RJ VISION PVT. LTD.

Excellence & Beyond...

RJ – CET (2015 – 16)

(Entrance cum Scholarship Test)

COURSE – RADIANT (CLASS 12TH)

(Test Syllabus - Class 11th)

TIME : 1.15 HR MM : 180

This Booklet contains _____ pages

Important Instructions :

1. The test is of **1 hour** duration and Test Booklet contains **60** questions. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **one mark** will be deducted from the total scores. The maximum marks are **240.**

2. Use **Blue/Black Ball point pen only** for writing particulars on this page/marking responses.

3. Rough work is to be done on the space provided for this purpose in the Test Booklet only.

4. **On completion of the test, the candidate must handover the Answer Sheet to the invigilator in the Room/Hall.**

5. Use of white fluid for correction is **NOT** permissible on the Answer Sheet.

6. Each candidate, must show on demand his/her Admission Card to the Invigilator.

7. No candidate, without special permission of the Superintendent or Invigilator, would leave his/her seat.

8. Use of Electronic/Manual Calculator is prohibited.

9. No part of the Booklet and Answer Sheet shall be detached under any circumstances.

10. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet Attendance Sheet.

Name of the Candidate (in Capitals) : _____

Roll Number : _____

School : _____

Centre of Examination (in Capitals) (Vasna / Niz / Anand / Others) _____

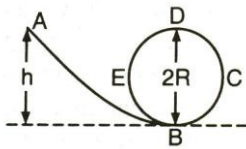**Candidate's Signature :** _____   **Invigilator Signature :** _____

1. The relation between time t and distance x is:

$$t = \alpha x^2 + \beta x$$

Where α and β are constants. The retardation is:

(1) $2\alpha\upsilon^3$ (2) $2\beta\upsilon^3$

(3) $2\alpha\beta\upsilon^3$ (4) $2\beta^2\upsilon^3$

2. A frictionless track ABCDE ends in a circular loop of radius R. A body slides down the track from point A which is at a height h = 5 cm. Maximum value of R for the body to successfully complete the loop is :

(1) 5 cm   (2) $\dfrac{15}{4}$ cm   (3) $\dfrac{10}{3}$ cm   (4) 2 cm

3. A block P of mass m is placed over a plank of mass M. Plank Q is placed over a smooth horizontal surface as shown in Fig. Block P is given a velocity υ to the right. If μ is the coefficient of friction between P and Q, the acceleration of Q relative to P is
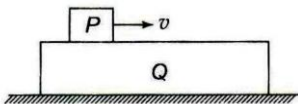
(1) μg (2) $\dfrac{\mu mg}{M}$

(3) $\mu g\left(1 - \dfrac{m}{M}\right)$ (4) $\mu g\left(1 + \dfrac{m}{M}\right)$

4. A body of mass m, having momentum p, is moving on a rough horizontal surface. If it is stopped in a distance x, the coefficient of friction between the body and the surface is given by

(1) $\mu = \dfrac{p^2}{2gm^2x}$ (2) $\mu = \dfrac{p^2}{2mgx}$

(3) $\mu = \dfrac{p}{2mgx}$ (4) $\mu = \dfrac{p}{2gm^2x}$

5. A body of mass m moving with a certain speed suffers an inelastic collision with a body of mass M at rest. The ratio of the final kinetic energy of the system to the initial kinetic energy is

(1) $\dfrac{m}{m+M}$ (2) $\dfrac{M}{m+M}$

(3) $\dfrac{m+M}{m}$ (4) $\dfrac{m+M}{M}$

6. There particles each of mass m, are placed at the corners of an equilateral triangle of side a, as shown in fig. The position vector of the centre of mass is
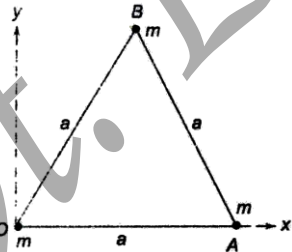
(1) $\dfrac{a}{2}(i + j/\sqrt{3})$ (2) $\dfrac{a}{2}(3i + j)$

(3) $\dfrac{a}{2}(3i + \sqrt{3}j)$ (4) $\dfrac{a}{2}(3i + j/\sqrt{3})$

7. If g is the acceleration due to gravity on the surface of the earth, the gain in potential energy of a satellite of mass m raised from the earth's surface to a height equal to the radius R of the earth is

(1) mgR/4

(2) mgR/2

(3) mgR

(4) 2 mgR

8. A wire of length L and cross-sectional area A is made of a material of Young's modulus Y. The work one in stretching the wire by an amount x is given by

(1) $\dfrac{YAx^2}{L}$ (2) $\dfrac{YAx^2}{2L}$

(3) $\dfrac{YAL^2}{x}$ (4) $\dfrac{YAL^2}{2x}$

9. A block floats in a liquid contained in a beaker (Fig). The beaker is placed on the floor of an elevator. If the elevator descends with acceleration a (< g), the upthrust on the block due to the liquid
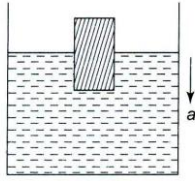
(1) is equal to the weight of the liquid displaced

(2) is greater than the weight of the liquid displaced

(3) is less than the weight of the liquid displaced

(4) become equal to zero

10. A uniform rod AB of length L is pivoted at one end A and hangs vertically. The time period of small oscillations about an axis passing through A and perpendicular to the rod is

(1) $2\pi\sqrt{\dfrac{L}{g}}$ 　　　　(2) $2\pi\sqrt{\dfrac{L}{2g}}$

(3) $2\pi\sqrt{\dfrac{L}{3g}}$ 　　　(4) $\pi\sqrt{\dfrac{L}{2g}}$

11. A simple pendulum is oscillating without damping. When the displacement of the bob is less than maximum, its acceleration vector is correctly show in Fig.
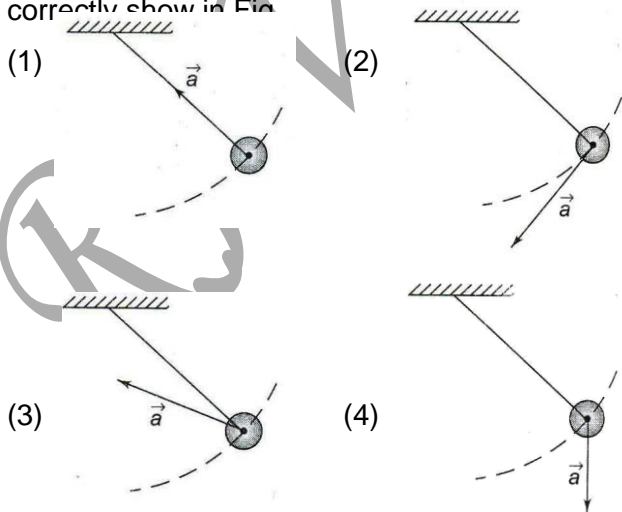

12. Two interfering waves have intensities in the ratio 9 : 1. Then the ratio of maximum to minimum amplitude is :

(1) 10 : 8

(2) 4 : 2

(3) 100 : 64

(4) 16 : 4

13. If heat energy ΔQ is supplied to an ideal diatomic gas, the increase in internal energy is ΔU and the work done by the gas is ΔW. The ratio $\Delta Q : \Delta U : \Delta W$ is

(1) 5 : 3 : 2 　　　　(2) 5 : 2 : 3

(3) 7 : 5 : 2 　　　　(4) 7 : 2 : 5
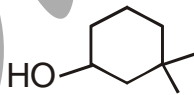
14. In the cyclic process shown on the P – V diagram the magnitude of the work done is :
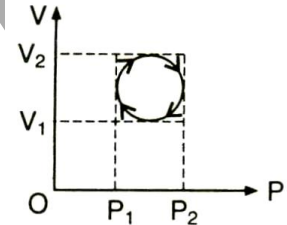
(1) $\pi\left(\dfrac{P_2 - P_1}{2}\right)^2$

(2) $\pi\left(\dfrac{V_2 - V_1}{2}\right)^2$

(3) $\dfrac{\pi}{4}(P_2 - P_1)(V_2 - V_1)$

(4) $\pi(P_2 V_2 - P_1 V_1)$

15. The root mean square velocity, v_{rms}, the average velocity v_{av} and the most probable velocity, v_{mp} of the molecules of the gas are in the order :

(1) $v_{mp} > v_{av} > v_{rms}$

(2) $v_{rms} > v_{av} > v_{mp}$

(3) $v_{av} > v_{mp} > v_{rms}$

(4) $v_{mp} > v_{rms} > v_{av}$

16. Number of nodal centres for $2s$ orbital
(1) 1   (2) 0   (3) 4   (4) 3

17. The orbital angular momentum of an electron in $2s$-orbital is

(1) $\dfrac{1}{2}\;\dfrac{h}{2\pi}$ (2) $\dfrac{h}{2\pi}$

(3) $\sqrt{2}\,\dfrac{h}{2\pi}$ (4) Zero

18. An organic compound has an empirical formula CH_2O, its vapour density is 45. The molecular formula of the compound is.
(1) CH_2O (2) C_2H_5O
(3) C_2H_2O (4) $C_3H_6O_3$

19. Molecular weight of $KMnO_4$ in acidic and neutral medium will be respectively -
(1) 7 x equivalent wt. and 2 x equivalent wt.
(2) 5 x equivalent wt. and 3 x equivalent wt.
(3) 3 x equivalent wt. and 5 x equivalent wt.
(4) 2 x equivalent wt. and 4 x equivalent wt.

20. At 700 K, the equilibrium constant K_p for the reaction $2SO_{3(g)} \rightleftharpoons 2SO_{2(g)} + O_{2(g)}$ is 1.80×10^{-3} and kP_a is 14, (R = 8.314 Jk^{-1} mol^{-1}). The numerical value in moles per litre of K_c for this reaction at the same temperature will be
(1) 3.09×10^{-7} mol-litre
(2) 5.07×10^{-8} mol-litre
(3) 8.18×10^{-9} mol-litre
(4) 9.24×10^{-10} mol-litre

21. For the reaction
$CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$ at a given temperature, the equilibrium amount of $CO_2(g)$ can be increased by
(1) Adding a suitable catalyst
(2) Adding an inert gas
(3) Decreasing the volume of the container
(4) Increasing the amount $CO(g)$

22. If work done by the system is 300 joul when 100 cal. Heat is ;supplied to it. The change in internal energy during the process is –
(1) –200 Joul   (2) 400 Joul
(3) 720 Joul   (4) 120 Joul

23. The correct order of increasing $C-O$ bond length of CO, CO_3^{2-}, CO_2 is
(1) $CO_3^{2-} < CO_2 < CO$ (2) $CO_2 < CO_3^{2-} < CO$
(3) $CO < CO_3^{2-} < CO_2$ (4) $CO < CO_2 < CO_3^{2-}$

24. Bond length of ethane (I), ethene (II), acetylene (III) and benzene (IV) follows the order
(1) $I > II > III > IV$ (2) $I > II > IV > III$
(3) $I > IV > II > III$ (4) $III > IV > II > I$

25. Molecular shapes of SF_4, CF_4 and XeF_4 are
(1) The same with 2, 0 and 1 lone pairs of electrons respectively
(2) The same, with 1, 1 and 1 lone pairs of electrons respectively
(3) Different, with 0, 1 and 2 lone pairs of electrons respectively
(4) Different, with 1, 0 and 2 lone pairs of electrons respectively

26. The IUPAC name of the compound

 is –

(1) 3,3-Dimethyl cyclohexanol
(2) 1,1,-Dimethy-3-hydroxyclyclohexane
(3) 3,3-Dimethyl-1-hydroxycyclohexane
(4) 1,1-Dimethyl-1-cyclohexanol

27. Nucleophilicity order is correctly represented by
(1) $CH_3^- < NH_2 < HO^- < F^-$
(2) $CH_3^- \simeq NH_2 < HO^- < F^-$
(3) $CH_3^- > NH_2^- > HO^- > F^-$
(4) $NH_2^- > F^- > HO^- > CH_3^-$

28. The correct order of reactivity towards the electrophilic substitution of the compounds aniline (I) benzene (II) and nitrobenzene (III) is-
(1) I < II > III   (2) I > II > III
(3) III > II > I   (4) II > III > I

29. Grignard's reagent gives alkane with –
(1) H_2O (2) C_2H_5OH
(3) $C_2H_5NH_2$ (4) All of these

30. Benzene undergoes –
(1) Nucleophilic substitutions
(2) Electrophilic substitutions
(3) Electrophilic additions
(4) Oxidation reactions in the presence of Lewis acid catalysts

31. Some leaves are removed from the stem cuttings planted for vegetative propagation. This is done
    (1) To increase water uptake
    (2) Because it helps in rooting of cuttings
    (3) To reduce water loss
    (4) Because the cuttings need less food

32. Glomerular filtrate is
    (1) Deproteinised plasma
    (2) Proteinised plasma
    (3) Blood plasma
    (4) Urine stored in urinary bladder

33. Root cap is not found in
    (1) Hollyhock
    (2) Pistia
    (3) Sunflower
    (4) China rose

34. Vasopressin is concerned with
    (1) General metabolism
    (2) Regulation of heart beat
    (3)Urine formation
    (4) Child birth

35. All arteries carry oxygenated blood except
    (1) Systemic
    (2) Hepatic
    (3) Pulmonary
    (4) Cardiac

36. Spleen is
    (1) Haemopoeitic
    (2) Lymphoid
    (3) Reproductive
    (4) Celluloid

37. In mammals, the largest vertebra is
    (1) Cervical
    (2) Lumbar
    (3) Caudal
    (4) Sacral

38. Which of the damaged cells cannot be repaired?
    (1) Liver cells
    (2) Brain cells
    (3) Bone cells
    (4) Epidermal cells

39. The major fraction of CO_2 released during cellular respiration is transported by the blood to the lung capillaries

    (1) In combination with haemoglobin

(2) As free CO_2
(3) As carbonic acid
(4) In the form of bicarbonate ions

40. Legume seeds exhibit dormancy because of
    (1) Undeveloped embryos
    (2) Hard seed coat
    (3) Absence of cytokinins
    (4) Absence of gibberellic acid

41. When a molecule of pyruvic acid is subjected to anaerobic oxidation and forms lactic acid, there is
    (1) Loss of 3 ATP molecules
    (2) Loss of 6 ATP molecul
    (3) Gain of 2 ATP molecules
    (4) Gain of 4 ATP molecules

42. In hydrophytic plants, water and salts are absorbed by
    (1) Roots
    (2) Leaves
    (3) Stem
    (4) Outer layer of plants

43. Which one is not an essential element in plants
    (1) Iron
    (2) Boron
    (3) Sulphur
    (4) Cadmium

44. Pneumatophores occur in plants of
    (1) Sandy soil
    (2) Saline marshy soil
    (3) Marshy soil
    (4) Water

45. Two plants A and B are supplied with CO_2 with H_2O^{18} and CO_2^{18} with H_2O respectively which of the following plant releases O^{18} type oxygen in photosynthesis
    (1) A plant
    (2) B plant
    (3) Both (1) and (2)
    (4) First (1) and then (2)

46. If $a_n = \sum_{r=0}^{n} \frac{1}{{}^nC_r}$, the value of $\sum_{r=0}^{n} \frac{n-2}{{}^nC_r}$ is :

(1) $\frac{n}{2} a_n$

(2) $\frac{1}{4} a_n$

(3) na_n

(4) 0

47. The value of 'c' for which the set, $\{(x, y) |x^2 + y^2 + 2x \leq 1\} \cap \{(x, y) |x - y + c \geq 0\}$ contains only one point in common is:

(1) $(-\infty, -1] \cup [3, \infty)$

(2) $\{-1, 3\}$

(3) $\{-3\}$

(4) $\{-1\}$

48. Equation of line passing through mid point of intercepts made by circle $x^2 + y^2 - 4x - 6y = 0$ on co-ordinate axes is:

(1) $3x + 2y - 12 = 0$

(2) $3x + y - 6 = 0$

(3) $3x + 4y - 12 = 0$

(4) $3x + 2y - 6 = 0$

49. If z be complex number such that equation $| z - a^2 | + | z - 2a | = 3$ always represents an ellipse then range of $a(\in R^+)$ is:

(1) $(1, \sqrt{2})$

(2) $|1, \sqrt{3}$

(3) $(-1, 3)$

(4) $(0, 3)$

50. The set of possible values of l for which $x^2 - (\lambda^2 - 5\lambda + 5)x + (2\lambda^2 - 3\lambda - 4) = 0$ has roots, whose sum and product are both less than 1, is

(1) $\left(-1, \frac{5}{2}\right)$ (2) $(1, 4)$

(3) $\left[1, \frac{5}{2}\right]$ (4) $\left(1, \frac{5}{2}\right)$

51. If α, β be the roots of $4x^2 - 16x + \lambda = 0$, where $\lambda \in R$, such that $1 < \alpha < 2$ and $2 < \beta < 3$, then the number of integral solutions of λ is

(1) 5

(2) 6

(3) 2

(4) 3

52. Let α, β, λ be the roots of $(x - a)(x - b)(x - c) = d, d \neq 0$, then the roots of the equation $(x - \alpha)(x - \beta)(x - \gamma) + d = 0$ are :

(1) $a + 1, b + 1, c + 1$

(2) a, b, c

(3) $a - 1, b - 1, c - 1$

(4) $\frac{a}{b}, \frac{b}{c}, \frac{c}{a}$

53. There are n straight lines in a plane, no two of which are parallel, and no three pass through the same point. Their points of intersection are joined. Then the number of fresh lines thus obtained is:

(1) $\frac{n(n-1)(n-2)}{8}$

(2) $\frac{n(n-1)(n-2)(n-3)}{6}$

(3) $\frac{n(n-1)(n-2)(n-3)}{8}$

(4) None of these

54. If the straight lines joining the origin and the points of intersection of the curve $5x^2 + 12xy - 6y^2 + 4x - 2y + 3 = 0$ and $x + ky - 1 = 0$ are equally inclined to the x-axis, then the value of k is equal to :

(1) 1

(2) - 1

(3) 2

(4) 3

55. The general solution of the equation

cosx . cos6x = – 1, is :

(1) $x = (2n+1)\pi$

(2) $x = 2n\pi$, $n \in I$

(3) $x = (2n-1)\pi$, $n \in I$

(4) none of these

56. The equation $\cos \theta = x + \dfrac{p}{x}$ for all

$x \in R$ *has* a real solution for θ. Then :

(1) $p = \dfrac{1}{2}$

(2) $p \leq \dfrac{1}{4}$

(3) $p \geq \dfrac{1}{4}$

(4) None of these

57. If $x + y = z$, then $\cos^2 x + \cos^2 y +$

$\cos^2 z - 2 \cos x \cos y \cos z$ is equal to

(1) $\cos^2 z$ 　　　　　(2) $\sin^2 z$

(3) $\cos (x + y - z)$ 　　(4) $\cos^2 x$

58. If $aN = \{ax : x \in N\}$ and $bN \cap cN = dN$, where

b, $c \in N$ are relatively prime, then

(1) $d = bc$

(2) $c = bd$

(3) $b = cd$

(4) None of these

59. If $f(y) = \log y$, then $f(y) + f\left(\dfrac{1}{y}\right)$ is equal to

(1) 2 　　　　　　　(2) 1

(3) 0 　　　　　　　(4) – 1

60. If $f : R \rightarrow R$ satisfies $f(x+y) = f(x) + f(y)$, for all

$x, y \in R$ and $f(1) = 7$, then $\displaystyle\sum_{r=1}^{n} f(r)$ is

(1) $\dfrac{7n}{2}$ 　　　　　　(2) $\dfrac{7(n+1)}{2}$

(3) $7n(n+1)$ 　　　　(4) $\dfrac{7n(n+1)}{2}$

ANSWERS
(RADIANT – CLASS 12TH)

PHYSICS

Q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans	1	4	4	1	1	1	2	2	3	3	2	2	3	3	2

CHEMISTRY

Q	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans	1	4	4	2	1	4	1	4	3	4	1	3	2	4	2

BIOLOGY

Q	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans	3	1	2	3	3	2	2	2	4	2	1	3	4	2	1

MATHS

Q	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans	4	4	4	4	4	4	2	3	2	3	2	7	1	3	4