



TALENT SEARCH EXAM

INSTRUCTIONS

1. Immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.
2. Test duration is **ONE HOUR(60MINUTES)**
3. For Medical stream the Test Booklet consists of **40 questions**, For Non-Medical stream the Test Booklet consists of **30 questions** .
4. There are four sections in the question paper.
The distribution of questions, subject wise in each part is mentioned below:-

PHYSICS	– 10 Questions
CHEMISTRY	– 10 Questions
MATHEMATICS	– 10 Questions
BIOLOGY	– 20 Questions
5. Candidates will be awarded Four marks (+4) each for indicated correct response of each Question & One mark (-1) will be deducted for indicated incorrect response. There will be No deduction from the total score if no response is indicated.
6. No candidate is allowed to carry any textual material, printed or written, bits of paper, mobile phone, any electronic device etc.
7. After the completion of the test, the candidate must hand over the Answer Sheet to the Invigilator On duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.
8. Do not fold or make any stray marks on the Answer sheet.

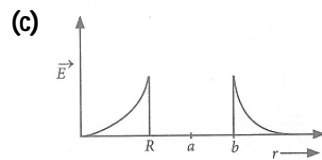
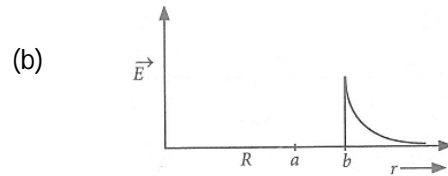
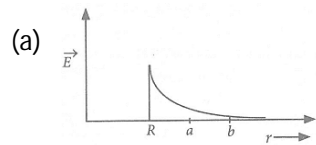
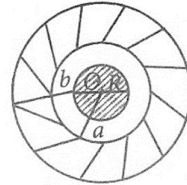
Name _____ Class: _____

You Can Check Your Answer-Key & Result on www.careeracademy.in



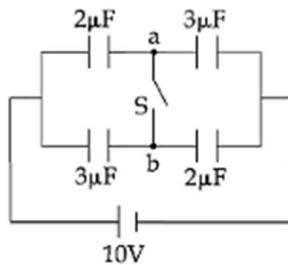
PHYSICS

1. A solid metal sphere of radius R having charge q is enclosed inside the concentric spherical shell of inner radius a and outer radius b as shown in the figure. The approximate variation electric field \vec{E} as a function of distance r from centre O is given by



(d) None of these

2. In figure is shown a system of four capacitors connected across a 10 V battery. Charge that will flow from switch S when it is closed is

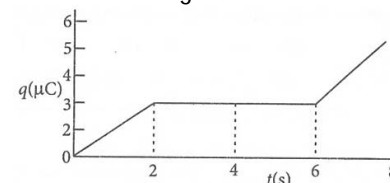


- (a) $5 \mu\text{C}$ from b to a (b) $20 \mu\text{C}$ from a to b
 (c) $5 \mu\text{C}$ from a to b (d) zero

40. Which of these is not a GMO
 (a) Bt. Brinjal (b) Golden Rice
 (c) Tracy (d) **Dolly.**

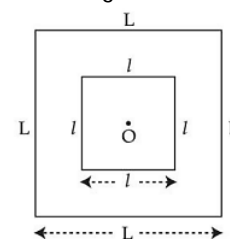
34. Antirrhinum plant with red flower is crossed with white flower antirrhinum plant. In F_1 generation the plant will be
(a) All pink colour (b) All red colour
 (c) 50 red : 50 white (d) 2 red : 1 white.
35. A child's blood group is 'O'. the parent blood group cannot be
 (a) A and B (b) A and A
(c) AB and O (d) B and O.
36. Biogenetic law as given by hackal states that
(a) Ontogeny repeats phylogeny
 (b) Phylogeny repeats ontogeny
 (c) Ontogeny and phylogeny go together
 (d) No relation ontogeny with phylogeny.
37. CD-4 receptor is associated with
(a) AIDS (b) Cancer
 (c) Malaria (d) Typhoid.
38. Which one of the following immunoglobulin is found as pentamer
 (a) IgC **(b) IgM**
 (c) IgA (d) IgE.
39. How many fragment will be generated. If you digest a linear DNA molecule with a restriction enzyme having four recognition sites on the DNA
 (a) 3 (b) 6
(c) 5 (d) 4

3. The charge on a capacitor plate in a circuit, as a function of time, is shown in the figure.



What is the value of current at $t = 4$ s?

- (a) $3 \mu A$ **(b) Zero**
 (c) $1.5 \mu A$ (d) $2 \mu A$
4. A small square loop of wire of side l is placed inside a large square loop of wire L ($L \gg l$). Both loops are coplanar and their centres coincide at point O as shown in figure. The mutual inductance of the system is



- (a) $\frac{2\sqrt{2}\mu_0 L^2}{\pi l}$ (b) $\frac{\mu_0 l^2}{2\sqrt{2}\pi L}$
(c) $\frac{2\sqrt{2}\mu_0 l^2}{\pi L}$ (d) $\frac{\mu_0 l^2}{2\sqrt{2}\pi L}$
5. A circular loop of radius 0.3 cm lies parallel to a much bigger circular loop of radius 20 cm. The centre of the small loop is on the axis of the bigger loop. The distance between their centres is 15 cm. If a current of 2.0 A flows through the smaller loop, then the flux linked with bigger loop is
 (a) 6.6×10^{-9} weber **(b) 9.1×10^{-11} weber**
 (c) 6×10^{-11} weber (d) 3.3×10^{-11} weber.
6. An LCR circuit contains resistance of 110Ω and a supply of 220 V at 300 rad/s angular frequency. If only capacitance is removed from the

circuit, current lags behind the voltage by 45° . If on the other hand, only inductor is removed the current leads by 45° with the applied voltage. The rms current flowing in the circuit will be

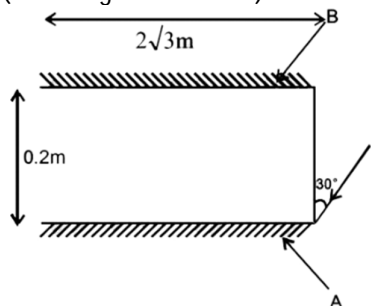
- (a) 1.5 A (b) 2A
(c) 2.5 A (d) 1A

7. 50 W/m^2 energy density of sunlight is normally incident on the surface of a solar panel. Some part of incident energy (25%) is reflected from the surface and the rest is absorbed. The force exerted on 1 m^2 surface area will be close to

($c = 3 \times 10^8 \text{ m/s}$)

- (a) $20 \times 10^{-8} \text{ N}$ (b) $10 \times 10^{-8} \text{ N}$
(c) $35 \times 10^{-8} \text{ N}$ (d) $15 \times 10^{-8} \text{ N}$

8. Two plane mirrors A and B are aligned parallel to each other, as shown in the figure. A light ray is incident at an angle 30° at a point just inside one end of A. The plane of incidence coincides with the plane of the figure. The maximum number of times the ray undergoes reflections (including the first one) before it emerges out is

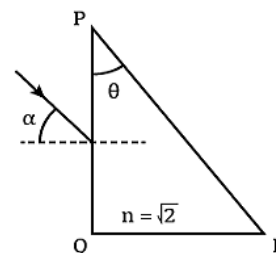


- (a) 28 (b) 30
(c) 32 (d) 34

28. Spindle shape pyramid is observed in
(a) **Ecological pyramid of number in grazing food chain of tree ecosystem**
(b) Ecological pyramid of number in aquatic ecosystem
(c) Ecological pyramid of energy in grassland
(d) Ecological pyramid of biomass in aquatic ecosystem.
29. If the cell of root in wheat plant has 42 chromosome then the number of chromosome in the cell of aleuron laxar is
(a) **63** (b) 42
(c) 21 (d) 84
30. Drugs that cause malformation in embryo during pregnancy are called
(a) Tranquilizers (b) **Teratogens**
(c) Antifertility drugs (d) Antipyretics.
31. Multiload 375 contain
(a) Hormones (b) **Copper**
(c) Iron (d) Enzyme.
32. In routine checkup, a male foetus is diagnosed with one barr body. This is a case of
(a) Down's syndrome (b) **Klinefelter's syndrome**
(c) Turner's syndrome (d) Super male.
33. In the hexaploid wheat, the haploid, monoploid & trisomy number is
(a) **21, 7, 43** (b) 21, 43, 7
(c) 43, 21, 7 (d) 42, 7, 21.

23. Following are the types of immunoglobulin and their function. Which one of this is incorrectly paired
 (a) **IgD – Viral pathogen** (b) IgG – Phagocytosis
 (c) IgE – Allergic reaction (d) IgM – Complement fixation.
24. *Monascus purpureus* is a yeast used commercially in the production
 (a) Citric acid
 (b) **Blood cholesterol lowering agent**
 (c) Ethanol
 (d) A substance used in myocardial infarction.
25. Which of the following is commercially produced by using a fungus
 (a) **Citric acid** (b) Acetic acid
 (c) Butyric acid (d) Lactic acid.
26. Which sample are shows maximum diversity
 (a) **Birds – 4**
Insect – 4
Elephant – 4
 (b) Crow – 8
 Pigeon – 8
 Cuckoo – 8
 Myna – 8
 (c) Pigeon – 10
 Crow – 3
 Insect – 7
 (d) Butterfly – 20
 Banana fly – 20
 Lizards – 20
27. Agenda-21 was adopted in
 (a) Kyoto protocol (b) **Earth summit**
 (c) Helsinki declaration (d) Montreal protocol.

9. A parallel beam of light is incident from air at an angle α on the side PQ of a right angled triangular prism of refractive index $n = \sqrt{2}$. Light undergoes total internal reflection in the prism at the face PR when α has a minimum value of 45° . The angle θ of the prism is



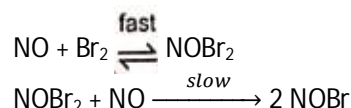
- (a) 15° (b) 22.5°
 (c) 30° (d) 45°
10. In a Young's double slit experiment, 16 fringes are observed in a certain segment of the screen when light of wavelength 700nm is used. If the wavelength of light is changed to 400 nm, the number of fringes observed in the same segment of the screen would be
 (a) 24 (b) **28**
 (c) 30 (d) 18

CHEMISTRY

11. 1 g of monobasic acid HA in 100g water lowers freezing point by 0.155 K. 0.75 g of some acid require 25 mL of $\frac{M}{10}$ Ba(OH)₂ for complete neutralisation. Find % age of degree of ionisation ($K_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}$)
 (a) 75 % (b) 30%
 (c) **25%** (d) 40%
12. Select the one that represent a concentration cell

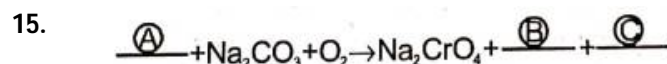
- (a) $Pt. H_2 \left| \begin{matrix} HCl \\ c_1 \end{matrix} \right| \left| \begin{matrix} HCl \\ c_2 \end{matrix} \right| Pt. H_2$ (b) $Pt H_2 \left| \begin{matrix} HCl \\ c_1 \end{matrix} \right| Cl_2 Pt$
 (c) $Zn|Zn^{2+}||Cu^{2+}|Cu$ (d) $Fe|Fe^{2+}||Cu^{2+}|Cu$

13. The solubility of a specific non volatile salt is high at 25° C. If 2gm, 4gm and 6gm of the salt added 100gm at 25° C, the vapour pressure X, Y, Z respectively) will follow the order of
 (a) $X > Y = Z$ (b) $X > Y > Z$
 (c) $Z > Y > Z$ (d) $X = Y = Z$
14. The reaction $2NO + Br_2 \rightarrow 2NOBr$, obeys the following mechanism



The rate expression of the above reaction can be written as

- (a) $r = K [NO]^2 [Br_2]$ (b) $r = K [NO] [Br_2]$
 (c) $r = K [NO] [Br_2]^2$ (d) $r = K [NOBr_2]$



In the above reaction (A), (B) and (C) respectively are

- (a) $FeCr_2O_4, Fe_3O_4, CO_2$ (b) $FeCr_2O_4, Fe_2O_3, CO_2$
 (c) $FeCrO_4, Fe_2O_3, CO$ (d) $FeCr_2O_4, Fe_3O_4, CO$

16. Complex $[Pt(NH_3) NO_2 Py (NH_2OH)]^+$ show how many geometrical isomerisms

- (a) 3 (b) 2
 (c) 1 (d) 5

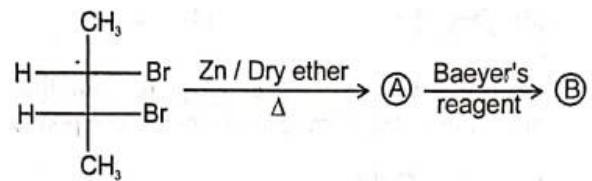
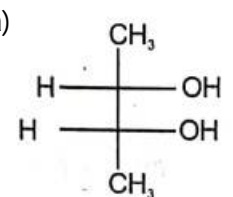
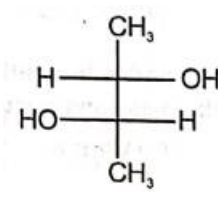
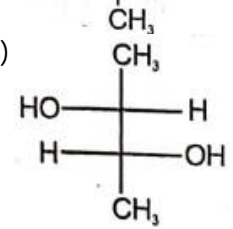
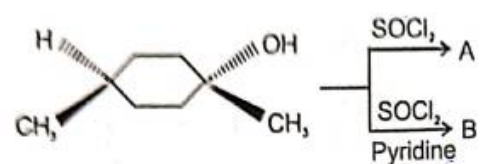
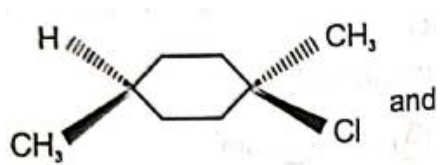
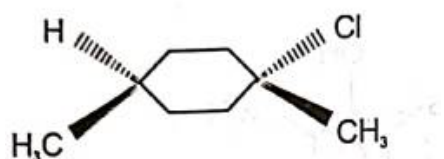
- (a) 2 (b) 5
 (c) $\frac{1}{8}$ (d) $\frac{25}{8}$

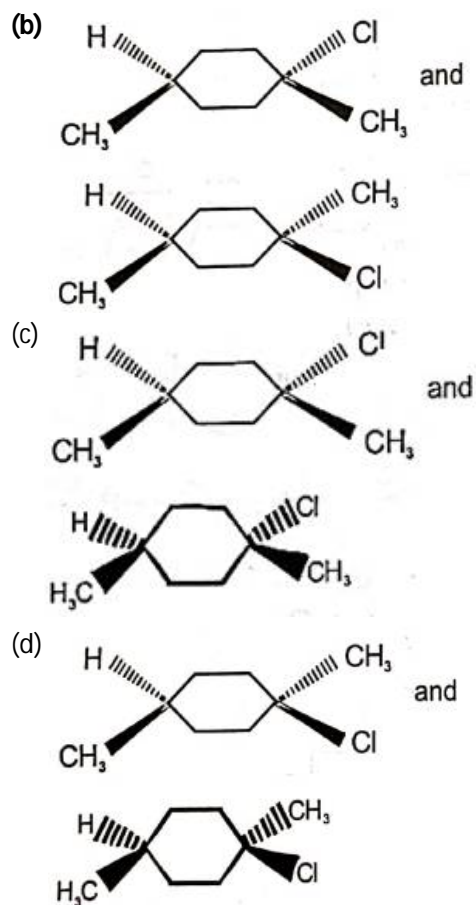
29. A signal which can be green or red with probability $\frac{4}{5}$ and $\frac{1}{5}$ respectively, is received by station A and then transmitted to station B. The probability of each station receiving the signal correctly is $\frac{3}{4}$. If the signal received at station B is green, then the probability that the original signal was green is
 (a) $\frac{3}{5}$ (b) $\frac{6}{7}$
 (c) $\frac{20}{23}$ (d) $\frac{9}{20}$
30. The number if points of discontinuity of $f(x) = [2x]^2 - \{2x\}^2$ (where $[\cdot]$ denotes greatest integer function and $\{\cdot\}$ denotes fractional part of x) in interval $(-2,2)$ are
 (a) 6 (b) 8
 (c) 4 (d) 3

BIOLOGY

21. Which of the following interaction does not promotes coevolution
 (a) Commensalism (b) Mutualism
 (c) Parasitism (d) **Interspecific competition.**
22. The form of cancer called carcinoma is associated with
 (a) Lymph cells (b) Mesodermal cell
 (c) Blood cell (d) **Epithelial cell.**

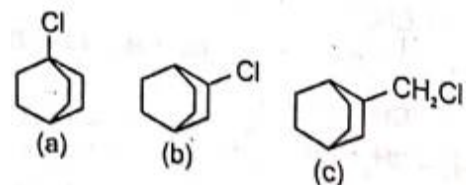
24. The area (in square units) of the region $A = \{(x, y): (x - 1)[x] \leq y \leq 2\sqrt{x}, 0 \leq x \leq 2\}$, where $[t]$ denotes greatest integer function, is
 (a) $\frac{8}{3}\sqrt{2} - 1$ (b) $\frac{4}{3}\sqrt{2} + 1$
 (c) $\frac{8}{3}\sqrt{2} - \frac{1}{2}$ (d) $\frac{4}{3}\sqrt{2} - \frac{1}{2}$
25. If a curve $y = f(x)$ passes through the point $(1, -1)$ and satisfies the differential equation, $y(1 + xy)dx = x dy$, then $f\left(-\frac{1}{2}\right)$ is equal to
 (a) $-\frac{2}{5}$ (b) $-\frac{4}{5}$
 (c) $\frac{2}{5}$ (d) $\frac{4}{5}$
26. Let $P = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ 9 & 3 & 1 \end{bmatrix}$ and $Q = [a_{ij}]$ be two 3×3 matrices such that $Q - P^5 = I_3$. Then $\frac{q_{21} + q_{31}}{q_{32}}$ equals to
 (a) 10 (b) 135
 (c) 9 (d) 15
27. If m and n respectively are the number of local maximum and local minimum points of the function $f(x) = \int_0^{x^2} \frac{t^2 - 5t + 4}{2 + e^t} dt$, then the ordered pair (m, n) equals to,
 (a) (3,2) (b) (2, 3)
 (c) (2,2) (d) (3,4)
28. Let $\vec{a} = 2\hat{i} + \hat{j} - 2\hat{k}$ and $\vec{b} = \hat{i} + \hat{j}$. Let \vec{c} be a vector such that $|\vec{c} - \vec{a}| = 3$, $|(\vec{a} \times \vec{b}) \times \vec{c}| = 3$ and the angle between \vec{c} and $\vec{a} + \vec{b}$ be 30° . Then $\vec{a} \cdot \vec{c}$ equals to

17. 
 Identify product (B)
 (a)  (b) 
 (c)  (d) both (b) and (c)
18. 
 Products A and B are respectively
 (a)  and 



19. The specific conductivity of standard BaSO_4 solution is $3.06 \times 10^{-6} \text{ ohm}^{-1} \text{ cm}^{-1}$ and that of water is $6.0 \times 10^{-8} \text{ ohm}^{-1} \text{ cm}^{-1}$. If $\Lambda^\circ(\text{BaSO}_4)$ is approximately $150.0 \text{ ohm}^{-1} \text{ eq}^{-1} \text{ cm}^2$, the K_{sp} of BaSO_4 will be
- (a) 4.0×10^{-12} (b) 2.5×10^{-9}
 (c) 2.5×10^{-13} (d) 4.0×10^{-10}

20. Arrange the following in increasing order of reactivity towards $\text{S}_{\text{N}}1$ reaction



- (A) $a > b > c$ (B) $b > c > a$
 (C) $a > c > b$ (D) $c > b > a$

MATHEMATICS

21. The domain of $f(x)$ is $(0,1)$, therefore domain of $f(x) + f(\ln|x|)$ is
- (a) $(-1, e)$ (b) $(1, e)$
 (c) $(-e, -1)$ (d) $(-e, 1)$
22. If $f\left(\frac{3x-4}{3x+4}\right) = x + 2, x \neq -\frac{4}{3}$ and $\int f(x) dx = A \log|1-x| + Bx + C$, then the ordered pair (A, B) is equal to (where C is constant of integration)
- (a) $\left(-\frac{8}{3}, \frac{2}{3}\right)$ (b) $\left(\frac{8}{3}, -\frac{2}{3}\right)$
 (c) $\left(\frac{8}{3}, \frac{2}{3}\right)$ (d) $\left(-\frac{8}{3}, -\frac{2}{3}\right)$
23. The value of $\int_{-\pi/2}^{\pi/2} \left(\frac{1+\sin^2 x}{1+\pi \sin x}\right) dx$, is
- (a) $\frac{\pi}{2}$ (b) $\frac{5\pi}{4}$
 (c) $\frac{3\pi}{4}$ (d) $\frac{3\pi}{2}$