

Instructions

1. Keep the timer and then start the exam.
2. Keep your work tidy.
3. Make sure to write new section on the new page and all the questions number properly.
4. For Maths - make sure to do all the rough work on the right hand side only.
5. Recheck your paper before submitting. Check your paper like you are checking your enemy's paper - find the maximum mistakes and then correct it.

SECTION-A

Q1. The number $1.\bar{3}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$, is:

- A** $\frac{32}{100}$ **B** $\frac{3}{10}$ **C** $\frac{1}{3}$ **D** $\frac{2}{100}$

1 Mark

Q2. Simplified value of $(16)^{-\frac{1}{4}} \times \sqrt[4]{16}$ is:

- A** 0 **B** 1 **C** 4 **D** 16

1 Mark

Q3. Write the correct answer in the following:
Which of the following is equal to $x^{\frac{1}{2}}$?

- A** $x^{\frac{1}{2}} - x^{\frac{1}{2}}$ **B** $\sqrt[2]{(x^{\frac{1}{2}})^{\frac{1}{2}}}$
C $(\sqrt{x^2})^{\frac{1}{2}}$ **D** $x^{\frac{1}{2}} \times x^{\frac{1}{2}}$

1 Mark

Q4. The simplest form of 0.123 is:

- A** $\frac{41}{333}$ **B** $\frac{37}{330}$ **C** $\frac{11}{333}$ **D** None of these.

1 Mark

Q5. If $8 = t^{\frac{2}{3}} + 4t^{-\frac{1}{3}}$, What is the value of t when $t = 64$?

- A** $\frac{31}{2}$ **B** $\frac{33}{2}$ **C** 16 **D** $\frac{257}{16}$

1 Mark

Q6. Which of the following is equal to $x^{\frac{1}{2}}$?

- A** $\sqrt[2]{(x^{\frac{1}{2}})^{\frac{1}{2}}}$ **B** $x^{\frac{1}{2}} \times x^{\frac{1}{2}}$
C $(\sqrt{x^2})^{\frac{1}{2}}$ **D** $x^{\frac{1}{2}} - x^{\frac{1}{2}}$

1 Mark

Q7. Classify the following number as rational or irrational, give reasons to support your answer.
 $\sqrt{21}$

1 Mark

Q8. Classify the following number as rational or irrational, give reasons to support your answer.
3.04040004...

1 Mark

Q9. Give an example of two irrational numbers whose Difference is a rational number.

1 Mark

Q10. Give an example of two irrational numbers whose Sum is an irrational number.

1 Mark

Q11. Classify the following number as rational or irrational, give reasons to support your answer.
 $\frac{2}{3}\sqrt{6}$

1 Mark

Q12. Define an irrational number.

1 Mark

SECTION-B

Q13. Write $(625)^{-\frac{1}{4}}$ in decimal form.

2 Marks

Q14. State the power law of exponents.

2 Marks

Q15. Let a be a rational number and b be an irrational number. Is ab necessarily an irrational number? Justify your answer with an example.

2 Marks

Q16. Is the product of two irrationals always irrational? Justify your answer.

2 Marks

Q17. If $a = \frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$ and $b = \frac{\sqrt{5}-\sqrt{2}}{\sqrt{5}+\sqrt{2}}$, show that $3a^2 + 4ab - 3b^2 = 4 + \frac{26}{3}\sqrt{10}$.

3 Marks

Q18. If $p = \frac{3-\sqrt{5}}{3+\sqrt{5}}$ and $q = \frac{3+\sqrt{5}}{3-\sqrt{5}}$, find the value of $p^2 + q^2$.

3 Marks

Q19. Rationalise the denominator of the following:
 $\frac{2}{\sqrt{3}+\sqrt{5}-\sqrt{2}}$

3 Marks

Q20. Express in the form of $\frac{p}{q}$: $0.\overline{38} + 1.\overline{27}$.

3 Marks

SECTION-C

Q21. Prove that:

4 Marks

$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}} = 2$$

Q22. Prove that:

$$\frac{3^{-5} \times 9^{\frac{5}{2}} \times \sqrt{81}}{5^2 \times \sqrt[3]{\frac{27}{5}} \times (15)^{-\frac{1}{3}} \times 3^{\frac{1}{3}}} = 28\sqrt{2}$$