



# NPSAT-2024

## For Class – XI Admission

Time :1 Hr. 30 Minutes.

Date: 

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***Do not open this booklet until you are asked to do so.  
Read carefully the instructions on test booklet.***

### **Important Instructions:**

1. The test booklet carries Physics, Chemistry, Math and Biology questions.
2. The answer sheet is kept inside the test booklet .when you are directed to open the test booklet, take out the answer sheet and fill in the particulars carefully.
3. Total no of pages in the question booklet are Eight (8).
4. The test booklet consists of 80 questions in the form of sections A, B, C and D respectively.
5. Section A and B is compulsory for all students. Students opting for PCM need not to appear Section D questions .Students opting for Biology need not to appear section C questions. Students opting for both biology and mathematics have to appear all the sections.
6. Section A carries 20 Physics questions, section B carries 20 Chemistry questions, section C carries 20 Mathematics questions and section D carries 20 Biology questions.
7. Each Question carries 4 options like (a), (b), (c) and (d) respectively. Weightage for correct response is **4** marks and incorrect response is **-1** mark.
8. Use black/blue ball point pen while filling the particulars and the marking responses of answer sheets in the exam hall.
9. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device etc. except the admit card inside the examination room/hall.
10. Rough work is to be done on the space provided for this purpose in the test booklet.
11. On completion of the test, candidate must handover the answer sheet and test booklet to the invigilator in the room/hall.
12. Do not fold or make any stray mark on the answer sheet.
13. Tick the correct subject combination on both question booklet and OMR Sheet.

**Name of the candidate (in Capital letters) :** \_\_\_\_\_

**Registration no :**

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**Subject Combination :**

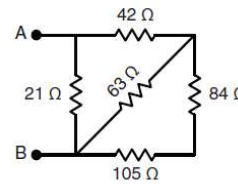
<b>PCM</b>	<b>PCB</b>	<b>PCMB</b>
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**Name of the examination center :** \_\_\_\_\_

**Candidate's Signature :** \_\_\_\_\_ **Invigilator's Signature :** \_\_\_\_\_

## Section - A

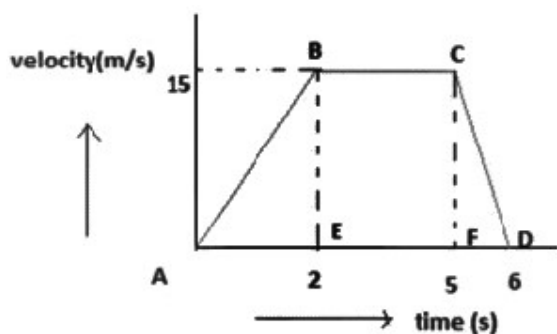
1. Find the equivalent resistance for the given electric circuit.



- a)  $17\Omega$   
b)  $34\Omega$   
c)  $8.5\Omega$   
d)  $42\Omega$

2. The velocity of a body starting from rest is doubled by how much will its displacement change provided the acceleration remains constant?  
a) It will be doubled                  b) It will be halved                  c) It will be 4 times                  d) It will be  $\frac{1}{4}$  times
3. A current of 4A flows through a resistance of  $200\Omega$  for 20s. What will be the Heat generated?  
a) 1600J                  b) 3200J                  c) 800J                  d) 6400J
4. A body of mass 5kg is acted upon by a force of 80N for a time of 15s. If it starts from a velocity of 10m/s, what will be its final velocity?  
a) 26m/s                  b) 125m/s                  c) 52m/s                  d) 250m/s
5. The radius of curvature of a convex lens is 40cm. Where should the object be placed in front of it to form an erect and enlarged image?  
a) 30cm                  b) 50cm                  c) 15cm                  d) 25cm
6. The absolute refractive index of a medium is 1.25. What is the speed of light through it?  
a)  $1.2 \times 10^8$  m/s                  b)  $1.5 \times 10^8$  m/s                  c)  $3.6 \times 10^8$  m/s                  d)  $2.4 \times 10^8$  m/s
7. Four resistors each of resistance  $4\Omega$  are to be combined in such a way that the equivalent resistance will be  $3\Omega$ . How should the resistors be combined?  
a) All 4 in parallel                  b) 2 in series which in turn parallel to the other 2  
c) 3 in Parallel which in turn in series with the 4<sup>th</sup>                  d) 3 in series which in turn parallel with the 4<sup>th</sup>
8. The power of an engine is to be tripled. Which of the following changes will lead to that?  
a) the time taken is tripled keeping work done constant.  
b) the work done is  $\frac{1}{3}$  times keeping the time taken constant.  
c) the time taken is  $\frac{1}{3}$  times keeping the work done constant.  
d) Both the time taken and work done are tripled.
9. An object 3cm high is placed at a distance of 10cm in front of a concave mirror of focal length 20cm. Find the size of the image formed.  
a) 3cm                  b) 6cm                  c) 15cm                  d) 12cm
10. A satellite of mass  $m$  revolves around the earth of mass  $M$  in an orbit of radius  $\frac{3}{2}R$  from the surface where  $R$  is the radius of the Earth. What will be the force acting on it compared to the surface?  
a) It will be  $\frac{9}{4}$  times                  b) It will be  $\frac{4}{25}$  times  
c) It will be  $\frac{4}{9}$  times                  d) It will be  $\frac{25}{4}$  times
11. A boy after walking for 20 steps of 50cm each turns  $90^\circ$  and walks 10 steps. What is the net displacement of the boy after this motion?  
a)  $\sqrt{15}$  m                  b) 25m                  c)  $2\sqrt{5}$  m                  d)  $5\sqrt{5}$  m
12. Given three resistors of equal resistance, how many combinations of these three resistances can be made for obtaining different equivalent resistance?  
a) 6                  b) 5                  c) 4                  d) 3
13. Two conductors of resistances  $3R$  and  $4R$  are connected in series in a circuit. What will be the ratio of the heat developed?  
a) 3:4                  b) 4:3                  c) 9:16                  d) 16:9

14. Two thin lenses of focal length  $f_1$  and  $f_2$  are placed in contact with each other such that the combination acts as a glass slab. How is  $f_1$  and  $f_2$  related?  
 a)  $f_1 = \frac{1}{f_2}$                       b)  $f_1 = -f_2$                       c)  $f_1 = \sqrt{f_2}$                       d)  $f_1 = f_2$
15. A ball of mass 2kg is thrown vertically upwards with a kinetic energy of 490J. The height at which kinetic energy of the body becomes half its original value is  
 a) 50m                      b) 25m                      c) 12.5m                      d) 10m
16. A ball falling from rest describes distance  $d_1$ ,  $d_2$ , and  $d_3$  in the first, second and third seconds of its fall. Then the ratio of  $d_1 : d_2 : d_3$  is  
 a) 1:1:1                      b) 1:2:3                      c) 1:3:5                      d) 1:4:9
17. A body of mass 3kg is thrown upwards. It rises to a maximum height of 50 m. At what height its kinetic energy will be reduced to 80%? Take  $g=10\text{m/s}^2$   
 a) 10m                      b) 30m                      c) 40m                      d) 20m
18. An object is placed 10cm in front of a convex lens length having radius of curvature 16cm. Where will the image be formed?  
 a) 40cm                      b) 20cm                      c) 10cm                      d) 8cm
19. Taking the speed of sound in air to be 340m/s, what should be the minimum distance required to hear echo?  
 a) 34m                      b) 17m                      c) 340m                      d) 170m
20. What is the net displacement for the given motion?



- a) 90m                      b) 45m                      c) 135m                      d) 67.5m

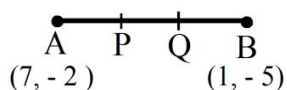
## Section – B

21. What is the rate of chemical reaction?  
 a) Chemical reaction rate is a chemical property  
 b) Chemical reaction rate is a physical property  
 c) Chemical reaction rate is an intensive property  
 d) Chemical reaction rate is an extensive property
22. The term “catalyst” refers to \_\_\_\_\_  
 a) Can either increase or decrease the speed of a chemical reaction  
 b) Alters the value of equilibrium constant in a reversible chemical reaction  
 c) Increases the speed of a chemical reaction  
 d) Decreases the speed of a chemical reaction
23. The reaction order is determined by  
 a) Power of any one of the reactant concentrations  
 b) Number of molecules of reactants taking part in the reaction

- c) Sum of the powers of the concentrations of all the reactants
- d) Concentration of intermediate species formed
24. According to Robert Boyle, which of the following is not a property of an acid ?
  - a) turns blue Litmus red
  - b) sour in taste
  - c) neutralize bases
  - d) bitter in taste
25. Which of the following compounds can't be used as an acid and a base at the same time?
  - a) amphoteric substance
  - b) amphiprotic substance
  - c) ampholyte
  - d) protophilic
26. Lewis concept does explain the behaviour of \_\_\_\_\_
  - a) bases
  - b) salts
  - c) protonic acids
  - d) amphoteric substances
27. The primary ore of aluminum is which of the following?
  - a) Kaolinite
  - b) Bauxite
  - c) Malachite
  - d) Cinnabar
28. Which of the following is not an appropriate ore for iron extraction?
  - a) Hematite
  - b) Magnetite
  - c) Siderite
  - d) Iron Pyrites
29. Cinnabar is used to extract which metal?
  - a) Zinc
  - b) Copper
  - c) Iron
  - d) Mercury
30. Aluminium does not have which of the following properties?
  - a) Aluminium is a poor conductor of heat and electricity
  - b) Aluminium is light in weight
  - c) It readily dissolves in HCl
  - d) Aluminium is highly resistant to corrosion
31. Which of the following isn't a cobalt property?
  - a) Cobalt is a lustrous white metal
  - b) It is attacked by alkalies
  - c) Cobalt is malleable
  - d) Cobalt is ductile
32. Which one of the following is not a zinc ore?
  - a) Limonite
  - b) Zincite
  - c) Calamine
  - d) Franklinite
33. When magnesium is alloyed with which of the following elements, the tendency to break under stress is not reduced?
  - a) Aluminium
  - b) Silicon
  - c) Zinc
  - d) Copper
34. Copper and zinc alloy is known as \_\_\_\_\_
  - a) Brass
  - b) Bronze
  - c) Duralumin
  - d) Nichrome
35. The main component of Duralumin alloy is \_\_\_\_\_
  - a) Copper
  - b) Nickel
  - c) Iron
  - d) Aluminum
36. Hydrocarbons are organic molecules that contain the element carbon.
  - a) Hydrogen
  - b) Oxygen
  - c) Carbon
  - d) Both hydrogen and carbon
37. Give the name of the benzene acylation procedure.
  - a) Friedel craft reaction
  - b) Wurtz reaction
  - c) Wurtz fitting reaction
  - d) Debey Huckel reaction
38. Alkane chlorination is an example of \_\_\_\_\_
  - a) Radical
  - b) Elimination
  - c) Free radical
  - d) Addition
39. Which of the chemicals below does not have a carbonyl group?
  - a) Alcohol
  - b) Aldehyde
  - c) Ketone
  - d) Carboxylic acid
40. Butanal is known by what name?
  - a) n-Butanaldehyde
  - b)  $\alpha$ -Butanaldehyde
  - c) n-Butyraldehyde
  - d)  $\alpha$ -Butyraldehyde

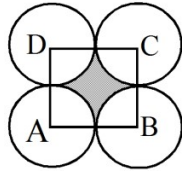
## Section – C

41. What is the least number that is divisible by all the natural numbers from 1 to 10 (both inclusive) ?  
 (a) 100 (b) 1260 (c) 2520 (d) 5040
42. If one of the zeros of the cubic polynomial  $x^3 + ax^2 + bx + c$  is  $-1$  then the product of the other two zeros is  
 (a)  $a - b - 1$  (b)  $b - a - 1$  (c)  $1 - a + b$  (d)  $1 + a - b$
43. In a  $\triangle ABC$ ,  $\angle C = 3\angle B = 2(\angle A + \angle B)$ , then  $\angle B = ?$   
 (a)  $20^\circ$  (b)  $40^\circ$  (c)  $60^\circ$  (d)  $80^\circ$
44. If  $\frac{2}{x} + \frac{3}{y} = 6$  and  $\frac{1}{x} + \frac{1}{2y} = 2$  then  
 (a)  $x = 1, y = \frac{2}{3}$  (b)  $x = \frac{2}{3}, y = 1$  (c)  $x = 1, y = \frac{3}{2}$  (d)  $x = \frac{3}{2}, y = 1$
45. In an isosceles  $\triangle ABC$ , If  $AC = BC$  and  $AB^2 = 2AC^2$  then  $\angle C = ?$   
 (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
46. If  $2x = \sec A$  and  $\frac{2}{x} = \tan A$  then  $2\left(x^2 - \frac{1}{x^2}\right) = ?$   
 (a)  $\frac{1}{2}$  (b)  $\frac{1}{4}$  (c)  $\frac{1}{8}$  (d)  $\frac{1}{16}$
47.  $(\sec A + \tan A)(1 - \sin A) = ?$   
 (a)  $\sin A$  (b)  $\cos A$  (c)  $\sec A$  (d)  $\operatorname{cosec} A$
48. What is the Probability that a leap year selected at random will contain 53 Sunday?  
 (a)  $\frac{4}{7}$  (b)  $\frac{1}{7}$  (c)  $\frac{2}{7}$  (d)  $\frac{5}{7}$
49. All kings, queens and aces are removed from a pack of 52 cards. The remaining cards are well-shuffled and then a card is drawn from it. Find the probability that the drawn card is a black face card.  
 (a)  $\frac{1}{19}$  (b)  $\frac{1}{20}$  (c)  $\frac{3}{19}$  (d)  $\frac{4}{19}$
50. The point P which divides the line segment joining the points A (2, - 5) and B(5, 2) in the ratio 2 : 3 lies in the quadrant  
 (a) I (b) II (c) III (d) IV
51. In the given figure P (5 – 3) and Q (3, y) are the points of trisection of the line segment joining A (7, -2) and B (1, - 5). Then, y equals

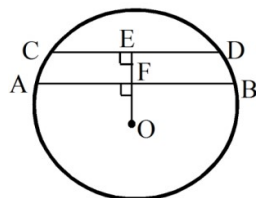


- (a) 2 (b) 4 (c)  $-4$  (d)  $-\frac{5}{2}$

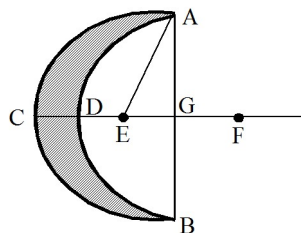
52. In the given figure, ABCD is a square each of whose sides measures 28 cm. What is the area of the shaded region?



- (a)  $256 \text{ cm}^2$                       (b)  $168 \text{ cm}^2$                       (c)  $312 \text{ cm}^2$                       (d)  $478 \text{ cm}^2$
53. The diameter of a wheel is 84 cm. How many revolutions will it make to cover 792 m?  
 (a) 200                      (b) 250                      (c) 300                      (d) 350
54. The height of a conical tent is 14 m and its floor area is  $346.5 \text{ m}^2$ . How much canvas, 1.1 m wide, will be required for it?  
 (a) 490 m                      (b) 525 m                      (c) 665 m                      (d) 860 m
55. A metallic cylinder of radius 8 cm and height 2 cm is melted and converted into a right circular cone of height 6 cm. The radius of the base of this cone is  
 (a) 4 cm                      (b) 5 cm                      (c) 6 cm                      (d) 8 cm
56. The curved surface area of a cylindrical pillar is  $264 \text{ m}^2$  and its volume is  $924 \text{ m}^3$ . The height of the pillar is  
 (a) 4m                      (b) 5 m                      (c) 6 m                      (d) 7 m
57. How many bags of grain can be stored in a cuboidal granary (8 m x 6 m x 3 m), if each bag occupies a space of  $0.64 \text{ m}^3$ ?  
 (a) 8256                      (b) 90                      (c) 212                      (d) 225
58. In the figure,  $OE \perp CD$ ,  $OF \perp AB$ ,  $AB \parallel CD$ ,  $AB = 24 \text{ cm}$ ,  $CD = 10 \text{ cm}$ , radius  $OA = 13 \text{ cm}$ . The length of EF is

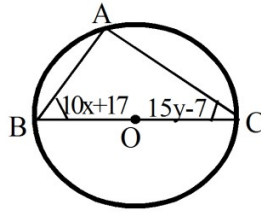


- (a) 3 cm                      (b) 4 cm                      (c) 7 cm                      (d) 8 cm
59. A crescent is formed of two circular arcs ACB, ADB of equal radius, centres E and F in the given figure. The perpendicular bisector of AB cuts the crescent at C and D, where  $CD = 12 \text{ cm}$ ,  $AB = 16 \text{ cm}$ . The radius of arcs is



- (a) 18 cm                      (b) 16 cm                      (c) 12 cm                      (d) 10 cm

60. In the given figure BC will pass through centre of a circle where points A, B and C are concyclic and  $\angle B$  is 44 more than  $\angle C$ . The value of x and y respectively are



- (a)  $x = 4, y = 3$                       (b)  $x = 3, y = 5$                       (c)  $x = 7, y = 2$                       (d)  $x = 5, y = 2$

## Section – D

61. The barrier between the protoplasm and the outer environment in an animal cell is  
 (a) Cell wall                      (b) Plasma membrane                      (c) Nuclear membrane                      (d) Cytoplasm
62. Animal cell lacking nuclei would also lack in  
 (a) Ribosome                      (b) Lysosome                      (c) Endoplasmic reticulum                      (d) Chromosome
63. A long tubular outgrowth of nerve cell which conducts impulses away from the cell body is termed as  
 (a) Cyton                      (b) Axon                      (c) Neuron                      (d) Dendrite
64. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in  
 (a) Cytoplasm                      (b) Mitochondria                      (c) Chloroplast                      (d) Nucleus
65. The chlorophyll in photosynthesis is used for  
 (a) Absorbing light                      (b) Breaking down water molecule  
 (c) No function                      (d) Reduction of  $\text{CO}_2$
66. Identify which of the following statements about thyroxine is incorrect?  
 (a) Thyroid gland required incline to synthesize thyroxine.  
 (b) Thyroxine is also called thyroid hormone.  
 (c) It regulates protein, carbohydrates and fat metabolism in the body.  
 (d) Iron is essential for the synthesis of thyroxine.
67. The sense of smell is detected by  
 (a) Taste buds                      (b) Olfactory receptors                      (c) Touch receptors                      (d) None of the above
68. Which of the following is not a function of the endocrine system?  
 (a) Regulation of growth and development                      (b) Regulation of metabolism  
 (c) Regulation of heart rate and breathing                      (d) Regulation of reproductive functions
69. Hemophilia is a sex-linked recessive disorder. If a carrier female ( $X^hX$ ) marries a normal male ( $XY$ ), what is the probability of their son having hemophilia?  
 (a) 0%                      (b) 25%                      (c) 50%                      (d) 100%
70. Mendel's contribution to genetics was the  
 (a) Principle of mutation                      (b) Theory of natural selection  
 (c) Law of independent assortment of factor                      (d) Principle of genetic recombination
71. A yellow and Round seeded pea plant has genotype  $XyRr$ . The gametes produced shall be  
 (a)  $Yy, Rr$                       (b)  $YR, yR, Yr, yr$                       (c)  $YR, yr$                       (d)  $Y, y, R, r$

72. In humans, gestation is completed in  
 (a) 40 weeks                      (b) 60 weeks                      (c) 120 weeks                      (d) 240 days
73. Factors responsible for the rapid spread of bread mould on slices of bread are  
 i) large number of spores                      ii) availability of moisture and nutrients in bread  
 iii) presence of tubular branched hyphae                      iv) formation of round shaped sporangia.  
 Which of the above statements are true?  
 (a) (i) and (iii)                      (b) (ii) and (iv)                      (c) (i) and (ii)                      (d) (iii) and (iv)
74. External fertilization takes place in  
 (a) fish and frog                      (b) frog and monkey                      (c) dog and goat                      (d) goat and fish
75. The number of chromosomes in parents and off springs of a particular species remains constant due to  
 (a) doubling of chromosomes before zygote formation  
 (b) halving of chromosomes during gamete formation  
 (c) doubling of chromosomes during gamete formation  
 (d) halving of chromosomes after gamete formation
76. Length of pollen tube depends on the distance between  
 (a) pollen grain and upper surface of stigma  
 (b) pollen grain on upper surface of stigma and ovule  
 (c) pollen grain in anther and upper surface of stigma  
 (d) upper surface of stigma and lower part of style.
77. In an ecosystem, the 10% of energy available for transfer from one trophic level to next is in the form of \_\_\_\_\_  
 (a) heat energy                      (b) light energy                      (c) mechanical energy                      (d) chemical energy
78. What percentage of sunlight is captured by plants to convert into food energy?  
 (a) 1%                      (b) 10%                      (c) 50%                      (d) More than 50%
79. A man with blood group A marries a woman having blood group O. What will be the blood group of the child?  
 (a) O only    (b) A only    (c) AB                      (d) Equal chance of acquiring blood group A or blood group O.
80. Which of the following is not a direct conclusion that can be drawn from Mendel's Experiment?  
 (a) Only one parental trait is expressed  
 (b) Two copies of each trait is inherited in sexually transmitted organism  
 (c) For recessive trait to be expressed both copies should be identical  
 (d) Natural selection can alter frequency of inherited trait.

----- ***Best of Luck*** -----





# NPSAT - 2024

## OMR SHEET

Candidate's Name : .....

Registration Number :

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Date :

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Subject Combination :

PCM

PCB

PCMB

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

Candidate's Signature : \_\_\_\_\_

Invigilator's Signature : \_\_\_\_\_