PANDEY SIR'S
IITIAN CLASSES
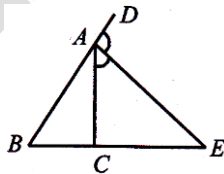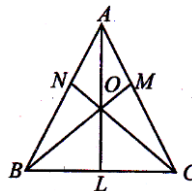• IIT-JEE • MEDICAL • FOUNDATION • BOARD

iSAT
IITIAN CLASSES
SCHOLARSHIP CUM ADMISSION TEST

INSTRUCTIONS:

1. This Questions paper contains 12 printed pages and 90 questions. All questions are compulsory. Please ensure that the question Paper you have received contains all questions and pages. If you find some mistake like missing questions or pages then contact the invigilator immediately.

2. The Question Paper contains 45 questions of Science, 25 questions of Mathematics and 20 questions of Mental Ability.

3. All questions are straight objective type questions and each carries 4 options for their answers out of which only one is correct.

4. Each Question carries **4 Marks**.
   There is **NO NEGATIVE** Marking.
   0 marks will be awarded for an unattempted question.

5. You have to indicate your response by darkening the appropriate bubble on the OMR sheet provided.

6. Use only HB pencil or Black/Blue Ball Pen for darkening the bubble(s).

7. Use of calculator, Blank Paper, Log Table, Slide Rule & Mobile is not allowed. If you are carrying any of these, then keep them at a place specified by invigilator at your own responsibility.

Class: 10th Moving +1

Q1. If p and q are zeroes of the quadratic polynomial $2x^2 + 2(m+n)x + m^2 + n^2$, then the quadratic polynomial whose zeroes are $(p+q)^2$ and $(p-q)^2$, is

(a) $x^2 + 2\,mnx + (m^2 + n^2)^2$

(b) $x^2 - 4\,mnx - (m^2 - n^2)^2$

(c) $x^2 - 2\,mnx - (m^2 - n^2)^2$

(d) $x^2 + 4\,mnx - (m^2 - n^2)^2$

Q2. In an A.P., S_p denotes the sum of first p terms and $S_m = n$ and $S_n = m$ also $m > n$, then the sum of first (m – n) terms, is

(a) $\dfrac{(m-n)(m+2n)}{m}$

(b) $\dfrac{(m+n)(2m+n)}{m}$

(c) $\dfrac{(m-n)(m+2n)}{n}$

(d) $\dfrac{(m-n)(2m+n)}{n}$

Q3. In the given figure, AE is the bisector of the exterior $\angle CAD$ meeting BC produced at E. If AB = 10 cm, AC = 6 cm and BC = 12 cm, then CE is equal to

(a) 12 cm   (b) 16 cm   (c) 20 cm   (d) 18 cm

Q4. A point O is taken inside an equilateral $\triangle ABC$. If $OL \perp BC$, $OM \perp AC$ and $ON \perp AB$ such that $OL = 14$ cm, $OM = 10$ cm and ON = 6 cm, then the area of $\triangle ABC$, is

(a) $300\sqrt{3}$ cm^2

(b) $200\sqrt{3}$ cm^2

(c) 300 cm^2

(d) $325\sqrt{2}$ cm^2

Q5. If x be the area of a right angled $\triangle ABC$ in which $\angle ABC = 90^o$ and $BC = b$, then the length of the altitude BN on the hypotenuse AC is

(a) $\dfrac{2b}{\sqrt{b^4 + 4x^2}}$

(b) $\dfrac{2bx}{\sqrt{b^4 - 4x^2}}$

(c) $\dfrac{4bx}{\sqrt{b^2 + 4x^2}}$

(d) $\dfrac{2bx}{\sqrt{b^4 + 4x^2}}$

Q6. If $\operatorname{cosec}\theta - \sin\theta = m$ and $\sec\theta - \cos\theta = n$, then the value of $(m^2 n)^{2/3} + (mn^2)^{2/3}$, is

(a) 0   (b) $\sin\theta$ (c) 1   (d) $\cos\theta$

Q7. The radii of two concentric circles are 16 cm and 10 cm. AB is a diameter of the bigger circle. BD is tangent to the smaller circle touching it at D. Then the length of AD, is

(a) $3\sqrt{130}$ cm   (b) $2\sqrt{139}$ cm   (c) $2\sqrt{130}$ cm   (d) $4\sqrt{139}$ cm

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SPACE FOR ROUGH WORK

Q8. In the figure, the area of square ABCD is 4 cm^2 and E is midpoint of AB; F, G, H and K are the mid points of DE, CF, DG and CH respectively. The area of triangle KDC is

(a) $\dfrac{1}{4} \text{cm}^2$

(b) $\dfrac{1}{8} \text{cm}^2$

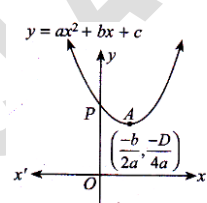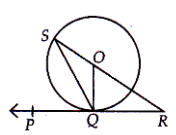(c) $\dfrac{1}{16} \text{cm}^2$

(d) $\dfrac{1}{32} \text{cm}^2$
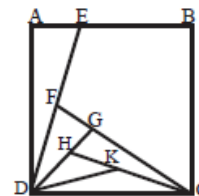
Q9. In the given figure, if E is the midpoint of AB, AGE & BEF are quadrants and DOC is a semicircle then the area of the shaded portion, is $\left(\text{take } \pi = \dfrac{22}{7} \right)$

(a) 154cm^2

(b) 416 cm^2

(c) 284cm^2

(d) 546 cm^2
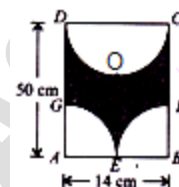
Q10. The probability of getting a bad egg from a lot of 400 eggs is 0.035. Then the probability of getting a good egg, is

(a) 0.965

(b) 0.965

(c) 0.65

(d) 0.65

Q11. If S_n denotes the sum of first n terms of an A.P., whose common difference is d, then the value of $(S_{3n} - S_{3n-1}) - (S_{2n} - S_{2n-1})$ will be

(a) $S_n - S_{n-1}$

(b) nd

(c) 0

(d) $S_{3n} - S_n$

Q12. In $\triangle ABC$, $\angle B = 90^o$, $AB = 4\sqrt{5}$, $BD \perp AC$, $AD = 4$, then area of $(\triangle ABC)$ is equal to

(a) 96 sq. units

(b) 80 sq. units

(c) 120 sq. units

(d) 160 sq. units

Q13. If $\sin\theta = p$ and $\cos\theta = q$, then the value of $\dfrac{p - 2p^3}{2q^3 - q}$ is

(a) $\sec\theta$

(b) $\csc\theta$

(c) $\cot\theta$

(d) $\tan\theta$

Q14. The radii of two concentric circles are 7 cm and 14 cm respectively. The area between the two sectors of the circles whose central angle is 60°, is $\left(\text{take } \pi = \dfrac{22}{7} \right)$

(a) 154 sq. cm

(b) 77 sq. cm

(c) 308 sq. cm

(d) 98 sq. cm

SPACE FOR ROUGH WORK

Q15. A right circular cylinder whose diameter is equal to its height, is inscribed in a right circular cone of base diameter 16 cm and height 3 times the base diameter. The axes of both solids coincide. Then the volume (in cm^3) of the solid inside the cone but outside the cylinder, is

(a) 296π (b) 512π (c) 432π (d) 592π

Q16. The sum of 49 consecutive integers is 7^5, what is their median?

(a) 7   (b) 7^3 (c) 7^2 (d) 7^4

Q17. If α and β are the zeroes of the quadratic polynomial $f(t) = t^2 - 4t + 3$, then the value of $\alpha^4\beta^3 + \alpha^3\beta^4$, is

(a) 128   (b) 116   (c) 108   (d) 98

Q18. The graph of $y = ax^2 + bx + c$ is given. Identify the signs of a, b and c.

(a) a > 0, b < 0 and c < 0   (b) a > 0, b > 0 and c < 0
(c) a < 0, b < 0 and c > 0   (d) a > 0, b < 0 and c > 0

Q19. If the centroid of the triangle formed by the points (a, (b)), (b, (c)) and (c, (a)) is at the origin, then $a^3 + b^3 + c^3$ is equal to

(a) abc   (b) 0   (c) $a + b + c$ (d) 3abc

Q20. A point P divides the line joining the points (2, 1) and (5, -8) in ratio 1 : 2. Also, the point P lies on the line $2x - y + k = 0$. Then the value of k, is

(a) 8   (b) -8 (c) -6 (d) 6

Q21. If $15\tan^2\theta + 4\sec^2\theta = 23$, then the value of $(\sec\theta + \mathrm{cosec}\,\theta)^2 - \sin^2\theta$, is

(a) $\dfrac{13}{\sqrt{2}}$ (b) $\dfrac{13}{2}$ (c) $\dfrac{15}{2}$ (d) $\dfrac{15}{\sqrt{2}}$

Q22. In the given figure, PQR is a tangent to the circle with centre O. OQ is the radius of the circle at the point of contact. R and O are joined and produced to the points S on the circle. If $\angle QRO = 28^\circ$, $\angle QOR = x$ and $\angle OQS = y$, then the value of x and y respectively, are

(a) $31^\circ, 31^\circ$ (b) $62^\circ, 62^\circ$ (c) $62^\circ, 31^\circ$ (d) $90^\circ, 45^\circ$


SPACE FOR ROUGH WORK

Q23. O is the centre of a circle of radius 5 cm. T is a point such that OT = 13 cm. TP and TQ are tangents to the circle and OT intersects the circle at E. AB is tangent to the circle at E intersecting TP and TQ at A and B respectively. Then the length of AB, is

(a) $6\dfrac{2}{5}$ cm   (b) $6\dfrac{2}{3}$ cm   (c) $6\dfrac{2}{9}$ cm   (d) $3\dfrac{1}{3}$ cm
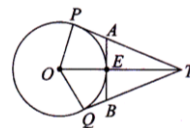
Q24. In the given figure, AB is a diameter of a circle with centre O, AT is a tangent and $\angle AOQ = 58^{o}$, then the $\angle ATQ$, is

(a) 61° (b) 60° (c) 55° (d) 51°
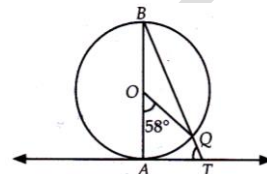
Q25. V_1, V_2, V_3 and V_4 are the volume of four cubes of side lengths x cm, 2x cm, 3x cm and 4x cm respectively. Some statements regarding these volumes are shown here.

(1) $V_1 + V_2 + 2V_3 < V_4$ (2) $V_1 + 4V_2 + V_3 < V_4$ (3) $2(V_1 + V_3) + V_2 = V_4$

Which of the given statements is correct?

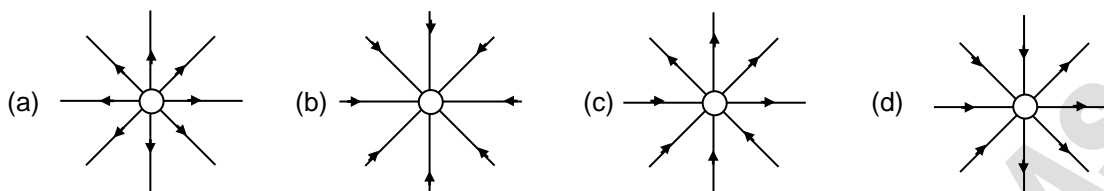(a) (1) and (2) only   (b) (2) and (3) only   (c) (1) and (3) only   (d) (1), (2) and (3)
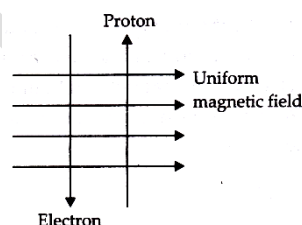

SPACE FOR ROUGH WORK

PHYSICS

Q26. If isolated magnetic poles exist freely in nature then which of the following figures represent the magnetic lines of force due to an isolated north pole?

(a)   (b)   (c)   (d)

Q27. A uniform magnetic field exists in the plane of paper pointing from left to right as shown in figure. In the field, an electron and a proton move as shown. The electron and the proton experience forces
(a) Both pointing into the plane of paper
(b) Both pointing out of the plane of paper
(c) Pointing into the plane of paper and out of the plane of paper, respectively
(d) Pointing opposite and along the direction of the uniform magnetic field respectively

Q28. Current carrying conductor is surrounded by,
(a) An electric field,   (b) A gravitational field.   (c) A magnetic field.   (d) No field.

Q29. Two free parallel wires carrying currents in the opposite directions:
(a) Attract each other   (b) Repel each other
(c) Do not affect each other   (d) Get rotated to be perpendicular to each other

Q30. Which of the following networks yields maximum effective resistance between A and B ?
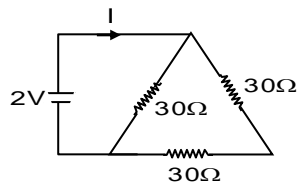
(a)   (b)   (c)   (d)
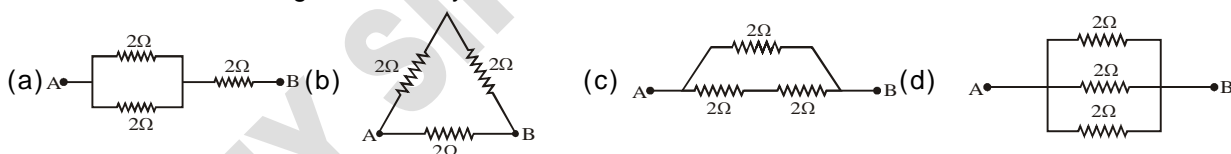
Q31. The resistivity of a wire
(a) Increases with the length of the wire
(b) Decreases with the area of cross-section of the wire
(c) Decreases with the length and increases with the area of cross-section of the wire
(d) None of the above statement is correct

SPACE FOR ROUGH WORK

Q32. The current I in the circuit shown is

(a) $\frac{1}{45}$ A   (b) $\frac{1}{15}$ A

(c) $\frac{1}{10}$ A   (d) $\frac{1}{5}$ A

Q33. A total resistance of 3Ω is produced by combining an unknown resistor R with a 12Ω resistor. What is the value of R and how it is connected to the 12Ω resistor?

(a) 4Ω, parallel   (b) 5Ω, parallel   (c) 6Ω, parallel   (d) 4Ω, series

Q34. Velocity of light in air is 3×10^8 m/s and refractive index of water is 4/3. The time taken by light to travel a distance of 500 m in water is

(a) 1.25 µs   (b) 2.22 µs   (c) 12.5 µs   (d) 22.6 µs

Q35. An object is placed at a distance of 20 *cm* from a convex lens of focal length 10 *cm.* The image is formed on the other side of the lens at a distance

(a) 20 *cm*   (b) 10 *cm*   (c) 40 *cm*   (d) 30 *cm*

Q36. A plane mirror produces a magnification of

(a) −1   (b) +1   (c) Zero   (d) Between 0 and ∞

Q37. Two lenses of power $6D$ and $-2D$ are combined to form a single lens. The focal length of this lens will be

(a) $\frac{3}{2}$ m   (b) $\frac{1}{4}$ m   (c) 4 m   (d) $\frac{1}{8}$ m

Q38. A light bulb is placed between two plane mirrors inclined at an angle of $60°$. The number of images formed are

(a) 6   (b) 2   (c) 5   (d) 4

Q39. Myopia can be removed by using

(a) Concave lens   (b) Convex lens   (c) Cylindrical lens   (d) By surgical removal

Q40. In case of a thick plane mirror multiple images are formed. Considering images formed due to refraction and reflection at the to surfaces, the brightest image formed will be

(a) First   (b) Second   (c) Third   (d) Fourth

SPACE FOR ROUGH WORK

Q41. Heating of ferrous sulphate gives which of the following product?
(a) Ferric oxide   (b) Sulphur dioxide   (c) Sulphur trioxide   (d) All of the above

Q42. How rancidity can be prevented?
(a) By adding antioxidants in food   (b) By adding more oxygen to food
(c) By keeping food items in open   (d) All of the above

Q43. P, Q and R are 3 metals that undergo chemical reactions as follows:
$$P_2O_3 + 2Q \rightarrow Q_2O_3 + 2P$$
$$2P + 3RO \rightarrow P_2O_3 + 3R$$
$$2RSO_4 + 2Q \rightarrow Q_2(SO_4)_3 + 2R$$
Observe the reactions and arrange the metals in the increasing order of their reactivity
(a) R, P, Q   (b) Q, P, R   (c) P, Q, R   (d) Q, R, P

Q44. Which of the following reactions will not occur?
(a) $Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$ (b) $Cu + 2\underset{dil}{HCl} \rightarrow CuCl_2 + H_2$

(c) $2Al + 6\underset{dil}{HCl} \rightarrow 2AlCl_3 + 3H_2$ (d) $Fe + 2\underset{dil}{HCl} \rightarrow FeCl_2 + H_2$

Q45. A compound 'X' reacts with potassium iodide solution to give yellow precipitate. On heating X, reddish brown gas is observed. Compound X is
(a) $PbCl_2$ (b) $Pb(NO_3)_2$ (c) PbI_2 (d) $PbSO_4$

Q46. The acid having a highest H^+ ion concentration is one with
(a) pH = 7.0   (b) pH = 2.3   (c) pH = 1.2   (d) pH = 8.2

Q47. Cassiterite is an ore of
(a) Mn   (b) Ni   (c) Sb   (d) Sn

Q48. The process of roasting of an ore is carried out in the
(a) Absence of air   (b) Presence of air   (c) Limited supply of air   (d) None of these

Q49. A metal obtained directly by roasting of its sulphide ore is
(a) Cu   (b) Pb   (c) Hg   (d) Zn

Q50. The elements A, B, C, D and E have atomic number 9, 11, 17,12 and 13 respectively. Which pair of the elements belong to the same group?
(a) A and B   (b) B and D   (c) A and C   (d) D and E

SPACE FOR ROUGH WORK

Q51. Where would you locate the element with electronic configuration 2, 8 in the modern periodic table?
(a) Group 8   (b) Group 2   (c) Group 18   (d) Group 10

Q52. An alkyne has the general formula
(a) C_nH_{2n} (b) C_nH_{2n+2} (c) C_nH_{2n-2} (d) C_nH_{2n+1}

Q53. Which of the following can damage optic nerve leading to blindness, if taken internally?
(a) CH_3COOH (b) C_2H_5OH (c) $NaHCO_3$ (d) CH_3OH

Q54. Which of the following represents ketones?
(a) $R - C = O$ (b) R – OH   (c) R – CHO   (d) R – COOH
       |
       R

Q55. Pentane has the molecular formula C_5H_{12}. It has
(a) 5 covalent bonds   (b) 12 covalent bonds   (c) 16 covalent bonds   (d) 17 covalent bonds

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SPACE FOR ROUGH WORK

Q56. What causes a green plant exposed to the light on only one side, to bend towards the source of light as it grows?
(a) Light stimulates plant cells on the lighted side to grow faster.
(b) Auxin accumulated on the shaded side stimulates greater cell elongation there.
(c) Green plants need light to perform photosynthesis
(d) Green plants seek light because they are phototropic.

Q57. Absorption of amino acids occurs through:
(a) Villi and lacteals
(b) Villi and blood vessels
(c) Blood vessels and lacteals
(d) Stomach.

Q58. Heart is covered by
(a) Peritoneum
(b) Pleural membrane
(c) Pericardium
(d) Visceral membrane

Q59. Select the correct statement
(a) Heterotrophs do not synthesise their own food
(b) Heterotrophs utilise solar energy for photosynthesis
(c) Heterotrophs synthesise their own food
(d) Heterotrophs are capable of converting carbon dioxide and water into carbohydrates

Q60. Chest expands during
(a) Inspiration
(b) Expiration
(c) Exchange of gases
(d) Forceful expulsion of air

Q61. Failure of descendence of testes into the scrotum is known as
(a) Paedogenesis
(b) Impotency
(c) Cryptorchidism
(d) Castration

Q62. Urethra in female differs from male in being
(a) Only excretory
(b) Involved in birth and excretion
(c) Highly muscular
(d) Long erectile tube

Q63. Corpus callosum connects -
(a) Two cerebral hemispheres
(b) Two optic lobes
(c) Two olfactory lobes
(d) Optic chiasma

Q64. The fear, fight and flight hormone is
(a) Glucagon
(b) Insulin
(c) Oxytocin
(d) Adrenaline

SPACE FOR ROUGH WORK

Q65. Which of the following hormone controls appearance of secondary sexual characters in human male :-
(a) Testosterone   (b) Progesterone   (c) Thyroxine   (d) Estrogen

Q66. Nissl's bodies found in neurons are -
(a) Made of DNA   (b) Masses of ribosome and RER
(c) Help in formation of neurofibrils   (d) Masses of mitochondria

Q67. Chemical transmission of nerve impulses from one neuron to another at a synapse occurs through -
(a) Cholesterol   (b) Acetylcholine   (c) Cholecystokinin   (d) ATP

Q68. The principal pathways by which water is transported in angiosperms is
(a) Xylem vessel system   (b) Xylem and phloem
(c) Sieve tubes members of phloem   (d) Sieve cells of phloem

Q69. The carbohydrate synthesized in the leaves are transported through sieve tubes most commonly in the form of
(a) Glucose   (b) Triose   (c) Sucrose   (d) Soluble starch

Q70. Which is the correct sequence of parts in human alimentary canal?
(a) Mouth $\rightarrow$ stomach $\rightarrow$ small intestine $\rightarrow$ oesophagus $\rightarrow$ large intestine
(b) Mouth $\rightarrow$ oesophagus $\rightarrow$ stomach $\rightarrow$ large intestine $\rightarrow$ small intestine
(c) Mouth $\rightarrow$ stomach $\rightarrow$ oesophagus $\rightarrow$ small intestine $\rightarrow$ large intestine
(d) Mouth $\rightarrow$ oesophagus $\rightarrow$ stomach $\rightarrow$ small intestine $\rightarrow$ large intestine

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SPACE FOR ROUGH WORK

(Q. Nos. 1-2) In each of the following questions, there is same relationship between the two terms of the left of $'::'$ and the same relationship holds between the two terms to its right. Also, in each question, one term to the right of $'::'$ is missing. This term is given as one of the alternatives, from the given alternatives below each question. Find out this term from the given alternatives.

Q71. BDGK : OKHF :: KMPT :?
(a) XTQO   (b) XOTQ   (c) XUQO   (d) YTQO

Q72. BEFC: EDBF :: VYZW : ?
(a) YXVZ   (b) XYVZ   (c) YVXZ   (d) ZVXV

Q73. Rishab is facing his house. He turns 45° in clockwise direction then to 180° in anticlockwise direction, then 135° to anticlockwise direction and finally 270° to clockwise direction to face his shop in south direction. In which direction will he face while he faces his house?
(a) South   (b) North east   (c) West   (d) North west

Q74. If the letters in the word 'POWERFUL' are rearranged as they appear in the English alphabet, the position of how many letters will remain unchanged after the rearrangement.
(a) One   (b) Two   (c) Three   (d) None of these

Q75. In the following number series, how many times number 2 has come before 8 but 3 has not come after 8?
3, 4, 2, 8, 3, 5, 2, 8, 6, 7, 4, 2, 8, 6, 6, 2, 8,
(a) One   (b) Three   (c) Four   (d) Two

Q76. If in a particular year, 16th June was Friday, then the first Friday in July of that year will fall on which date?
(a) 8th July   (b) 5th July   (c) 7th July   (d) 6th July

Q77. In a row of boys Suresh is 8th from the left and Mukesh is also 8th from the right. When Suresh and Mukesh interchange their positions, Suresh becomes 16th from the left?
How many boys are there in the row?
(a) 24   (b) 19   (c) 23   (d) 26

SPACE FOR ROUGH WORK

Q78. If C is husband of B, B is daughter of A, A is mother D and D is a male, then how D is related to B?
(a) Son   (b) Brother   (c) Father   (d) Husband

(Q. Nos. 79 – 81) Study the following informations and answer the questions.

- A and D are good in Science and Cricket.
- A and C are good in Science and Mathematics
- B and E are good in Tennis and Cricket.
- B and C are good in Mathematics and Tennis
- D and E are good in Music and Cricket.

Q79. Who is good in Cricket, Maths and Science?
(a) A   (b) C   (c) D   (d) B

Q80. Who is good in Science, Tennis and Maths?
(a) E   (b) C   (c) B   (d) D

Q81. Who is not good in both Science and Music?
(a) E   (b) B   (c) A   (d) C

(Q. Nos. 82-83) Read carefully following words and their codes given in the table below and answer the questions

JOIN	GPHN
GET	JFV
EAT	FAV
GREAT	JRFAW
FOUL	EPQL

Q82. How many alphabets have been retained as codes?
(a) 4   (b) 3   (c) 5   (d) 2

Q83. What will be the code for 'FIGURE'?
(a) EHJQRF   (b) FHJQAR   (c) FDELVF   (d) FIJPRA

Q84. In a certain code 'WHITE' is written as 'DSRGV', then how will 'BLACK' be written in the same code?
(a) YOZXP   (b) OYZXP   (c) XOZPY   (d) YOZPX

Q85. If L = 20, R = 26 and RED = 51, then BLUE =?
(a) 65   (b) 72   (c) 76   (d) 82

SPACE FOR ROUGH WORK

ANSWERS

1- B	2-A	3-D	4- A	5-D	6-C	7-B	8-B	9-D	10-B
11-B	12-B	13-D	14-B	15-D	16-B	17-C	18-D	19-D	20-B
21-C	22-C	23-B	24-A	25-D	26-A	27-A	28-C	29-B	30-A
31-D	32-C	33-A	34-B	35-A	36-B	37-B	38-C	39-A	40-B
41-D	42-A	43-A	44-B	45-B	46-C	47-D	48-B	49-C	50-C
51-C	52-B	53-D	54-A	55-C	56-B	57-B	58-C	59-A	60-A
61-C	62-A	63-A	64-D	65-A	66-B	67-B	68-A	69-C	70-D
71-A	72-A	73-A	74-A	75-B	76-C	77-C	78-B	79-A	80-B
81-B	82-B	83-A	84-A	85-B					