

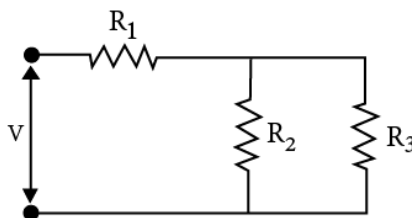
INSTRUCTIONS

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 TWO HOUR(120MINUTES)
3. The Test Booklet consists of 45 questions of 4 marks each. The maximum marks are 180.
4. There are four sections in the question paper.
The distribution of question, subject wise in each part is mentioned below.

PHYSICS	– 10 Questions
CHEMISTRY	– 10 Questions
BIOLOGY	– 10 Questions
MATHEMATICS	– 15 Questions
5. Candidates will be awarded Four marks (+4) each for indicated correct response of each Question& One mark (-1) deduct for indicated incorrect response. No deduction from the total score will be made if no response is indicated.
6. No candidate is allowed to carry any textual material, printed or written, bits of papers, 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.

PHYSICS

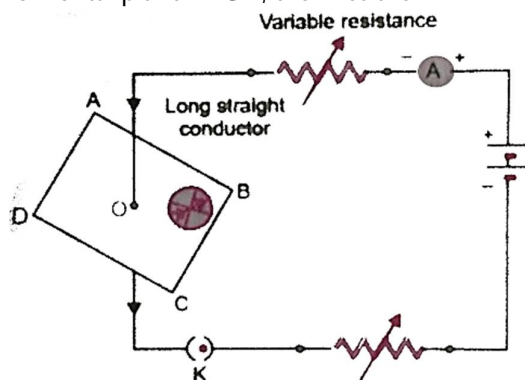
1. A point source of light is placed 4 m below the surface of water of refractive index $5/3$. The minimum diameter of a disc, which should placed over the source, on the surface of water to cut off all light coming out of water is
 (a) 1 m (b) 4 m (c) 3 m **(d) 6 m**
2. A student sitting on the last bench can read the letters written on the blackboard but is not able to read the letters written in his textbook. Which of the following statements is correct?
 (a) **The near point of his eyes has receded away** (b) The near point of his eyes has come closer to him.
 (c) The far point of his eyes has come closer to him. (d) The far point of his eyes has receded away.
3. For ensuring dissipation of same energy in all three resistors (R_1, R_2, R_3) connected as shown in figure, their value must be related as



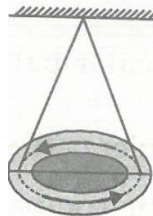
- (a) $R_1 = R_2 = R_3$ (b) $R_2 = R_3$ and $R_1 = 4R_2$ **(c) $R_2 = R_3$ and $R_1 = \frac{1}{4} R_2$** (d) $R_1 = R_2 + R_3$

SPACE FOR ROUGH WORK (You can check your Answer-key & Result on www.careeracademy.in)

4. Masses of three wires of copper are in the ratio 1 : 3 : 5 and their lengths are in the ratio of 5 : 3 : 1. The ratio of their electrical resistances are
 (a) 1 : 3 : 5 (b) 5 : 3 : 1 (c) 1 : 15 : 125 (d) 125 : 15 : 1
5. If the key in the arrangement, in the given figure is taken out (the circuit is made open) and magnetic field lines are drawn over the horizontal plane ABCD, the lines are:



- (a) concentric circles (b) elliptical in shape
(c) straight lines parallel to each other
 (d) concentric circles near the point O but of elliptical shapes as we go away from it.
6. A circular loop is suspended in air as shown in figure. When the loop is seen from above, current flows anticlockwise and when seen from below, current flows clockwise. This loop behaves as a magnet. The N-pole of this magnet is one



- (a) the upper face**
 (b) lower face
 (c) the lower face if current is large
 (d) upper face if current is large
7. A nucleus breaks into two parts whose velocity is in ratio 2 : 1 . The ratio of their radius is
 (a) 1 : 2^{2/3} (b) 2^{2/3} : 1 (c) 1 : 2^{1/3} (d) 2^{1/2} : 1

8. Match the following:

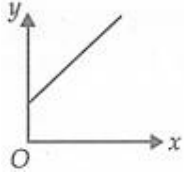
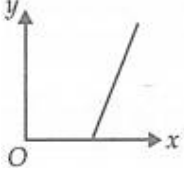
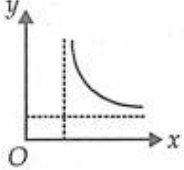
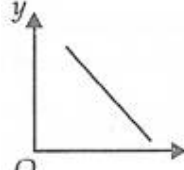
	List-I		List-II
(P)	α - decay	1.	$\frac{235}{92}\text{U} + \frac{1}{0}\text{n} \rightarrow \frac{141}{56}\text{Ba} + \frac{92}{36}\text{Kr} + 3\left(\frac{1}{0}\text{n}\right) + Q$
(Q)	β - decay	2.	$\frac{3}{1}\text{H} + \frac{2}{1}\text{H} \rightarrow \frac{4}{2}\text{He} + Q$
(R)	Nuclear fission	3.	$\frac{230}{88}\text{Th} \rightarrow \frac{226}{88}\text{Ra} + \frac{4}{2}\text{He} + Q$
(S)	Nuclear fusion	4.	$\frac{137}{55}\text{Cs} \rightarrow \frac{137}{56}\text{Ba} + e^{-} + \bar{\nu} + Q$

SPACE FOR ROUGH WORK (You can check your Answer-key & Result on www.careeracademy.in)

Code :

	P	Q	R	S
(a)	1	4	3	2
(b)	4	1	3	2
(c)	3	4	2	1
(d)	2	3	1	4

9. The graphs given apply to convex lens of focal lengths f , producing a real image at a distance v from the optical centre when self luminous object is at distance u from the optical centre. The magnitude of magnification is m . Identify the following graphs with the first named quantity being plotted along $y - axis$.

	List-I		List-II
(P)	v against u	1.	
(Q)	$\frac{1}{v}$ against $\frac{1}{u}$	2.	
(R)	m against v	3.	
(S)	$(m + 1)$ against $\frac{v}{f}$	4.	

Code :

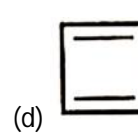
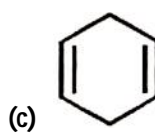
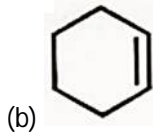
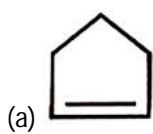
	P	Q	R	S
(a)	1	2	3	4
(b)	3	1	4	2
(c)	2	3	4	1
(d)	3	4	2	1

SPACE FOR ROUGH WORK (You can check your Answer-key & Result on www.careeracademy.in)

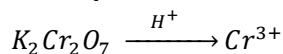
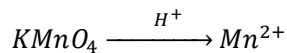
10. **Assertion:** A voltmeter and ammeter can be used together to measure resistance but not power
Reason : Power is proportional to voltage and current.
 Directions: In the following questions, a statement of assertion is followed by a statement of reason.
 Mark the correct choice as :
- (a) If both assertion and reason are true and reason is the correct explanation of assertion
 (b) If both assertion and reason are true but reason is not the correct explanation of assertion
 (c) If assertion is true but reason is false.
 (d) **If assertion is false but reason is true.**

CHEMISTRY

11. Point out (A) in the given reaction sequence

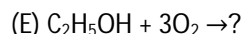
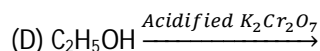
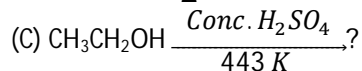
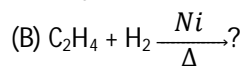
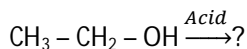
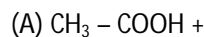
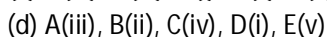
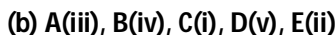
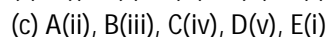
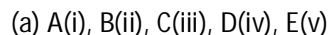
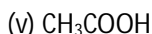
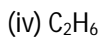
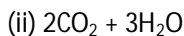


12. What is the ratio of number of electrons gained by acidified KMnO_4 and acidified $\text{K}_2\text{Cr}_2\text{O}_7$ in the reaction given below:



- (a) 5 : 6 (b) 6 : 5 (c) 3 : 5 (d) 5 : 3

13. Match the following:

Column-I**Column-II**

SPACE FOR ROUGH WORK (You can check your Answer-key & Result on www.careeracademy.in)

14. The conjugate bases of Bronsted acids H_2O and HCl are respectively
 (a) OH^- , Cl^- (b) H_3O^+ , Cl^- (c) H_3O^+ , Cl^+ (d) OH^- , Cl^+
15. The equivalent weight of $MnSO_4$ is half of its molecular weight when it is converted to
 (a) Mn_2O_3 (b) MnO_2 (c) MnO_4^- (d) MnO_4^{2-}
16. In the complete combustion of hydrocarbon (C_nH_{2n+2}) the number of oxygen molecules required per mole of hydrocarbon is
 (a) $\frac{n}{2}$ (b) $\frac{(n+1)}{2}$ (c) $\frac{(3n+1)}{2}$ (d) $(n + \frac{1}{2})$
17. The number of hydrogen ions in 10 mL of a solution with pH = 13 is
 (a) 10^{13} (b) 6.023×10^8 (c) 6.023×10^{13} (d) 6.023×10^{10}
18. Dehydrohalogenation of alkyl halide is an example of
 (a) Substitution reaction (b) **Elimination reaction**
 (c) Polymerisation reaction (d) Addition reaction
19. Complete the reaction: $Zn + 2NaOH \rightarrow ?$
 (a) $Zn(OH)_2 + H_2O$ (b) $Na_2ZnO_2 + Na_2O$
 (c) $Zn(OH)_2 + H_2O_2$ (d) **$Na_2ZnO_2 + H_2$**
20. Electrons in the last shell of X, Y, W and Z are 2, 6, 4 and 1 respectively. Which of the following statement is correct?
 (a) Melting point of compound formed by X and Y is more than that of by W & Z.
 (b) Compound formed by X and Y is more volatile than that of by W and Z
 (c) **Melting point of compound formed by X and Z is more than that of by W and Y**
 (d) Incomplete information so inference cannot be drawn.

BIOLOGY

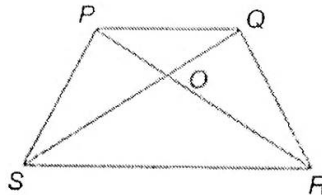
21. Thymus in mammals is mainly concerned with
 (a) Regulation of body growth (b) Secretion of thymotropin
 (c) Regulation of body temperature (d) **Immunological function.**
22. Anterior lobe of pituitary secretes
 (a) FSH, TSH and Oxytocin (b) STH, GH and ADH
 (c) TSH, ADH and Prolactin (d) **FSH, GH and LH.**
23. Starting from the innermost part, the correct sequence of parts in an ovule are
 (a) Egg, Nucellus, Embryo sac, Integument (b) **Egg, Embryo, Nucellus, Integument**
 (c) Embryo sac, Nucellus, Integument, Egg (d) Egg, Integument, Embryo sac, Nucellus.

24. Ploidy of endosperm will be _____. If the male and female parents are tetraploid and hexaploid
(a) 16 X (b) 8 X (c) 7 X (d) 10 X
25. Which of the following is not a component of fallopian tubes
(a) Infundibulum (b) Ampulla (c) Isthmus (d) Fundus.
26. In a typical mendalian cross, which is a dihybrid cross, one parent is homozygous for both dominant traits and another parent is homozygous for both recessive traits in F_2 generation, both parental combination and recombinant appear. The phenotypic ratio of parental combination to recombinants is
(a) 10: 6 (b) 9: 7 (c) 15: 1 (d) 12: 4
27. Which of the following is not example of an analogous organ
(a) Sweet potato and potato (b) Eyes of octopus and mammals
(c) Flipper of penguin and dolphin (d) Mouth part of cockroach and housefly.
28. The structural and functional unit of our kidney is
(a) Seminiferous tubule (b) Uriniferous tubules
(c) Neuron (d) Alveoli.
29. The process of formation of ATP molecule in light reaction of photosynthesis is called-
(a) Oxidative phosphorylation (b) Kreb's cycle
(c) Photophosphorylation (d) Glycolysis.
30. Which plant hormone is responsible for the phenomenon of apical dominance
(a) Auxin (b) Cytokinin (c) Gibberallin (d) Ethylene.

MATHEMATICS

31. Let α, β be the roots of the equation $x^2 + (20)^{1/4}x + 5^{1/2} = 0$. Then $\alpha^8 + \beta^8$ is equal to
(a) 50 (b) 16 (c) 100 (d) 10
32. The sum of first 40 terms of the series $3 + 4 + 8 + 9 + 13 + 14 + 18 + 19 + \dots$ is $(102)m$, then m equals to
(a) 5 (b) 10 (c) 20 (d) 25
33. Five numbers x_1, x_2, x_3, x_4, x_5 are randomly selected from the numbers 1, 2, 3, ..., 18 and the arranged in the increasing order ($x_1 < x_2 < x_3 < x_4 < x_5$). The probability that $x_2 = 7$ and $x_4 = 11$ is
(a) $\frac{1}{136}$ (b) $\frac{1}{72}$ (c) $\frac{1}{68}$ (d) $\frac{1}{34}$

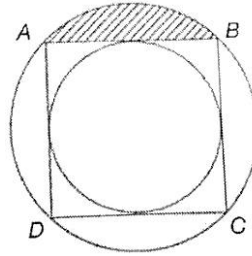
34. The values of $(37)^{3^x} - (33)^{3^x}$ ends to _____ ($x \in \mathbb{N}$)
 (a) 4 (b) 6 (c) 0 (d) either (a) or (b)
35. In a test of 50 questions, each correct answer fetches two marks and each wrong answer fetches $(-\frac{1}{2})$ marks. A candidate attempted all the questions and scored 40 mark. How many questions did he attempted correctly?
 (a) 24 (b) 26 (c) 22 (d) 20
36. If $f(x + 2) = x^2 + 7x - 13$, then find the remainder when $f(x)$ is divided by $(x + 2)$
 (a) -25 (b) -12 (c) -23 (d) -11
37. The sum of 15 observations of a data is $(434 + x)$. If the mean of the data is x then x is
 (a) 25 (b) 27 (c) 31 (d) 33
38. Two circles touch each other externally. The sum of their area is $490\pi \text{ cm}^2$. Their centres are separated by 28 cm. Find the difference of their radii (in cm)
 (a) 3.5 (b) 7 (c) 10.5 (d) 14
39. The expression $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A}$ can be written as
 (a) $\sec A \operatorname{Cosec} A + 1$ (b) $\tan A + \cot A$ (c) $\sec A + \operatorname{cosec} A$ (d) $\sin A \cos A + 1$
40. The angle of elevation of a jet plane from a point A on the ground in 60° . After a flight of 20 seconds at the speed of 432 km/hr, the angle of elevation changes to 30° . If the jet plane is flying at a constant height, then its height is
 (a) $3600\sqrt{3}m$. (b) $2400\sqrt{3}m$. (c) $1200\sqrt{3}m$. (d) $1800\sqrt{3}m$
41. In the trapezium $PQRS$, PQ is parallel to RS and the ratio of the areas of the triangle POQ to triangle ROS is 225 : 900. Then $SR =$ _____
 (a) $30 PQ$
 (b) $25 PQ$
 (c) $2 PQ$
 (d) PQ



42. P , Q and R are on AB , BC and AC of the equilateral triangle ABC respectively. $AP : PB = CQ : QB = 1 : 2$. G is the centroid of the triangle PQB and R is the mid-point of AC . Find $BG : GR$
 (a) 1 : 2 (b) 2 : 3 (c) 3 : 4 (d) 4 : 5

43. In the following figure, a circle is inscribed in square $ABCD$ and the square is circumscribed by a circle. If the radius of the smaller circle is r cm, then find the area of the shaded region (*in cm^2*)

- (a) $\left(\frac{\pi-2}{4}\right)r^2$
 (b) $\left(\frac{3\pi-4}{2}\right)r^2$
 (c) $\left(\frac{\pi+2}{4}\right)r^2$
 (d) $\left(\frac{\pi-2}{2}\right)r^2$



44. A metal cube of edge $\frac{3}{10}$ m is melted and formed into three smaller cubes. If the edges of the two smaller cubes are $\frac{1}{5}$ m and $\frac{1}{4}$ m, find the edge of the third smaller cube.
 (a) $\frac{7}{20}$ m (b) $\frac{1}{20}$ m (c) $\frac{3}{20}$ m (d) None of these
45. In a $\triangle ABC$, point D is on side AB and point E on side AC, such that $BCED$ is a trapezium. If $DE : BC = 3 : 5$, then $\text{Area}(\triangle ADE) : \text{Ar}(\square BCED) =$
 (a) 3 : 4 (b) 9 : 16 (c) 3 : 5 (d) 9 : 25