TEST # X - 01, May 2023

NAME: _____   Total. Time: 1:30 Hr   M.M: 150

INSTRUCTIONS

1. The paper consists of two sections A & B. Section A – Mathematics & Section B - Science.

2. The objective paper is designed by considering School Exam, NTSE & IIT Foundation.

3. The marking system is given just before the start of the Part in each section.

4. Blank papers, clipboards, log tables, slide rules, calculators, cameras, cellular phones, pagers and electronic gadgets are NOT allowed during exam.

5. The maximum mark allotted to the paper is 150.

6. Total time allotted for the exam is 1:30 Hours.

7. SECTION – A (MATHEMATICS) Questions No's: 1 – 15.

   SECTION – B (SCIENCE) Questions No's 16 – 45.

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Test is just a crosscheck of our learning during the month! So, be honest with thyself!

SECTION – A (MATHEMATICS)

PART - I

SINGLE OPTION CORRECT (+ 4, – 1, 0)

1. When $\left(x^5 + 1\right)$ is divided by (x - 2), the remainder is -

   (A) 5   (B) 17   (C) 31   (D) 33

2. If (x + 1) and (x - 2) are the factors of the expression $(2x^3 – px^2 + x + q)$, then the values of p and q are given by -

   (A) p = 5, q = 2   (B) p = 7, q = 8   (C) p = 7, q = 10   (D) p = 15, q = 12

3. If (x - 3), (x - 3) are factors of $x^3 – 4x^2 – 3x + 18$ then the other factor is

   (A) x + 2   (B) x + 3   (C) x - 2   (D) x + 6

4. If α, β, γ are the zeroes of the polynomial $ax^3 + bx^2 + cx + d$, then the value of $\alpha\beta + \beta\gamma + \gamma\alpha$ is -

   (A) - c/a   (B) c/a   (C) - d/a   (D) d/a

5. If $x^2 + y^2 = 25$, xy = 12, then value of x is/are -

   (A) {3, 4}   (B) {3, - 3}   (C) {3, 4, - 3, - 4}   (D) {- 3, - 4}

6. If the roots of the equation $2x^2 + 3(k - 2)x + k + 4 = 0$ be equal in magnitude but opposite in sign, then k is/are

   (A) 1   (B) 2   (C) 3   (D) None

ROUGH SPACE

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7. The discriminant D = b^2 – 4ac of the quadratic equation ax^2 + bx + c = 0, where a, b & c are real. indicates

   (A) D > 0 → Roots are Imaginary

   (B) D > 0 → Roots are equal

   (C) D = 0 → Roots are equal and Imaginary

   (D) D = 0 → Roots are equal and Real

8. Nature of the roots of the quadratic equation x^2 – x + 1 = 0 is/are

   (A) Real and Distinct

   (B) Imaginary and Distinct

   (C) Real and Equal

   (D) Imaginary and Equal

9. When f(x) = x^3 + ax^2 – bx – 8 is divided by x – 2, the remainder is zero and when divided by x + 1, the remainder is – 30. Find the value of "a" and "b".

   (A) a = 7, b = 3   (B) a = - 7, b = - 5   (C) a = - 7, b = - 14   (D) a = 5, b = - 14

10. If $\dfrac{2}{3}$ & $-\dfrac{1}{2}$ are solutions of quadratic equation $6x^2$ + ax – b = 0. The value of a and b are _____

   (A) a = - 1, b = - 2   (B) a = 1, b = - 2   (C) a = - 1, b = 2   (D) a = 1, b = 2

PART – II

MULTI OPTION CORRECT (+ 4, –1, 0).

11. x = 3 is a solution of (k + 2)x^2 – kx + 6 = 0 and β is another root of it, then

   (A) k = 4   (B) k = - 4   (C) β = 1   (D) β = - 1

12. Solutions of $(x^2 + 3x)^2$ - $(x^2 + 3x)$ – 6 = 0, x∈R. is/are

   (A) x = - 1   (B) x = 2   (C) $\dfrac{-3+\sqrt{21}}{2}$ (D) $\dfrac{-3+\sqrt{7}}{2}$

ROUGH SPACE

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13. Select the correct options.

   If p(x) = q(x)d(x) + r(x), by division algorithm, where p(x) & d(x) are any two polynomials with d(x) ≠ 0 then

   (A) r(x) = 0 always

   (B) degree of r(x) < degree of d(x) always

   (C) If r(x) = 0 then d(x) is a factor of p(x)

   (D) if divisor d(x) is linear then r(x) = constant

14. Consider the equation $x^3 - x^2 - kx + k = 0$, $k > 0$ and $\alpha, \beta \,\&\, \gamma$ as their roots then

   (A) $\dfrac{1}{\alpha} + \dfrac{1}{\beta} + \dfrac{1}{\gamma} = 1$

   (B) $\alpha + \beta + \gamma = 1 \, \forall \, k \in R^+$

   (C) if k < 0, then equation has only one real root

   (D) If k = 0, then equation has two distinct roots

15. If α, β are roots of the equation $x^2 - 3x + 7 = 0$, then

   (A) $\dfrac{1}{\alpha} + \dfrac{1}{\beta} = \dfrac{3}{7}$

   (B) $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha} = -\dfrac{5}{7}$

   (C) $(\alpha - \beta)^2 = -19$

   (D) $\alpha + \dfrac{7}{\alpha} + 3 = 0$

ROUGH SPACE

←⊢~ ■: ☺ ☺ Best of Luck! ☺ ☺ :■ ~⊢→

SECTION – B (SCIENCE)

PART – I (PHYSICS)

SINGLE OPTION CORRECT (+ 3, – 1, 0)

16. An object is placed at the center of curvature of a concave mirror. The distance between its image and the pole is -

    (A) equal to f   (B) between f and 2f   (C) equal to 2f   (D) greater than 2f

17. Select the in-correct statement(s)

    (A) If Light ray incident normal to the interface of medium then deviation of light is 0°

    (B) Frequency of Light remain unaffected when it travels in different mediums

    (C) In VIBGYOR light spectrum, Violet (V) monochromatic light has Larger Wavelength (λ)

    (D) Optical densities relation $_a\mu_g = \dfrac{1}{_g\mu_a}$

18. A ray of light travelling in air falls on the surface of a transparent slab. The ray makes an angle of 45° with the normal to the surface. Find the angle made by the refracted ray with the normal within the slab. Refractive index of the material of the slab = $\sqrt{2}$.

    (A) 30° (B) 45° (C) 60° (D) None of these

19. Refractive index of water is 4/3. Calculate the speed of light in water. Speed of light in vacuum is 3×10^8 m/s.

    (A) 2.5×10^8 m/s   (B) 2.25×10^8 m/s   (C) 2×10^8 m/s   (D) 4×10^8 m/s

20. h_o = height of object, h_e = height of Image. Select the correct relation of Magnification m in the case of spherical mirrors.

    (A) $m = \dfrac{h_o}{h_e} = -\dfrac{v}{u}$ (B) $m = \dfrac{h_e}{h_o} = -\dfrac{u}{v}$ (C) $m = \dfrac{h_e}{h_o} = \dfrac{u}{v}$ (D) $m = \dfrac{h_e}{h_o} = -\dfrac{v}{u}$
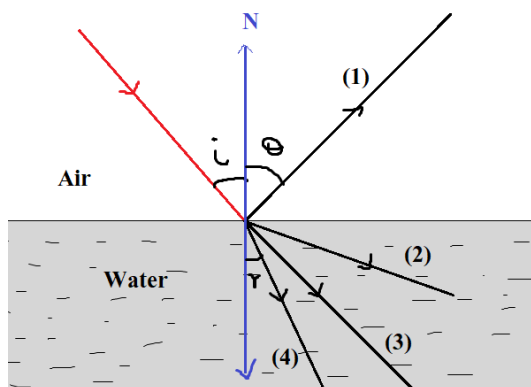
ROUGH SPACE

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21. Consider the figure as shown for the incident light on water surface.

Select the Wrong statement (Assume $\mu_{water} > \mu_{air}$)

(A) Angles $\angle i = \angle \theta$ & reflection is negligible than refraction.

(B) Refracted ray is ray (2)

(C) Refracted ray is ray (4)

(D) Speed of Light in water is less than in air and

$_{air}\mu_{water} = \dfrac{V_{air}}{V_{water}}$, where v represent speed of light.

22. Where should an object be placed before a concave mirror of focal length 20 cm so that a real image is formed at a distance of 60 cm from it?

(A) 25 cm   (B) 30 cm   (C) 35 cm   (D) None of these

PART – I - B

MULTI OPTION CORRECT (+ 4, -1, 0).

23. Select the correct statement(s)

(A) Light cannot travel in vacuum.

(B) A real image of an object can be formed only by a concave mirror.

(C) The angle of incidence and the angle of reflection are equal and non-coplanar with its Normal.

(D) in VIBGYOR light spectrum violet light travel slower in water than Red monochromatic light.

24. Correct statement(s) about the Snell's Law of Refraction.

(A) Optical density of a medium in which light travels (μ) = c/v

(B) The angle of Incidence and the angle of refraction satisfy the equation $\dfrac{\sin(i)}{\sin(r)} = $ Constant $(_1\mu_2)$.

(C) Optical density of rarer medium is greater than denser medium.

(D) Bending of light at the interface of two mediums is due to different optical densities of the mediums.

25. Select the correct statement(s)

(A) the algebraic sum of moments due to weights $w_1, w_2, ..., w_n$ of each point about the point center of gravity (G) is Zero.

(B) An Object is revolving about a mass m with uniform speed then it's Non-Accelerated motion

(C) Centrifugal Force & Centripetal Force are equal in magnitude but opposite in direction

(D) Moment of Force unit is Newton Meter in SI System

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CLASS – 10th

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PART – II (CHEMISTRY)

SINGLE OPTION CORRECT (+ 3, – 1, 0)

26. Which of the following is not a property of an acid?

    (A) Sour taste

    (B) Turns blue litmus paper red

    (C) Reacts with metals to produce hydrogen gas

    (D) Feels slippery

27. The pH value of a solution with a high concentration of hydrogen ions is:

    (A) Less than 7

    (B) Equal to 7

    (C) Greater than 7

    (D) Cannot be determined

28. What happens when an acid is mixed with a base?

    (A) A salt and water are produced

    (B) A gas is produced

    (C) An acid is produced

    (D) A base is produced

29. Which of the following is a strong acid?

    (A) Hydrochloric acid   (B) Citric acid   (C) Acetic acid   (D) Carbonic acid

30. What is the pH of a neutral solution?

    (A) 0   (B) 7   (C) 14   (D) Can't be determined

31. What is the product of the reaction between an acid and a metal oxide?

    (A) A salt and water   (B) A gas and water   (C) A base and water   (D) A metal and water

32. Which of the following is not a method to determine the concentration of an acid or base?

    (A) pH meter   (B) Titration   (C) Indicator solution   (D) Electrolysis

33. Which of the following is an example of a weak base?

    (A) Ammonia   (B) Sodium hydroxide   (C) Calcium hydroxide   (D) Potassium hydroxide

34. Which of the following is not a use of acids?

    (A) As a cleaning agent

    (B) In food preservation

    (C) In making fertilizers

    (D) In making metals rust-resistant

35. Which of the following is not an acid rain effect?

    (A) Erosion of buildings and statues

    (B) Increase in soil fertility

    (C) Harm to aquatic life

    (D) Acidification of lakes and stream

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CLASS – 10th   FOUNDATION TEST SERIES

PART – III (BIOLOGY)

SINGLE OPTION CORRECT (+ 3, – 1, 0)

36. Which one of the following is not an excretory activity:

   (A) giving out carbon dioxide   (B) passing out of faecal matter

   (C) sweating   (D) removal of urea

37. In which part of the alimentary canal digested food is absorbed:

   (A) stomach   (B) appendix   (C) large intestine   (D) small intestine

38. saliva contains an enzyme called:

   (A) amylase   (B) lipase   (C) trypsin   (D) pepsin

39. Bile juice is stored in:

   (A) liver   (B) gall bladder   (C) pancreas   (D) one of these

40. What is malpighian body

   (A) PCT & DCT   (B) bowman's capsule & glomerulus

   (C) PCT & Loop of Hensley   (D) DCT & loop of henele

41. Functional unit of kidney is

   (A) Neuron   (B) Nephron   (C) malpighian body   (D) afferent artery

42. In humans urea is formed in

   (A) ureter   (B) liver   (C) kidney   (D) spleen

43. excretion primarily involves:

   (A) removal of all byproducts during catabolism   (B) removal of all byproducts during anabolic

   (C) throwing out access water   (D) Removal of nitrogenous wastes

44. Which of the following is fat digesting enzyme

   (A) trypsin   (B) amylase   (C) pepsin   (D) lipase

45. In mammalian kidney, formation of urine involves

   (A) glomerular filtration, tubular reabsorption, tubular secretion

   (B) glomerular filtration, tubular secretion, tubular reabsorption

   (C) tubular secretion, tubular reabsorption, glomerular filtration

   (D) none of these

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