

Name

.....

Batch..... Roll No.

BRILLIANT SCIENCE OLYMPIAD

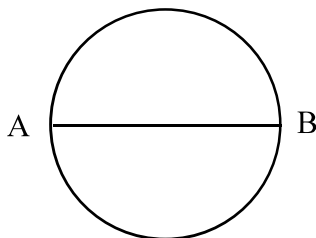
MOCK TEST

PHYSICS + CHEMISTRY + BIOLOGY + MATHS

Class X

PHYSICS

1. In the figure given below, find the resistance between points A and B. Both the circle and the diameter are made of uniform wire of resistance 1×10^{-4} ohm per metre. The length AB is 2 metre.



- A) $\frac{2}{3} \times 10^{-4}$ ohm B) $2\pi \times 10^{-4}$ ohm C) 14.56×10^{-4} ohm D) 0.88×10^{-4} ohm
2. A conductor offers resistance R to the flow of current. If the length of the conductor is doubled and area of cross-section is halved, the new resistance becomes:
A) 2R B) 4R C) 8R D) R/4
3. A straight conductor of length 0.5 m carrying current 2A is placed perpendicular to a magnetic field of 0.2 T. The force on the conductor is:
A) 0.1 N B) 0.2 N C) 0.4 N D) 0 N
4. Two parallel long wires carry currents in the same direction. They will:
A) Repel each other B) Attract each other
C) Not exert any force on each other D) Rotate about each other
5. A car accelerates uniformly from rest and attains a speed of 20 m/s in 10 s. The distance travelled by the car in this time is:
A) 100 m B) 150 m C) 200 m D) 250 m
6. A body moves with uniform acceleration. If it covers 5 m in the 3rd second and 9 m in the 5th second, the acceleration is:
A) 2 m/s² B) 1.5 m/s² C) 1 m/s² D) 0.5 m/s²
7. When a carpet is beaten with a stick, dust comes out. This is an example of:
A) Newton's First Law B) Newton's Second Law
C) Newton's Third Law D) Law of gravitation
8. A body of mass 2 kg moving with velocity 10 m/s collides with another body of mass 3kg at rest. If they stick together, the common velocity after collision is:
A) 2 m/s B) 4 m/s C) 6 m/s D) 8 m/s
9. A body of mass 10 kg is acted upon by a force of 20 N. The acceleration produced is:
A) 0.2 m/s² B) 2 m/s² C) 10 m/s² D) 20 m/s²
10. The gravitational force between two objects is F. If the distance between them is doubled, the force becomes:
A) F/2 B) F/4 C) 2F D) 4F
11. A hydraulic press has a small piston of area 20 cm² and a large piston of area 1000 cm². If a force of 50 N is applied on the small piston, the force obtained on the large piston will be:
A) 1000 N B) 2000 N C) 2500 N D) 5000 N

12. A liquid column of height h exerts pressure P at its base. If the density of the liquid is doubled while height remains the same, the new pressure is:
A) $P/2$ B) P C) $2P$ D) $4P$
13. The image formed by a plane mirror is always:
A) Real and inverted B) Virtual and erect
C) Virtual and inverted D) Real and erect
14. A man 1.6 m tall stands in front of a plane mirror. The minimum length of the mirror needed for him to see his full image is:
A) 1.6 m B) 0.8 m C) 0.4 m D) 3.2 m
15. The radius of curvature of a concave mirror is 40 cm. Its focal length is:
A) 20 cm B) 40 cm C) 80 cm D) 10 cm

CHEMISTRY

16. Atomic radii of alkali metals follow the order
A) $\text{Li} > \text{Na} > \text{K} > \text{Cs}$ B) $\text{K} > \text{Cs} > \text{Li} > \text{Na}$
C) $\text{Na} > \text{K} > \text{Cs} > \text{Li}$ D) $\text{Cs} > \text{K} > \text{Na} > \text{Li}$
17. How many groups and periods are there in modern periodic table?
A) 18 groups and 7 periods B) 18 groups and 8 periods
C) 8 groups and 8 periods D) 8 groups and 7 periods
18. $\text{Fe} + \text{CuSO}_4 \longrightarrow \text{FeSO}_4 + \text{Cu}$
 $\text{Zn} + \text{FeSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Fe}$
Which of the following is correct order of reactivity on the basis of above reactions?
A) $\text{Fe} > \text{Cu} > \text{Zn}$ B) $\text{Cu} > \text{Fe} > \text{Zn}$ C) $\text{Zn} > \text{Fe} > \text{Cu}$ D) $\text{Zn} > \text{Cu} > \text{Fe}$
19. A substance which oxidizes itself and reduces other, is known as
A) Oxidizing agent B) Reducing agent
C) Dehydrating agent D) Catalyst
20. Calcium hydroxide is a
A) Dibasic acid B) Diacidic base C) Monoacidic base D) Triacidic base
21. The reaction between an acid and a base to form salt and water is termed as :
A) Oxidation B) Precipitation C) Combination D) Neutralisation
22. The metal always found in free state is :
A) Gold B) Copper C) Iron D) Aluminium
23. Sodium oxide (Na_2O) is an example of :
A) Acidic oxide B) Basic oxide C) Amphoteric oxide D) Neutral oxide

24. The general formula for saturated hydrocarbon is :
- A) $C_n H_{2n+2}$ B) $C_n H_{2n}$ C) $C_n H_{2n-2}$ D) $C_n H_{2n-n}$
25. _____ is the first member of ketone series
- A) Methanone B) Ethanone C) Propanone D) Butanone
26. At the same temperatures and pressure, the rate of diffusion of which gas among the following is the same as that of N_2
- A) CO_2 B) CO C) NO D) CH_4
27. How many moles of nitrogen will be present in 2.24 L of nitrogen gas at STP?
- A) 9.9 B) 0.1 C) 0.001 D) 1.00
28. Which among the following is the most electronegative element?
- A) Oxygen B) Nitrogen C) Fluorine D) Chlorine
29. The ion that is isoelectronic with CO is :
- A) O_2^+ B) O_2^- C) CN^- D) N_2^+
30. The functional group in methanol and methanal respectively, are
- A) $-OH, -CHO$ B) $-CHO, -OH$ C) $-OH, -COOH$ D) $-CHO, -COOH$

BIOLOGY

31. Which of the following is the correct sequence of blood flow in the human heart?
- A) Right atrium → Right ventricle → Lungs → Left atrium → Left ventricle → Body
- B) Left atrium → Left ventricle → Lungs → Right atrium → Right ventricle → Body
- C) Right ventricle → Right atrium → Lungs → Left ventricle → Left atrium → Body
- D) Right atrium → Left atrium → Right ventricle → Left ventricle → Body
32. In anaerobic respiration of yeast, the end products are:
- A) Lactic acid + ATP B) CO_2 + Alcohol + ATP
- C) CO_2 + Lactic acid D) Alcohol + Water + ATP
33. Ramesh observed that when he ran fast, his breathing rate increased significantly.
- Which of the following correctly explains this?
- A) More oxygen is needed by the body
- B) More ATP is required for muscle contraction
- C) Accumulated CO_2 needs to be removed faster
- D) All of the above

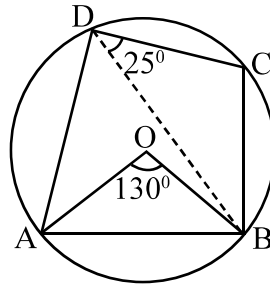
34. Which of the following processes occurs in both plants and animals?
A) Transpiration B) Photosynthesis C) Respiration D) Digestion
35. Which as the main excretory product of humans
A) Amonia B) Uric acid C) Urea D) CO₂
36. Which one of the following statements is correct about autotrophic nutrition?
A) It requires carbon dioxide but not water
B) It requires chlorophyll, carbon dioxide and water
C) It does not require light
D) It requires oxygen
37. During swallowing, the entry of food into the windpipe is prevented by:
A) Trachea B) Glottis C) Epiglottis D) Larynx
38. A pure tall pea plant is crossed with a pure dwarf plant. In the F₁ generation all plants are tall. This shows:
A) Dwarfness is dominant B) Tallness is dominant
C) Tallness is recessive D) Co-dominance
39. Which of the following pairs is analogous?
A) Wing of a bird – wing of a bat B) Forelimb of a human – forelimb of a cat
C) Wing of an insect – wing of a bird D) Flipper of a whale – forelimb of a dog
40. Who is known as the father of DNA finger printing?
A) James Watson B) Alec Jeffreys C) Mendel D) Har Gobind Khorana
41. In a terrestrial ecosystem, the largest amount of energy is found in:
A) Tertiary consumers B) Secondary consumers
C) Producers D) Primary consumers
42. Which statement is incorrect regarding fertilization?
A) In external fertilization, a large number of gametes are produced.
B) Internal fertilization occurs inside the female body.
C) Fertilization always occurs in the uterus of human females.
D) Zygote is formed after fusion of male and female gametes.
43. Which of the following is correct about pollination?
A) The process where pollen reaches anther to stigma
B) The process of fertilization occurring in the ovary
C) The process where egg from one flower falls on the pistil of the same flower
D) The process of fruit formation

44. Which of the following ecosystems has an inverted pyramid of biomass?
A) Forest B) Grassland C) Pond D) Marine
45. Hyposecretion of insulin causes:
A) Diabetes insipidus B) Goitre
C) Diabetes mellitus D) Cretinism

MATHEMATICS

46. Let $f(x) = x^2 + 2x + a$. If the discriminant of the equation $f(x) = 0$ is 24, the value of 'a' is :
A) 5 B) 4 C) -5 D) -4
47. The quadratic equation whose roots are $\sqrt{5} + 3$ and $3 - \sqrt{5}$ is :
A) $x^2 - 6x + 4 = 0$ B) $x^2 - 4x + 6 = 0$ C) $x^2 + 6x + 4 = 0$ D) $x^2 - 6x - 4 = 0$
48. In an arithmetic progression, the 4th term is 13 and 9th term is 28. Then the value of 3d, where d is the common difference is :
A) 3 B) 9 C) -3 D) -9
49. If $\sin \theta = \frac{3}{5}$ and θ is acute, then $\cos \theta$ equals
A) $\frac{4}{5}$ B) $\frac{5}{3}$ C) $\sqrt{\frac{16}{5}}$ D) $\frac{1}{2}$
50. A solid is made by attaching a hemisphere on top of a cylinder. The radius of the base is 7 cm and the height of the cylinder is 10 cm. The total surface area of the solid is $\left(\text{use } \pi = \frac{22}{7} \right)$
A) 900 cm^2 B) 904 cm^2 C) 898 cm^2 D) 902 cm^2
51. A card is drawn from a deck of 52 cards randomly. The probability of getting either an ace or a red card is
A) $\frac{4}{13}$ B) $\frac{17}{52}$ C) $\frac{8}{25}$ D) $\frac{7}{13}$
52. In a triangle, the angles are in the ratio 3 : 4 : 5. What is the largest angle?
A) 60° B) 75° C) 90° D) 120°
53. The product of two zeros of the polynomial $2x^3 + 3x^2 - 5x - 6$ is 3. The third zero is :
A) 3 B) 1 C) 2 D) -1
54. Coordinates of A and B are (1, 2) and (4, 6). What is the length of AB
A) 5 B) 25 C) $\sqrt{10}$ D) $\sqrt{34}$

55. ABCD is a cyclic quadrilateral. If $\angle AOB = 130^\circ$, where O is the centre of the circle and $\angle CDB = 25^\circ$, the measure of $\angle ABC$ is



- A) 75° B) 85° C) 80° D) 90°
56. If the sum to n terms of an arithmetic progression is $S_n = 4n^2 + 5n$, then the common difference is :
- A) 4 B) 8 C) 2 D) 9
57. The slant height of a cone is equal to twice the radius of its base. If the cone has a volume of $81\pi \text{ cm}^3$, the height of the cone is :
- A) 8 cm B) 3 cm C) 2 cm D) 9 cm
58. A ladder leans against a wall, making an angle of 60° with the ground. The foot of the ladder is 5 meters away from the wall. The length of the ladder is :
- A) 10 meters B) 2.5 meters C) 5 meters D) 8.66 meters
59. In what ratio, does the x-axis divide the line segment joining the points A (4, 6) and B (-11, -3)?
- A) 1 : 2 B) 1 : 4 C) 4 : 1 D) 2 : 1
60. The value of P for which the polynomial $x^3 - 3x^2 + px - 7$ is exactly divisible by $(x - 2)$ is :
- A) $\frac{9}{2}$ B) $\frac{11}{2}$ C) $\frac{13}{2}$ D) $\frac{7}{2}$

Name
.....

Batch..... Roll No.

BRILLIANT SCIENCE OLYMPIAD

MOCK TEST

		<i>P +C +B +M - KEY WITH HINTS</i>				Class X	
1.	D	16.	D	31.	A	46.	C
2.	C	17.	A	32.	B	47.	A
3.	B	18.	C	33.	D	48.	B
4.	B	19.	B	34.	C	49.	A
5.	A	20.	B	35.	C	50.	D
6.	C	21.	D	36.	B	51.	D
7.	A	22.	A	37.	C	52.	B
8.	B	23.	B	38.	B	53.	B
9.	B	24.	A	39.	C	54.	A
10.	B	25.	C	40.	B	55.	C
11.	C	26.	B	41.	C	56.	B
12.	C	27.	B	42.	C	57.	D
13.	B	28.	C	43.	D	58.	A
14.	B	29.	C	44.	D	59.	D
15.	A	30.	A	45.	C	60.	B