqrt{\frac{4x(x^2-1)}{x}}$
 (2) $\sqrt{\frac{4x^2-1}{2}}$
 (3) $2\sqrt{4x^2+1}$
 (4) $2\sqrt{2(x^2+1)}$

60. In the given figure, $AC \parallel BE$, $\text{ar}(ADC) = 9 \text{ cm}^2$ and $\text{ar}(ACE) = 6 \text{ cm}^2$, then the area of quadrilateral $ABCD$ is



- (1) 3 cm^2
 (2) 15 cm^2
 (3) 9 cm^2
 (4) 12 cm^2

Space for Rough Work

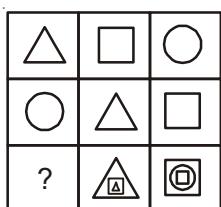
SECTION-C : MENTAL ABILITY

61. Complete the given series.

A2D3G5J7

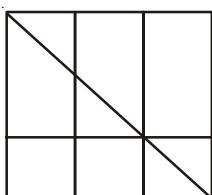
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|---------|---------|
| (1) M13 | (2) M11 |
| (3) N11 | (4) N13 |

62. Choose the correct alternative to complete the figure matrix.



- | | |
|-----|-----|
| (1) | (2) |
| (3) | (4) |

63. The maximum number of quadrilaterals in the given figure are



- | | |
|--------|--------|
| (1) 23 | (2) 24 |
| (3) 28 | (4) 26 |

Directions (Q.64 & Q.65) : Read the following information carefully and based on it, answer the questions given below.

In a company, 84 employees are working, out of which 43 employees are males. 36 employees are above 30 years of age and among them 12 are females.

64. How many females are below 30 years of age?

- | | |
|--------|--------|
| (1) 29 | (2) 30 |
|--------|--------|

- | | |
|--------|--------|
| (3) 28 | (4) 31 |
|--------|--------|

65. How many males are below 30 years of age?

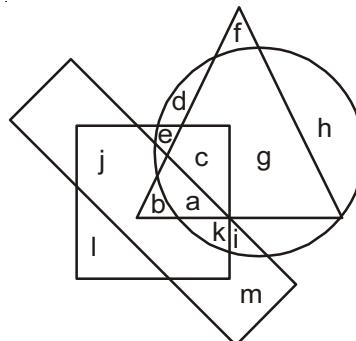
- | | |
|--------|--------|
| (1) 23 | (2) 19 |
|--------|--------|

- | | |
|--------|--------|
| (3) 24 | (4) 25 |
|--------|--------|

66. From the given alternatives, choose the correct one which shows the best logical relationship between 'quadrilateral, square and triangle'.

- | | |
|-----|-----|
| (1) | (2) |
| | |
| (3) | (4) |

Directions (Q.67 to Q.69) : In the given figure, the circle represents 'unemployed people', the square represents 'hard-working people', the triangle represents 'uneducated people' and the rectangle represents 'intelligent people'.



Space for Rough Work

67. People who are 'hard-working, but not intelligent' are represented by

- (1) c, l & m
- (2) e, c & l
- (3) e, c & k
- (4) e, l & m

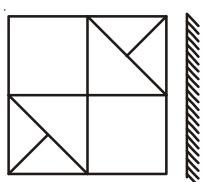
68. People who are 'both employed and uneducated, but not hard-working' are represented by

- | | |
|-------|-------|
| (1) m | (2) l |
| (3) h | (4) f |

69. People who are 'educated, hard-working and intelligent, but not unemployed' are represented by

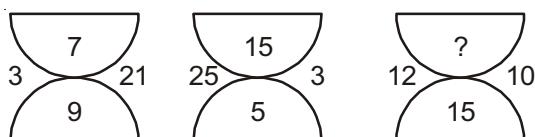
- | | |
|-------|-------|
| (1) j | (2) e |
| (3) l | (4) k |

70. Find the mirror image of



- | | |
|---------|---------|
|
(1) |
(2) |
|
(3) |
(4) |

71. Find the missing number.



- (1) 8
- (2) 6
- (3) 10
- (4) 12

72. Arrange the following in a meaningful logical sequence.

- | | |
|---------|----------------|
| (i) Cow | (ii) Centipede |
|---------|----------------|

- | | |
|--------------|----------------|
| (iii) Spider | (iv) Millipede |
|--------------|----------------|

- | | |
|---------|--|
| (v) Man | |
|---------|--|

- | | |
|---------------------------------|---------------------------------|
| (1) (iv), (iii), (ii), (i), (v) | (2) (v), (i), (ii), (iii), (iv) |
| (3) (iv), (iii), (ii), (v), (i) | (4) (v), (i), (iii), (ii), (iv) |

Directions (Q.73 & Q.74) : Study the given information carefully and answer the questions that follow.

(i) P is taller and older than A but shorter and younger than O.

(ii) E is taller than B, who is not as tall as A.

(iii) The oldest is the shortest.

(iv) B is older than O.

73. Who among them is the oldest?

- | | |
|-------|-------|
| (1) O | (2) E |
| (3) B | (4) A |

74. Who among them is the tallest?

- | | |
|-------|-------|
| (1) E | (2) P |
| (3) O | (4) A |

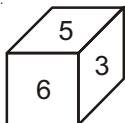
75. Find the missing number in the given series.

0, 6, 6, 20, ___, 42

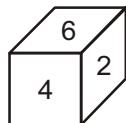
- | | |
|--------|--------|
| (1) 25 | (2) 32 |
| (3) 20 | (4) 28 |

Space for Rough Work

76. A dice numbered 1 to 6 is thrown two times and its two different outcomes are given below. Find the number on the face opposite to '2'.



- (1) 5 (2) 3
 (3) 1 (4) 6



77. 'Odometer' is related to 'Distance' in the same way as 'Barometer' is related to _____.

- (1) Hydrostatic pressure
 (2) Wind speed
 (3) Rainfall
 (4) Atmospheric pressure

78. Which of the options, when put in the blanks, will give the correct result?

- 20 ___ 10 ___ 12 ___ 6 = ___
 (1) +, -, ÷, 28 (2) -, +, ×, 18
 (3) +, -, ÷, 3 (4) -, +, ÷, 18

79. In a row of girls, A is 13th from the left end and B is 6th from the right end. If they interchange their positions, B becomes 24th from the right end. How many girls are there in the row?

- (1) 24 (2) 36
 (3) 29 (4) 40

80. Find the missing number.

- 11, 24, 39, 416, 525, ___
 (1) 636 (2) 825
 (3) 1024 (4) 1050

Space for Rough Work

Our Results of Medical & Engg. Ent. Exams. 2015



Our Results of AIPMT (Medical) 2014



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