

Diagnostic cum Scholarship Tests

SAMPLE PAPER For Students of Class IX

Paper 3

JEE Main & JEE Advanced

Paper Code: 89-3

Duration : 135 minutes

Maximum Marks : 201

Please read the instructions and guidelines carefully :

Important Note : Please ensure to accurately input the details for the Question Paper Code as indicated at the top of this sheet (Side 2) into the corresponding columns / fields on the OMR sheet before proceeding with the paper. Incorrectly filled information regarding the class or paper may result in inaccurate outcomes or results.

"This paper has been scientifically designed to evaluate your potential – manifested and hidden for the target examinations mentioned in various sections of the paper. Thus, your adherence to the instructions is critical in the evaluation of the same"

1. This Question paper consists of 2 sections.
2. Student should devote allotted time for each section. If a section is easy, then it is easy for everyone & was meant to be like that with a goal in mind. Do not switch over to another section if you find the section to be easy. If a section is tough, then it is tough for everyone. You are advised to spend 45 Minutes on Section-I and 90 Minutes on Section-II. Dedicating the required time to finish each section successfully is essential. Opening the next section before completing the allotted time for the preceding section is not permitted. This adherence is crucial for assessing your true potential, as each section is meticulously crafted to evaluate your potential for the corresponding competitive examinations.
3. Candidate should open the seal of Section-II only after devoting 45 minutes on Section-I.
4. Sheets will be given to each candidate for rough work. Candidate must fill all details on the rough sheet and submit the same to invigilator along with OMR sheet. Candidate must mention the Question No. while doing the rough work in the sheet.
5. Please note candidates are not allowed to bring any prohibited items into the exam hall such as electronic devices, mobile phones, smart watch, earphones, calculators, books, notes, formula sheets, and bags.
6. Marking scheme is given in table below:

Section	Subject	Question no.	Marking Scheme for each question	
			Correct answer	Wrong answer
SECTION – I (JEE Main) Time Allotted: 45 Minutes	PHYSICS (PART-A & D)	1 to 4 & 13 to 16	+4	-1
	CHEMISTRY (PART-B & E)	5 to 8 & 17 to 20	+4	-1
	MATHEMATICS (PART-C & F)	9 to 12 & 21 to 24	+4	-1
SECTION – II (JEE Advanced) Time Allotted: 90 Minutes	PHYSICS (PART-A & G)	25 to 27 & 40 to 45	+3	-1
	CHEMISTRY (PART-B & H)	28 to 30 & 46 to 51	+3	-1
	MATHEMATICS (PART-C & I)	31 to 33 & 52 to 57	+3	-1
	PHYSICS (PART-D)	34 to 35	+4 *Partial Marking	-2
	CHEMISTRY (PART-E)	36 to 37	+4 *Partial Marking	-2
	MATHEMATICS (PART-F)	38 to 39	+4 *Partial Marking	-2

* Partial Marking: (Q. No. 34 to 39):

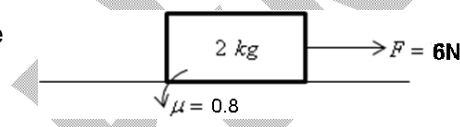
Full Marks	: +4 If only (all) the correct option(s) is(are) chosen;
Partial Marks	: +3 If all the four options are correct but ONLY three options are chosen;
Partial Marks	: +2 If three or more options are correct but ONLY two options are chosen, both of which are correct;
Partial Marks	: +1 If two or more options are correct but ONLY one option is chosen and it is a correct option;
Zero Marks	: 0 If none of the options is chosen (i.e. the question is unanswered)
Negative Marks	: -2 In all other cases.

Section - I

Time: 45 Minutes

PHYSICS - (PART - A)

This part contains 4 Multiple Choice Questions number 1 to 4. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

1. A block of mass 2 kg is placed on a rough surface, $F = 6$ N is applied on the block as shown, force of friction on the block is
(A) 12 N (B) 0 N
(C) 10 N (D) 6 N
- 
2. Weight of the body in air is 100 N and its appeared weight in water is 36 N then Buoyant force acting on it is
(A) 100 N (B) 36 N
(C) 64 N (D) 136 N
3. A body of mass m collides against a wall with a velocity v and rebounds with the same speed. Its change of momentum is
(A) $2mv$ (B) $3mv$
(C) mv (D) Zero
4. The lens used to correct myopia is
(A) concave (B) convex
(C) bifocal (D) coloured

CHEMISTRY - (PART - B)

This part contains 4 Multiple Choice Questions number 5 to 8. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

5. During electrolytic refining of zinc, it gets :
(A) deposited on cathode (B) deposited on anode
(C) deposited on cathode as well as anode (D) remains in the solution
6. Al and Zn, react with oxygen to form _____ oxides.
(A) Acidic (B) Neutral
(C) Amphoteric (D) Basic
7. Nature of products obtained on complete combustion of methane is:
(A) Acidic neutral (B) Acidic, basic.
(C) Basic, neutral (D) Neutral, neutral
8. Which of the following pairs of polymers have glucose as its monomer?
(A) Proteins and polyesters (B) Starch and cellulose
(C) Starch and proteins (D) Cellulose and proteins

MATHEMATICS – (PART – C)

This part contains 4 Multiple Choice Questions number 9 to 12. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

9. If $4(4x)^7 = 4^{6^2}$, then what is the value of x?
 (A) 5 (B) 25
 (C) 64 (D) 256
10. $\left(\frac{2}{3}\right)^{\text{rd}}$ of a number when multiplied by $\frac{3}{4}$ of the same number make 338. The number is:
 (A) 18 (B) 24
 (C) 36 (D) 26
11. If the angles of a triangle are in the ratio 2 : 3 : 4, then the difference between the greatest and smallest angles is :
 (A) 10 (B) 20
 (C) 30 (D) 40
12. Two angles in a triangle are in the ratio 4 : 5. If the sum of these angles is equal to the third angle, then the third angle is:
 (A) 180° (B) 40°
 (C) 50° (D) 90°

PHYSICS – (PART – D)

This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **TWO (02)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

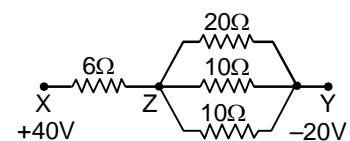
Comprehension-1 for Q. No. 13 to 14

A stone of mass 5 kg is thrown vertical upward direction. (Take $g = 10 \text{ ms}^{-2}$). Neglect air friction. Based on above information, answer the following questions:

13. The net force acting on stone during its upward motion is
 (A) 0.5 N, upward (B) 5 N, downward
 (C) 50 N, downward (D) zero
14. The net acceleration acting on stone at the highest point where it is momentarily at rest is
 (A) 10 m/s^2 , upward (B) 10 m/s^2 , first upward later downward
 (C) 10 m/s^2 , downward (D) zero

Comprehension-2 for Q. No. 15 to 16

In electric circuits many devices as resistances are connected in parallel and in series. When devices are in series the current through all is same. When devices are in parallel the potential drop across all is same. With this knowledge answer the following questions in the circuit given.



15. R_{eq} across ZY is
(A) 20 ohms (B) 10 ohms
(C) 4 ohms (D) 40 ohms
16. R_{eq} across XY is
(A) 11 ohms (B) 6 ohms
(C) 10 ohms (D) 20 ohms

CHEMISTRY – (PART – E)

This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **TWO (02)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

Comprehension-1 for Q. No. 17 to 18

Petroleum Conservation Research association is an organization established in India in 1978, under the aegis of the Ministry of Petroleum and Natural Gas of Government of India that is engaged in promoting energy efficiency in various sectors of the economy. It helps the government in proposing policies and strategies aimed at India's dependency on oil, in order to save money, reduce the environmental impact of oil use and also conserve fossil fuel. The PCRA is mandated to promote popular awareness of the importance of energy conservation

17. PCRA stands for
(A) Petroleum Conservation of Research Administration
(B) Petrol Conservation Research Automobiles
(C) Pure and Controlled Research Association
(D) Petroleum Conservation Research Association
18. The advice which is not given by PCRA is
(A) Ensure regular check up of the vehicles
(B) Ensure correct tyre pressure
(C) Switch off the head lights at traffic signals
(D) Drive at a constant and moderate speed as far as possible

Comprehension-2 for Q. No. 19 to 20

The rocks in which metals occur in the native state or combined state (in the form of compounds) are called minerals. The minerals from which the metals can be conveniently and economically extracted are known as ores.

19. A mineral is called ore if
(A) The metal present in the mineral is costly (B) A metal can be extracted from it
(C) A metal can be extracted profitably from it (D) A metal cannot be extracted from it
20. Which of the following statements is true?
(A) All ores are minerals (B) All minerals are ores
(C) A mineral cannot be an ore (D) An ore cannot be a mineral

MATHEMATICS – (PART – F)

This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **TWO (02)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

Comprehension-1 for Q. No. 21 to 22

P = Principal, A = Amount, I = Interest, n = no. of years, r% = rate of interest

The Simple Interest (S.I.) = $(P \times r \times n)/100$

If P is the principal kept at Compound Interest (C.I.)

@ r% p.a., amount after n years = $P(1 + r/100)^n$

Amount = Principal + Interest

21. A sum of money lent at compound interest amounts to Rs. 578.40 in 2 years and to Rs. 614.55 in 3 years. If at the same interest rate, the person lends Rs. 16,000 for 3 years at simple interest, how much interest will he receive?
- (A) Rs. 2,500 (B) Rs. 3,000
(C) Rs. 4,000 (D) Rs.3,500
22. Amit takes a loan from a bank at 18%CI for 2 years. At the end of the period, he pays back Rs. 6962. What was the loan amount?
- (A) Rs. 4000 (B) Rs. 6000
(C) Rs. 5000 (D) None of these

Comprehension-2 for Q. No. 23 to 24

Profit and loss terms are used to identify whether a sale is advantageous or not. We all are somewhat familiar with the concepts of profit and loss, when a person runs a business, he or she either faces loss or earns profits. When a person sells a product at a higher rate than the cost price, the difference between both amounts is called profit while when a person sells a product at a lower rate than the cost price, then the difference between both amounts is called loss.

23. A man sold 250 chairs and had a gain equal to selling price of 50 chairs. His profit per cent is:
- (A) 20% (B) 25%
(C) 50% (D) 15%
24. An article was sold at 16% gain. Had it been sold for Rs. 200 more, the gain would have been 20%. Then the cost price of the article is:
- (A) Rs. 5000 (B) Rs. 4800
(C) Rs.4500 (D) Rs. 5200

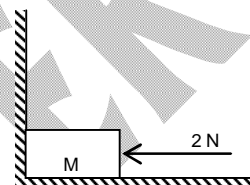
Section – II

Time: 90 Minutes

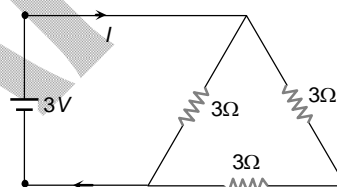
PHYSICS – (PART – A)

This part contains 3 Multiple Choice Questions number 25 to 27. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

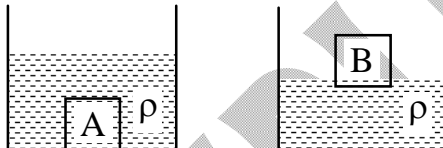
25. A 2 N force is applied to a mass M that is adjacent to a wall, as shown. If the mass is 2kg the force that the wall exerts on the mass is equal to
 (A) 0 N
 (B) 2 N
 (C) 15 N
 (D) 19.6 N



26. A 3 volt battery with negligible internal resistance is connected in a circuit as shown in the figure. The current I , in the circuit will be
 (A) $1/3$ A
 (B) 1 A
 (C) 1.5 A
 (D) 2 A



27. Both A and B block of some volume are placed in a same fluid then which of the following is true.



- (A) Density of A > Density of B and weight of A > Upthrust on A
 (B) Density of A = Density of B and weight of A = Upthrust on A
 (C) Density of A < Density of B and weight of A < Upthrust on A
 (D) None of these

CHEMISTRY – (PART – B)

This part contains 3 Multiple Choice Questions number 28 to 30. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

28. Which of the following oil is used in froth floatation process?
 (A) Coconut oil
 (B) Palm oil
 (C) Grease oil
 (D) Pine oil
29. Zinc Blende is concentrated by
 (A) chemical separation
 (B) magnetic speciation
 (C) froth floatation
 (D) hydraulic washing
30. Chemical method used in concentration of ore is known as -
 (A) bleaching
 (B) leaching
 (C) roasting
 (D) calcination

MATHEMATICS – (PART – C)

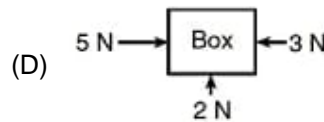
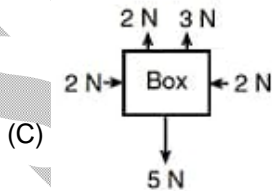
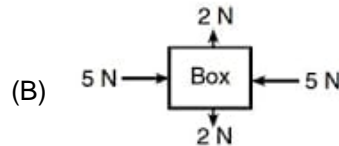
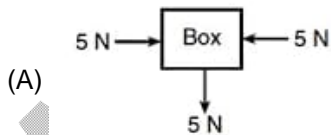
This part contains **3 Multiple Choice Questions** number **31 to 33**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

31. Factorization of the polynomial $11x^2 - 10\sqrt{3}x - 3$ gives
 (A) $(x + \sqrt{3})(11x - \sqrt{3})$ (B) $(x + 3\sqrt{3})(11x - \sqrt{3})$
 (C) $(x - \sqrt{3})(11x + \sqrt{3})$ (D) $(x + \sqrt{3})(11x + \sqrt{3})$
32. If $x + \frac{1}{x} = 7$, then $x^3 - \frac{1}{x^3}$ is
 (A) $9\sqrt{5}$ (B) $144\sqrt{5}$
 (C) $135\sqrt{5}$ (D) $\sqrt{5}$
33. A man buys two tables for Rs. 1350 and he sells one so as to lose 6% and the other so as to gain $7\frac{1}{2}\%$. On the whole transaction he neither gains nor losses. Find the cost of each table.
 (A) 1000, 350 (B) 850, 500
 (C) 750, 600 (D) 400, 950

PHYSICS – (PART – D)

This part contains **2 Multiple Choice Multi Correct Type Questions** number **34 to 35**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONE OR MORE THAN ONE** is/are correct.

34. Which diagram represents a box in equilibrium?



35. It is possible to observe total internal reflection when a ray is travelling from
 (A) Air to water (B) Glass to air
 (C) Water into glass (D) Glass into water

CHEMISTRY – (PART – E)

This part contains 2 Multiple Choice Multi Correct Type Questions number 36 to 37. Each question has 4 choices (A), (B), (C) and (D), out of which ONE OR MORE THAN ONE is/are correct.

36. Consider the following Coal $\xrightarrow[\text{in absence of air}]{\text{Strong heating}}$ X + Y + Z + Volatile impurities
 (i) 'Y' is the almost pure form of carbon and used as an essential raw material for steel industry.
 (ii) A number of useful substances are synthesised from 'Z' such as drugs, explosives roofing materials, naphthalene balls etc.
 Now, choose the incorrect option.
 (A) Y is coal gas and Z is coke
 (B) Y is coke and Z is coal gas
 (C) Y is coal tar and Z is coke
 (D) Y is coke and Z is coal tar
37. Which of the following lie above hydrogen in the activity series?
 (A) Aluminium
 (B) Silver
 (C) Mercury
 (D) Lead

MATHEMATICS – (PART – F)

This part contains 2 Multiple Choice Multi Correct Type Questions number 38 to 39. Each question has 4 choices (A), (B), (C) and (D), out of which ONE OR MORE THAN ONE is/are correct.

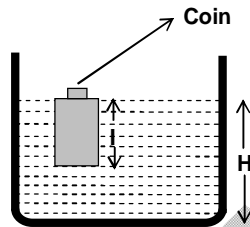
38. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, then $\frac{a^3 + c^3 + e^3}{b^3 + d^3 + f^3} =$
 (A) $\frac{a^3}{b^3}$
 (B) $\frac{a^2 \cdot c}{b^2 \cdot d}$
 (C) $\frac{a^2 d}{b^2 c}$
 (D) $\frac{a \cdot c \cdot e}{b \cdot d \cdot f}$
39. $y = \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots \infty}}}$, then the value of y is:
 (A) 3
 (B) 4
 (C) greater than 3
 (D) less than 6

PHYSICS – (PART – G)

This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

Comprehension-1 for Q. No. 40 to 42

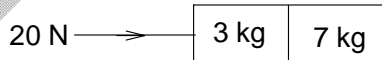
A wooden block with a coin placed on its top, floated in water as shown in fig. The distance l and h are shown there.



40. When coin ball into the water then
 (A) l decreases and h increases
 (B) l increases and h decreases
 (C) Both l and h increases
 (D) Both l and h decreases
41. The motion of coin and block just after the falling of coin into water move
 (A) Both will move vertically downward
 (B) Both will move vertically upward
 (C) Coin will move vertically downward and block will move vertically upward
 (D) Coin will move vertically upward and block will move vertically downward
42. If we replace the water by a fluid of higher density then
 (A) l decreases
 (B) l increases
 (C) no change in l
 (D) Can't say

Comprehension-2 for Q. No. 43 to 45

Two blocks of mass 3 kg and 7 kg are kept on smooth table. A force of 20 N is applied on 3 kg as shown in figure.



Now answer following questions based on given information.

43. Acceleration of 3 kg block is _____ m/s^2
 (A) $\frac{20}{3}$
 (B) 2
 (C) 1
 (D) $\frac{20}{7}$
44. Net force acting on 7 kg block is
 (A) 14 N
 (B) 20 N
 (C) 6 N
 (D) zero
45. The force acting between 3 kg and 7 kg will be
 (A) 14 N
 (B) 20 N
 (C) 6 N
 (D) zero

CHEMISTRY – (PART – H)

This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

Comprehension-1 for Q. No. 46 to 48

Metallurgy is defined as a process that is used for the extraction of metals in their pure form. The compounds of metals mixed with soil, limestone, sand, and rocks are known as minerals. Metals are commercially extracted from minerals at low cost and minimum effort. These minerals are known as ores.

The metallurgy of a metal involves three main operations:

- (i) Concentration or dressing of the ore.
- (ii) Isolation of the metal in crude state from the concentrated ore.
- (iii) Purification or refining of the crude metal.

46. Extraction of zinc from zinc blende is achieved by
 (A) Electrolytic reduction
 (B) Roasting followed by reduction with carbon
 (C) Roasting followed by reduction with another metal
 (D) Roasting followed by self reduction
47. In the aluminothermy process, aluminium acts as
 (A) An oxidising agent (B) A flux
 (C) A reducing agent (D) A solder
48. Heating ore with carbon in absence of air is known as
 (A) Reduction (B) Calcination
 (C) Smelting (D) Roasting

Comprehension-2 for Q. No. 49 to 51

The destructive distillation of coal is the process of heating coal in the absence of air.

Carbon, hydrogen, oxygen, nitrogen, and sulphur are among the elements found in coal.

When coal is burned in the absence of air, it produces a variety of products.

Coke: It has a carbon content of 98 percent

Liquid coal tar: Coal tar is made up of a variety of carbon compounds.

Coal gas: It is a mixture of hydrogen, methane, and carbon monoxide that comes from coal.

49. A black coloured substance X is obtained as product of coal processing. X is used in road surfacing and a compound Y is also obtained from the substance X. Compound Y is used to repel insects and moths. Compounds X and Y respectively are
 (A) Bitumen and naphthalene (B) Coal tar and coke
 (C) Bitumen and coke (D) Coke and naphthalene
50. Consider the given process

$$\text{Coal} \xrightarrow{\text{Strong heating}} \text{X(s)} + \text{Y(l)} + \text{Z(g)} + \text{volatile impurities.}$$
 The products 'Y', 'Z' and 'X' respectively are
 (A) Coal gas, Coal tar, Coke (B) Coal tar, Coke and Coal gas
 (C) Coke, Coal tar and Coal gas (D) Coal tar, Coal gas and Coke
51. Which of the following compounds found in Coal tar?
 (A) Benzene (B) Aniline
 (C) Anthracene (D) All of these

MATHEMATICS – (PART – I)

This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

Comprehension-1 for Q. No. 52 to 54

For two numbers a and b

$$(a + b)^3 = a^3 + b^3 + 3ab(a + b)$$

$$(a - b)^3 = a^3 - b^3 - 3ab(a - b)$$

52. If $\frac{x}{y} + \frac{y}{x} = -1$, ($x, y \neq 0$), then value of $x^3 - y^3$ is
 (A) 1 (B) -1
 (C) 0 (D) 1/2
53. Which of the following is a factor of $(x + y)^3 - (x^3 + y^3)$?
 (A) $x^2 + y^2 + 2xy$ (B) $x^2 + y^2 - xy$
 (C) xy^2 (D) $3xy$
54. If $a = 5^{1/3} + 5^{2/3}$ find $a^3 - 15a + 7$
 (A) 36 (B) 37
 (C) 38 (D) 39

Comprehension-2 for Q. No. 55 to 57

Sumit left for Kanpur by car. Having travelled 420 km, which constituted 87.5% of the distance, he was stopped due to a traffic jam. The jam was cleared in 9 min. Sumit then increased his speed by 20 km/hr and reached his destination 6 min earlier than had anticipated.

55. What was the initial speed (in kmph) of the car?
 (A) 80 (B) 75
 (C) 72 (D) 60
56. What is the average speed of the car over the entire journey?
 (A) 64 km/hr (B) 60 km/hr
 (C) 72 km/hr (D) None of these
57. What is the total time taken to cover the entire journey ?
 (A) 7.1 hrs (B) 7.3 hrs
 (C) 7.4 hrs (D) 7.9 hrs

FIITJEE

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Paper 3

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Paper Code: 89-3

ANSWER KEY

- | | | | |
|----------|-------------|-------------|-------------|
| 1. D | 2. C | 3. A | 4. A |
| 5. A | 6. C | 7. A | 8. B |
| 9. D | 10. D | 11. D | 12. D |
| 13. C | 14. C | 15. C | 16. C |
| 17. D | 18. C | 19. C | 20. A |
| 21. B | 22. C | 23. B | 24. A |
| 25. B | 26. C | 27. A | 28. D |
| 29. C | 30. B | 31. C | 32. B |
| 33. C | 34. B, C | 35. B, D | 36. A, B, C |
| 37. A, D | 38. A, B, D | 39. B, C, D | 40. D |
| 41. C | 42. A | 43. B | 44. A |
| 45. A | 46. B | 47. C | 48. C |
| 49. A | 50. D | 51. D | 52. C |
| 53. D | 54. B | 55. D | 56. D |
| 57. D | | | |