Fortunate 40

Sample Paper

for Students presently in Class VIII

Paper 3

NSEJS, JEE (Main) & JEE (Advanced)

Duration : 90 minutes   *Maximum Marks : 141*

Please read the instructions and guidelines carefully :

Important Note : Please ensure to accurately input the details for the Class and Paper No. as indicated at the top of this sheet 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 3 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 30 Minutes on Section-I, 30 Minutes on Section-II and 30 Minutes on Section-III. 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 30 minutes on Section-I and Seal for Section-III is to be opened only after devoting 30 minutes on Section-II.

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 (NSEJS) Time Allotted: 30 Minutes	**PHYSICS**	**(PART-A)**	1 to 4	+3	−1
	CHEMISTRY	**(PART-B)**	5 to 8	+3	−1
	BIOLOGY	**(PART-C)**	9 to 12	+3	−1
SECTION – II (JEE Main) Time Allotted: 30 Minutes	**PHYSICS**	**(PART-A)**	13 to 17	+4	−1
	CHEMISTRY	**(PART-B)**	18 to 22	+4	−1
	MATHEMATICS	**(PART-C)**	23 to 27	+4	−1
SECTION – III (JEE Advanced) Time Allotted: 30 Minutes	**PHYSICS**	**(PART-A)**	28 to 32	+3	−1
	CHEMISTRY	**(PART-B)**	33 to 37	+3	−1
	MATHEMATICS	**(PART-C)**	38 to 42	+3	−1

Section – I

Time: 30 Minutes

PHYSICS – (PART – A)

*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. 1 to 2

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

1.   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

2.   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. 3 to 4

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.
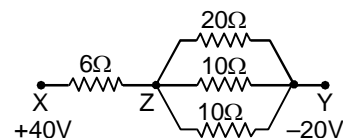
3. R_{eq} across ZY is
     (A) 20 ohms   (B) 10 ohms
     (C) 4 ohms   (D) 40 ohms

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

CHEMISTRY – (PART – B)

*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. 5 to 6

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.

5. 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

6. 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

Comprehension–2 for Q. No. 7 to 8

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

7. 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

8. 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

BIOLOGY – (PART – C)

*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. 9 to 10

Whenever you fall ill, the doctor may give you some antibiotic tablets, capsules or injections such as of penicillin. The source of these medicines are microorganisms. These medicines kill or stop the growth of the disease-causing microorganisms. Such medicines are called as antibiotics. These days a number of antibiotics are being produced from bacteria and fungi. Streptomycin, Tetracycline and Erythromycin are some of the commonly known antibiotics, which are made from fungi and bacteria. Antibiotics are even mixed with the feed of livestock and poultry to check microbial infection in animals. They are also used to control many plant diseases.

9. Which of the following is not an antibiotic?
    (A) Streptomycin
    (B) Tetracycline
    (C) Erythromycin
    (D) Albendazole

10. Antibiotics are obtained from
    (A) Fungi
    (B) Bacteria
    (C) Both (A) and (B)
    (D) Virus

Comprehension–2 for Q. No. 11 to 12

Deforestation is a major cause which leads to the change in soil properties. Physical properties of the soil get affected by plantation and vegetation. Fewer trees result in more soil erosion. Removal of the top layer of the soil exposes the lower, hard and rocky layers. This soil has less humus and is less fertile. Gradually the fertile land gets converted into deserts. It is called desertification. Deforestation also leads to a decrease in the water holding capacity of the soil. The movement of water from the soil surface into the ground (infiltration rate) is reduced. So, there are floods.

11. Which of the following process leads to decrease in water holding capacity?
    (A) Deforestation
    (B) Reforestation
    (C) Fragmentation
    (D) Stratification

12. The top layer of soil contains dark, amorphous substance called as
    (A) Bed Rock
    (B) Substratum
    (C) Humus
    (D) Sub-soil

Section – II

Time: 30 Minutes

PHYSICS – (PART – A)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 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 15

A wooden block with a coin placed on its top, floated in water as shown in fig. The distance I and h are shown there.
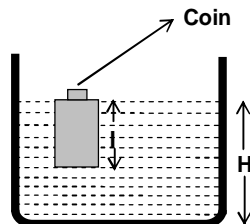
13. When coin ball into the water then
    (A) I decreases and h increases
    (B) I increases and h decreases
    (C) Both I and h increases
    (D) Both I and h decreases

14. 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

15. If we replace the water by a fluid of higher density then
(A) I decreases
(B) I increases
(C) no change in I
(D) Can't say

Comprehension–2 for Q. No. 16 to 17

Pressure in a still liquid increases with increase in depth by formula $\rho = h\rho g$. Here h denotes the height of liquid column, ρ denotes the density of that liquid and g denotes acceleration due to gravity.

16. Atmospheric pressure is equal to pressure exerted by mercury column of height 76 cm. (Take $\rho_{mercury}$ = 13600 kg/m^3 g = 10 m/s^2)
(A) 1.03×10^5 N/m^2
(B) 1.10×10^5 N/m^2
(C) 2.02×10^5 N/m^2
(D) 1.01×10^3 N/m^2

17. A solid metal cube of side 4 cm is dipped inside water of density 1000 kg/m^3 as shown in figure. Upthrust acting on the cube (take g = 10 m/s^2)
(A) 6.4 N
(B) 64 N
(C) 0.64 N
(D) 0.064 N
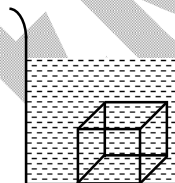
CHEMISTRY – (PART – B)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 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. 18 to 20

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.

18. 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

19. In the aluminothermy process, aluminium acts as
(A) An oxidising agent
(B) A flux
(C) A reducing agent
(D) A solder

20. Heating ore with carbon in absence of air is known as
(A) Reduction
(B) Calcination
(C) Smelting
(D) Roasting

Comprehension–2 for Q. No. 21 to 22

Reactive metals like sodium and potassium react with water with evolution of hydrogen gas and forming corresponding hydroxides where as the metals magnesium, zinc, aluminium and Iron are too low in reactivity to react with cold water but they will react with steam when red hot forming corresponding oxides.

21. Which of the following metal forms corresponding hydroxide on reaction with water?
(A) Al   (B) Na
(C) Fe   (D) Zn

22. Which of the following metal do not react with cold water?
(A) Na   (B) K
(C) Mg   (D) Li

MATHEMATICS – (PART – C)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 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. 23 to 25

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.

23. What was the initial speed (in kmph) of the car?
(A) 80   (B) 75
(C) 72   (D) 60

24. 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

25. 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

Comprehension–2 for Q. No. 26 to 27

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

26. 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

27. 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

Section – III

Time: 30 Minutes

PHYSICS – (PART – A)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 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. 28 to 30

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.

$$20 \text{ N} \longrightarrow \boxed{3 \text{ kg} \mid 7 \text{ kg}}$$
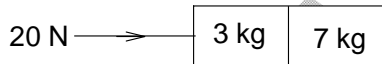
Now answer following questions based on given information.

28. Acceleration of 3 kg block is _____ m/s^2

(A) $\dfrac{20}{3}$

(B) 2

(C) 1

(D) $\dfrac{20}{7}$

29. Net force acting on 7 kg block is
(A) 14 N
(B) 20 N
(C) 6 N
(D) zero

30. The force acting between 3 kg and 7 kg will be
(A) 14 N
(B) 20 N
(C) 6 N
(D) zero

Comprehension–2 for Q. No. 31 to 32

A ball of mass m is dropped from a height H above a level floor as shown in figure. After striking the ground it bounces off back and reaches up to height h.
Based on above information, answer the following questions:
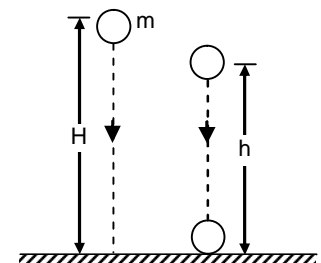
31. The speed of the ball just before striking is
(A) $\sqrt{2\,gH}$
(B) $\sqrt{2\,gh}$
(C) $\sqrt{2\,g(H-h)}$
(D) None of these

32. Loss in speed just before and just after of collision is
(A) $\sqrt{2g}(\sqrt{H}+\sqrt{h})$
(B) $\sqrt{2}\,g(\sqrt{H}+\sqrt{h})$
(C) $\sqrt{2g}(\sqrt{H}-\sqrt{h})$
(D) $\sqrt{2}\,g(\sqrt{H}-\sqrt{h})$

CHEMISTRY – (PART – B)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 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. 33 to 35

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.

33. 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

34. Consider the given process
$$Coal \xrightarrow{\text{Strong heating}} X(s) + Y(\ell) + Z(g) + \text{volatile impurities.}$$ 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

35. Which of the following compounds found in Coal tar
(A) Benzene
(B) Aniline
(C) Anthracene
(D) All of these

Comprehension–2 for Q. No. 36 to 37

Aluminium is stable in air and water in spite of the fact that it is reactive metal. The reason is that a thin film of its oxide is formed on its surface which makes it passive for further attack. The layer is so useful that in industry, it is purposely deposited by an electrolytic process called anodising. Reaction of aluminium with oxygen is highly exothermic and is called thermite reaction

$$2Al(s) + \frac{3}{2}O_2(g) \longrightarrow Al_2O_3(s); \ \Delta H = -1670 kJ$$
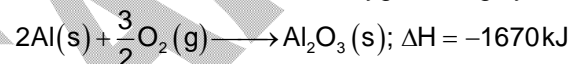
Thermite reaction finds applications in the metallurgical extraction of many metals from their oxides and for welding of metals. The drawback is that to start the reaction, high temperature is required for which an ignition mixture is used.

36. The reaction which is not involved in thermite process:
(A) $3Mn_3O_4 + 8Al \longrightarrow 9Mn + 4Al_2O_3$
(B) $Cr_2O_3 + 2Al \longrightarrow 2Cr + Al_2O_3$
(C) $2Fe + Al_2O_3 \longrightarrow Fe_2O_3 + 2Al$
(D) $B_2O_3 + 2Al \longrightarrow 2B + Al_2O_3$

37. Anodised aluminium is
(A) Al obtained at anode
(B) Al prepared electolytically
(C) Alloy of Al containing 95% Al
(D) Al electrolytically coated with aluminium oxide

MATHEMATICS – (PART – C)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 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. 38 to 40

For two numbers a and b

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

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

38.   If $\dfrac{x}{y} + \dfrac{y}{x} = -1$, (x, y ≠ 0), then value of $x^3 - y^3$ is

(A) 1   (B) –1
(C) 0   (D) 1/2

39.   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) $3xy$

40.   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. 41 to 42

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.

41.   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%

42.   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

40

Fortunate

Sample Paper

for Students presently in Class VIII

Paper 3

NSEJS, JEE (Main) & JEE (Advanced)

ANSWER KEY

1.	**C**	2.	**C**	3.	**C**	4.	**C**
5.	**C**	6.	**A**	7.	**D**	8.	**C**
9.	**D**	10.	**C**	11.	**A**	12.	**C**
13.	**D**	14.	**C**	15.	**A**	16.	**A**
17.	**C**	18.	**B**	19.	**C**	20.	**C**
21.	**B**	22.	**C**	23	**D**	24.	**D**
25.	**D**	26.	**B**	27	**C**	28.	**B**
29.	**A**	30.	**A**	31.	**A**	32.	**C**
33.	**A**	34.	**D**	35.	**D**	36.	**C**
37.	**D**	38.	**C**	39.	**D**	40.	**B**
41.	**B**	42.	**A**					