



GMR Classes

NEET - MOT -35 - DT 06-04-2020

Total Marks : 720

Duration : 3:00 hrs

Physics XI

SECTION 1 - (SCQ) (Maximum Marks : 180)

- This section contains **45** questions
- From given options ,**ONLY ONE** of these option(s) is correct.
- For each question, select the alphabets corresponding to the correct option(s) provided below the questions

For each question, marks will be awarded in one of the following categories :

Full Marks : **+4** If only corresponding option is chosen.

Zero Marks : **0** If none of the options is chosen.(i.e the question is unanswered)

Negative Marks : **- 1** In all other cases

1. A wheel of mass 2 kg, having practically all the mass concentrated along the circumference of a circle of radius 20 cm, is rotating on its axis with an angular velocity of 100 rad/s. The rotational kinetic energy of the wheel is

(A) 4joule

(B) 70joule

(C) 400joule

(D) 800joule

2. The moment of inertia of a system, consisting of a uniform rod of mass **m** and of length **2l** with two particles each of mass **m** attached to the ends (one to each end), about the COM axis perpendicular to the rod is

(A) $\frac{4}{3}ml^2$

(B) $\frac{7}{3}ml^2$

(C) $\frac{5}{3}ml^2$

(D) $\frac{1}{3}ml^2$

3. A ring of radius **r** and mass **M** rotates about an axis passing through its centre and perpendicular to its plane with angular velocity ω . Its kinetic energy is

(A) $Mr\omega$

(B) $\frac{1}{2}Mr^2\omega^2$

(C) $M\omega^2r^2$

(D) $\frac{1}{2}Mr\omega$

4. A single stage rocket fired vertically from rest at earth surface burns its fuel in 30 sec. The relative velocity of the jet with respect to the rocket is 3 km/sec. If the rocket attains a velocity of 8 km/sec at the end of this time interval then the ratio of final mass of rocket and its content to that before firing is

(A) 14 : 1

(B) 16 : 1

(C) (14.37) : 3

(D) (14.37) : 1

5. Two identical particles move towards each other with velocity $2V$ and V respectively. The velocity of centre of mass is

(A) V

(B) $\frac{V}{3}$

(C) $\frac{V}{2}$

(D) *zero*

6.

Match the following in Column-I and column-II. Assume radius as R and height of cone as R .

Column I

A. Distance of centre of mass of Semi-circular ring from centre

B. Distance of centre of mass of semi Circular disc from centre

C. Distance of centre of mass a Solid cone from vertex

D. Distance of centre of mass of a hemi spherical shell from centre

Column II

P. $\frac{R}{2}$

Q. $\frac{3R}{4}$

R. $\frac{4R}{3\pi}$

S. $\frac{2R}{\pi}$

(A) A-S ,B-R ,C-Q ,D-P

(B) A-R ,B -S ,C-Q ,D-P

(C) A-S ,B-R ,C-P ,D-Q

(D) A- Q ,B-P ,C-R ,D-S

7. Distance moved by a center of mass of rigid body in one full rotation if forward slipping takes place

(A) $2\pi R$

(B) $> 2\pi R$

(C) $< 2\pi R$

(D) $< \pi R$

8. Two particles P and Q are located at distances r_P and r_Q respectively from the axis of a rotating disc such that $r_P > r_Q$:

(A) Both P and Q have the same acceleration

(B) Both P and Q do not have any acceleration

(C) P has greater acceleration than Q

(D) Q has greater acceleration than P

9. Four solid spheres, each of mass m and radius r , are placed with their centres on the four corners of a square of side a ($> 2r$). Find the moment of inertia of the system about one side of the square.

(A) $\frac{2}{5}m [4r^2 + 5a^2]$

(B) $\frac{2}{5}m [5r^2 + 4a^2]$

(C) $2 ma^2$

(D) $2m (a^2 + r^2)$

10. A neutron traveling with a velocity v and kinetic energy E collides elastically head on with the nucleus of an atom of mass number A at rest. The fraction of total energy retained by the neutron is

(A) $\left(\frac{A-1}{A+1} \right)^2$

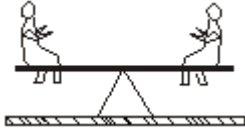
(B) $\left(\frac{A+1}{A-1} \right)^2$

(C) $\left(\frac{A-1}{A} \right)^2$

(D) $\left(\frac{A+1}{A} \right)^2$

11.

A diagram of a seesaw (lever) in a balanced state. Two children are sitting on opposite sides of the fulcrum at equal distances. The seesaw is horizontal, indicating it is in equilibrium.



- 12.** A girl sits near the edge of rotating circular platform. If the girl moves from circumference towards the centre of the platform, then the angular velocity of the platform will

- 13.** Mass is distributed uniformly over a thin square plate. If two end points of a diagonal are $(-2, 0)$ and $(2, 2)$, what are the co-ordinates of the centre of mass

- 14.** If two particles of masses 9kg and 4kg are acted upon by forces 12N and 5N along positive x and y axes respectively, what is the acceleration of centre of mass?

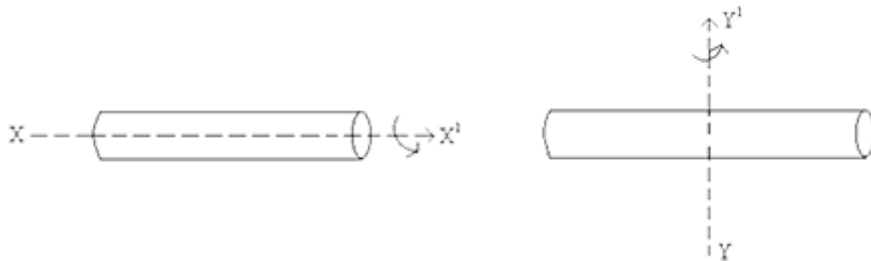
(A) $1\text{ m.s}^{-2}, \tan^{-1}\left(\frac{1}{5}\right)$ with $5N$ force

(B) $2m.s^{-2}, \tan^{-1}\left(\frac{1}{12}\right)$ with 12N force

(C) $1 \text{ m.s}^{-2}, \tan^{-1}\left(\frac{1}{12}\right)$ with $5N$ force

(D) $2 \text{ m.s}^{-2}, \tan^{-1}\left(\frac{5}{12}\right)$ with $5N$ force

15. In the following figures, about which axis the moment of inertia of the rod will be maximum



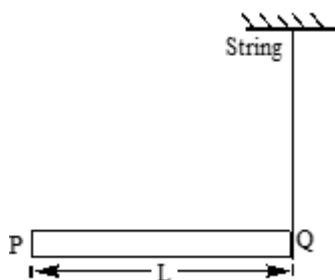
(A) xx'

(B) yy'

(C) Both a & b are equal

(D) The information given is incomplete

16. A uniform rod PQ of length L is hinged at one end P. The rod is kept in the horizontal position by a massless string tied to point Q as shown in the figure. If the string is cut, the initial angular acceleration of the rod will be



(A) $\frac{g}{L}$

(B) $\frac{2g}{L}$

(C) $\frac{2g}{3L}$

(D) $\frac{3g}{2L}$

17. A dancer is standing on a stool rotating about the vertical axis passing through its centre. She pulls her arms towards the body reducing her MI by a factor of n . The new angular speed of turn table is proportional

(A) n

(B) n^2

(C) n^3

(D) *None*

18. The centre of mass of triangle shown in figure has co-ordinates

(A)

$$-x = \frac{b}{2}; y = \frac{h}{2}$$

(B)

$$x = \frac{b}{2}; y = \frac{h}{2}$$

(C)

$$x = \frac{b}{3}; y = \frac{h}{3}$$

(D)

$$x = \frac{h}{3}; y = \frac{b}{3}$$

19. A body A of mass M while falling vertically downwards under gravity

breaks into two parts; a body B of mass $\frac{1}{3}M$ and body C of mass $\frac{2}{3}M$. The

centre of mass of bodies B and C taken together shifts compared to that of body A towards

(A) Body C

(B) Body B

(C) Depends on height of breaking (D) Does not shift

20. From a square plate of uniform thickness of side 20 cm a circular portion of diameter 8 cm is cut, with the diameter of the circle lying on the line joining the mid points of the opposite sides of the plate, and the edge of the circle lying at one edge of the square. Find the position of the centre of mass of the remaining portion of the square from its original centre of mass.

(A) $\pi \text{ cm}$

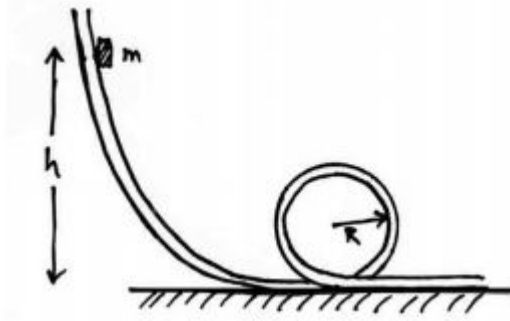
(B) $\frac{\pi}{25} \text{ cm}$

(C) $\frac{6\pi}{25 - \pi} \text{ cm}$

(D) $\frac{25 - \pi}{\pi} \text{ cm}$

21.

A small block of mass m slides along a frictionless loop inside loop track as shown in figure. The minimum value of the ratio R/r so that the block may not lose contact at the highest point the inner loop is



(A) $\frac{7}{2}$

(B) 2

(C) $\frac{5}{2}$

(D) 3

22. A rocket having initial mass 240 kg ejects fuel at the rate of 6 kg/sec with a velocity of 2 km/sec vertically down ward relative to itself. If initial velocity is zero and gravity is neglected the final velocity after 25 sec is

$[\log_{10} 2.67 = 0.4265]$

(A) 1.96 km/s

(B) 3.4 km/s

(C) 2.26 km/s

(D) 8.96 km/s

23.

A metal disc of radius a rotates with a constant angular velocity

ω about its axis. Assuming, m and e to be the

mass and charge of electron, the potential difference between the centre and the rim of the disc is

$$(A) \frac{1}{2} \left(\frac{m\omega^2 a^2}{e} \right)$$

$$(B) \frac{m\omega^2 a^2}{e}$$

$$(C) \frac{2m\omega^2 a^2}{e}$$

$$(D) \frac{4m\omega^2 a^2}{e}$$

24. A thin rod of length L can rotate in vertical plane about horizontal axis passing through one end of rod without friction. The rod is released when it is horizontal. The initial angular acceleration of rod is

$$(A) 2g/L$$

$$(B) 3g/L$$

$$(C) 3g/2L$$

$$(D) 2g/3L$$

25. A car accelerates uniformly from rest to a speed of 15ms^{-1} in a time of 20S. The radius of the car wheel is $1/3$ m. the angular acceleration of one of its wheels and the number of revolutions turned by a wheel in the process is

$$(A) 2.25 \text{ rad/s}^2, 225\text{rad} \quad (B) 1.15 \text{ rad/s}^2, 225 \text{ rad}$$

$$(C) 1.5 \text{ rad/s}^2, 125 \text{ rad} \quad (D) 2.25\text{rad/s}^2, 450 \text{ rad}$$

26. A uniform cylinder of height h and radius r is placed with its circular face on a rough inclined plan and the inclination of plane to horizontal is gradually increased . If μ is coefficient of friction then what conditions the cylinder will slide before toppling

$$(A) \mu > \frac{r}{h}$$

$$(B) \mu < \frac{r}{h}$$

$$(C) \mu < \frac{2r}{h}$$

$$(D) \mu > \frac{2r}{h}$$

27. Which of the following statements are correct ?

- a) Centre of mass of a body always coincides with the centre of gravity of the body.
- b) Central of mass of a body is the point at which the total gravitational torque on the body is zero.
- c) A couple on a body produces both translational and rotation motion in a body.
- d) Mechanical advantage greater than one means that small effort can be used to lift a large load.

(A) a and b

(B) b and c

(C) c and d

(D) b and c

28. If n particles of masses 1kg, 2kg, 3kg.... n kg of are placed at points 1,4,9.... n^2 respectively from the origin along x-axis. The distance of centre of mass from origin.

(A) $\frac{n(n+1)}{2}$

(B) $\frac{n^2(n+1)}{4}$

(C) $\frac{n(n+1)(2n+1)}{3}$

(D) $\frac{n(n+1)(2n+1)}{12}$

29. A particle of mass $m = 5$ units is moving with uniform speed $V = 3\sqrt{2}$ units in the XY plane along the line $Y = X + 4$. The magnitude of the angular momentum about origin is

(A) zero

(B) 60 units

(C) 7.5 units

(D) 40 units

30. The density of a rod AB increases linearly from A to B. Its midpoint is O and its centre of mass is at C. Four axes pass through A, B, O and C, all perpendicular to the length of the rod. The moments of inertia of the rod about these axes are I_A , I_B , I_O and I_C respectively

(A) $I_A > I_B, I_O > I_C$

(B) $I_A < I_B, I_O > I_C$

(C) $I_O > I_C, I_A > I_B$

(D) $I_O < I_C$

31. Three particles of masses 1 kg, 2 kg and 3 kg placed at the corners of an equilateral triangle of 1m side. Then co-ordinates of centre of mass assuming 1 kg mass at origin and the line joining 1 kg and 2 kg lie on x-axis.

(A) $\left(\frac{1}{2}, \frac{\sqrt{3}}{4}\right)$

(B) $\left(\frac{1}{4}, \frac{\sqrt{3}}{4}\right)$

(C) $\left(\frac{7}{12}, \frac{\sqrt{3}}{4}\right)$

(D) $\left(\frac{5}{12}, \frac{\sqrt{3}}{4}\right)$

32. Two bodies of masses 2 kg and 4kg are moving with velocities 20 m/s towards each other due to mutual gravitational attraction. What is the velocity of their centre of mass?

(A) 5.3 m/s

(B) 6.4 m/s

(C) zero

(D) 8.1 m/s

33. A system consists of mass M and m ($\ll M$). The centre of mass of the system is

(A) At the middle

(B) nearer to M

(C) Nearer to m

(D) At the position of larger mass

34. A square plate of side l has mass M . What is its moment of inertia about one of the diagonals?

(A) $\frac{Ml^2}{3}$

(B) $\frac{Ml^2}{4}$

(C) $\frac{Ml^2}{6}$

(D) $\frac{Ml^2}{12}$

35. Three particles of masses 1kg, 2kg, 2kg are placed at the corners of an equilateral triangle ABC where coordinates of A and B are (0, 0) and (2, 0) respectively. The coordinates of C.O.M. of the system

(A) $\left(\frac{6}{5}, \frac{3}{5}\right)$

(B) $\left(\frac{6}{5}, \frac{\sqrt{3}}{5}\right)$

(C) $\left(\frac{6}{5}, \frac{1}{5}\right)$

(D) $\left(\frac{6}{5}, \frac{2\sqrt{3}}{5}\right)$

36. STATEMENT–1: A block is kept at the top of a smooth wedge which is term is kept on a smooth horizontal surface. As the block slides down the wedge. Centre of the mass of system will be accelerated.

STATEMENT–2: When external force acting on the system is zero centre of is in rest.

(A) Statement–1 is True, Statement–2 is True; Statement–2 is a correct explanation for Statement–1.

(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.

(C) Statement – 1 is True, Statement – 2 is False.

(D) Statement –1 is False, Statement – 2 is True.

37. A uniform disc of radius R is put over another uniform disc of radius 2R of the same thickness and density. The peripheries of the two discs' touch each other. The centre of mass of the system from the centre of the bigger disk towards the centre of the smaller disk is

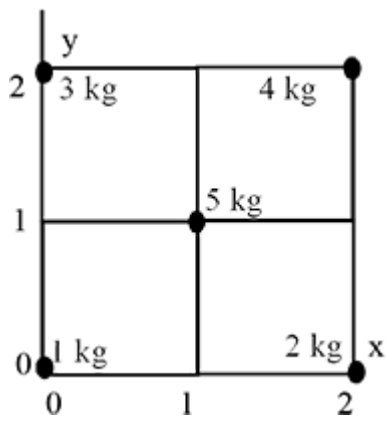
(A) $\frac{R}{2}$

(B) $\frac{R}{3}$

(C) $\frac{R}{4}$

(D) $\frac{R}{5}$

38. Five masses are placed in a plane as shown in figure. The coordinates of the centre of mass are nearest to



- (A) 1.2, 1.4 (B) 1.3, 1.1
(C) 1.1, 1.3 (D) 1.0, 1.0

39. Two blocks of masses 10 kg and 30 kg are placed along a vertical line. The first block is raised through a height of 7 cm. By what distance should the second mass be moved to raise the centre of mass by 1 cm?

- (A) 1 cm upward (B) 1 cm downward
(C) 2 cm upward (D) 2 cm downward

40. A bag of mass M hangs by a long mass less rope. A bullet of mass m , moving horizontally with velocity u is caught in the bag. Then for the combined (bag + bullet) system

- (A) momentum is $muM/(M + m)$ (B) kinetic energy is $mu^2/2$
(C) momentum is $mu(M + m)/M$
(D) kinetic energy is $m^2 u^2/(M + m)$

41. If the resultant of all external forces is zero, then velocity of centre of mass will be

- (A) zero (B) constant
(C) either (a) or (b) (D) neither (a) or (b) constant

42. Mass is distributed uniformly over a thin square plate. If two end points of a diagonal are $(-2, 0)$ and $(2, 2)$, what are the coordinates of centre of mass of plate ?

- (A) (2, 1) (B) (2, 2)
(C) (1, 0) (D) (0, 1)

43. If no external force acts on a system which of the following is incorrect

- (A) velocity of centre of mass remains constant.
(B) velocity of centre of mass is not constant.
(C) velocity of centre of mass may be zero.
(D) acceleration of centre of mass is zero.

44. The moment of inertia of a circular disc about its own axis is 4 Kg/m^2 . Its moment of inertia about the diameter will be

- (A) 4 Kg/m^2 (B) 2 Kg/m^2
(C) Zero (D) 8 Kg/m^2

45. Two bodies of masses 2 kg and 4 kg are moving with velocities 2 m/s and 10 m/s towards each other due to mutual gravitational attraction. What is the velocity of their centre of mass?

- (A) 5.3 ms^{-1} (B) 6.4 ms^{-1}
(C) zero (D) 8.1 ms^{-1}

Chemistry XI

SECTION 1 - (SCQ) (Maximum Marks : 180)

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46. In the preparation of H_2O_2 by auto oxidation method the starting substance

- (A) 2-ethyl anthrax quinone (B) 2-ethyl anthrax quinol
(C) P-benzo quinone (D) N-methyl aniline

47. Oxidation number of nitrogen in AgNO_3 is

- (A) -3 (B) +3
(C) +5 (D) -2

48. Deutero methane is obtained by the deuterolysis of

- (A) MgN_2 (B) CaC_2
(C) Al_4C_3 (D) C_6H_6

49. The reagent (s) used for softening the temporary hardness of water is (are):

- (A) $\text{Ca}_3(\text{PO}_4)_2$, $\text{Ca}(\text{OH})_2$ (B) $\text{Ca}(\text{OH})_2$, Na_2CO_3
(C) Na_2CO_3 , NaOCl (D) NaOCl , $\text{Ca}_3(\text{PO}_4)_2$

50. 50 ml of a certain sample of H_2O_2 , gives 1200 ml of O_2 at STP. The volume strength of H_2O_2 is $x \times 6$; $x = ?$

- (A) $x = 1$ (B) $x = 2$
(C) $x = 3$ (D) $x = 4$

51. De-ionized water is prepared by the following method

- (A) Clarks (B) Ion Exchange
(C) Permut (D) Calgon

52. The lightest element in the periodic table is

- (A) Lithium (B) Fluorine
(C) Hydrogen (D) Helium

53. The formula of chloric acid HClO_3 the formula of calcium chlorate is

- (A) $\text{Ca}(\text{ClO}_3)_2$ (B) CaClO_3
(C) Ca_2ClO_3 (D) $\text{Ca}(\text{ClO}_3)_3$

54. Assertion(A): PbCl_2 is more stable than PbCl_4 .

Reason(R): is a powerful oxidising agent.

- (A) If both A and R are true and R is the correct explanation of the A.
(B) If both A and R are true, but R is not a correct explanation of A.
(C) If A is true and R is false. (D) If A is false and R is true.

55. Hydrogen peroxide is

- (A) diamagnetic (B) paramagnetic
(C) ferromagnetic (D) ferrimagnetic

56. Identify the incorrect statement?

- (A) H_2O_2 gives yellow colour on reaction with $\text{Cr}(\text{OH})_3$
(B) H_2O_2 gives blue colouration with titanium salt solution
(C) H_2O_2 decolourises pink colour of KMnO_4
(D) H_2O_2 turns starch iodide paper to blue

57. IUPAC name of ammonia

- (A) Nitrogen hydride (B) Ammonia
(C) Azane (D) Hydrazene

58. The weight – volume % of 10V of H_2O_2 solution is

- (A) 1 (B) 2
(C) 3 (D) 4

59. Which of the following shows highest oxidation number in combined state?

- (A) *Os* (B) *Ru*
(C) *Both* (D) *None*

60. Oxidation number of N in NH_4NO_3 is:

- (A) -3 (B) $+5$
(C) -3 and $+5$ (D) $+3$ and -5

61. The average oxidation number of I in KI_3 , Fe in Fe_3O_4 are respectively:

- (A) $-1/3$, $+8/3$ (B) -1 , $+8$
(C) 0 , $+3$ (D) 0 , $+2$

62.

(A) : Nascent hydrogen can discharge the pink colour of KMnO_4 solution.

(R) : Nascent hydrogen is much more reactive than ordinary hydrogen.

- (A) If both (A) and (R) true and the (R) is the correct explanation of (A)
(B) If both (A) and (R) true but (R) is the not correct explanation of (A)
(C) If (A) is true but (R) is false (D) If both (A) and (R) are false

63. Which one of the following statements is CORRECT

- (A) H_2O_2 can be prepared by the action of dilute acid on MnO_2
(B) In all oxidising properties of H_2O_2 , O_2 must be one of the products
(C) In the manufacture of H_2O_2 , 2-ethylanthraquinol is reduced
(D) When acidified potassium dichromate is added to H_2O_2 solution in an ether, beautiful blue colour is developed

64. In the balanced equation $5\text{H}_2\text{O}_2 + \text{XClO}_2 + 2\text{OH}^- \rightarrow \text{XCl}^- + \text{YO}_2 + 6\text{H}_2\text{O}$. The reaction is balanced if

- (A) $\text{X} = 5, \text{Y} = 2$ (B) $\text{X} = 2, \text{Y} = 5$
(C) $\text{X} = 4, \text{Y} = 10$ (D) $\text{X} = 5, \text{Y} = 5$

65. Which of the following statement is incorrect

- (A) H_2O_2 is an oxidizing agent (B) H_2O_2 is a reducing agent
(C) H_2O_2 is a bleaching agent (D) H_2O_2 is a dehydrating agent

66. The percentage of deuterium in heavy water is

- (A) 22.4 (B) 11.2
(C) 44 (D) 20

67. In Nuclear reactors, heavy water is used as a

- (A) Fuel (B) Projectile
(C) Moderator (D) Coolent

68. In the following reaction

$x\text{CuO} + \text{NH}_3 \rightarrow x\text{Cu}_2 + \text{N}_2 + \text{H}_2\text{O}$ find the x value?

- (A) 3 (B) 4
(C) 5 (D) 6

69. Number of moles of $\text{K}_2\text{Cr}_2\text{O}_7$ reduced by one mole of Sn^{2+} ions is

- (A) $1/3$ (B) 3
(C) $1/6$ (D) 6

70. Which is polymeric hydride?

- (A) CaH_2 (B) MgH_2
(C) BaH_2 (D) SrH_2

71. A sample of H_2O_2 is labeled as 10 volume. Its strength in g L^{-1} is

- (A) 20
- (B) 30
- (C) 40
- (D) 50

72. Oxidation number of Cr in $\text{CrO}(\text{O}_2)_2$ is

- (A) +8
- (B) +6
- (C) +4
- (D) +5

73. Tritium emits

- (A) α -Particle
- (B) Positron
- (C) β -Particle
- (D) Neutron

74. Hydrogen economy is

- (A) Using H_2 gas in place of CNG
- (B) Production, storage and transportation of H_2 gas
- (C) Using liquid H_2 as alternative source of energy and its production, storage and transportation
- (D) The cost reduction due to the use of H_2 as a fuel

75. The volume of strength of 10N H_2O_2 is

- (A) 112
- (B) 11.2
- (C) 0.112
- (D) 56

76. Which metal exhibits more than one oxidation states

- (A) Na
- (B) Mg
- (C) Al
- (D) Mn

77. Hardness in water sample is 300 ppm CaCO_3 . Hence, its molarity is

- (A) 0.300 M
- (B) 0.030 M
- (C) 0.003 M
- (D) 0.0015 M

78. How many isotope of hydrogen are present and how many of them are Radioactive in nature

- (A) 2, 2 (B) 3, 3
(C) 3, 1 (D) 3, 2

79. Bosch method for the manufacture of hydrogen gas uses

- (A) Reaction of red hot coke with steam
(B) Reaction of red hot iron followed by reduction of Fe_3O_4 with syn gas
(C) Coal gasification followed by water gas shift reaction
(D) Reaction of metal with dilute acid

80. The oxidation number and covalency of sulphur in S_8 is:

- (A) +2, 0 (B) 0, 2
(C) 0, 8 (D) 6, 2

81. The atomic numbers of an element which shows the oxidation state of +3 is.

- (A) 31 (B) 33
(C) 17 (D) 13

82. In ice each Oxygen is surrounded by four oxygen atoms in _____ manner

- (A) Square planar (B) Tetrahedral
(C) Trigonal Planar (D) Angular

83. The molarity of 20 ml of 20 volumes H_2O_2 is

- (A) 0.90 (B) 1.80
(C) 2.70 (D) 1.90

84. Which removes temporary hardness of water and is used in the manufacture of bleaching powder:

- (A) slaked lime $\text{Ca}(\text{OH})_2$ (B) plaster of paris
(C) Epsom salt (D) Hydrolith

85. Chemical compound (A) is used for water softening to remove temporary hardness. Compound (A) reacts with sodium carbonate to give caustic soda. When CO_2 is bubbled through a solution of (A), it turns cloudy. The chemical formula of (A) will be

- (A) CaCO_3 (B) CaO
(C) Ca(OH)_2 (D) $\text{Ca(HCO}_3)_2$

86. Manufacture of H_2 is made by

- (A) Lane's process (B) Bosch process
(C) Electrolysis of warm solution of Ba(OH)_2
(D) All of these

87. The Ionization energy of Hydrogen is

- (A) Greater than inert gases (B) Nearer to inert gases
(C) Nearer to Halogens (D) Nearer to alkaline earth metals

88. The oxidation state of hydrogen in C_2H_2 is

- (A) +1 (B) -1
(C) 0 (D) +2

89. HBr and HI reduce sulphuric acid. HCl can reduce KMnO_4 and HF can reduce:

- (A) H_2SO_4 (B) KMnO_4
(C) $\text{K}_2\text{Cr}_2\text{O}_7$ (D) none of these

90. A deuterium atom

- (A) Has the same atomic mass as the hydrogen atom
(B) Has the same electronic configuration as the hydrogen atom
(C) Has the same composition of the nucleus as the hydrogen atom
(D) Contains one proton more than a hydrogen atom.

SECTION 1 - (SCQ) (Maximum Marks : 180)

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For each question, marks will be awarded in one of the following categories :

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Negative Marks : **- 1** In all other cases

91. Motor or bulliform cells In grasses shows-

- (A) Growth movement (B) Tropism
(C) Nastic movement (D) Turgor movement

92. The compounds that inhibit the action of auxin are known as—

- (A) Antiauxins (B) Auxins promoters
(C) Auxin precursors (D) Both 1 & 2

93. Phytotron is a device by which?

- (A) Induce mutation breeding in wheat (B) Electron bombarding system
(C) Plants are grown in controlled environment
(D) Heavy water plants

94. In the terrestrial habitat which of the following factors affect temperature and rainfall conditions

- (A) Translocation (B) Transformation
(C) Thermo-denaturation (D) Transpiration

95. Mimose (touch me not plant) shows-

- (A) Thigmotropism movement (B) Chemotactic movement
(C) Thigmonasty (D) Seismonasty

96. Which of the following hormones is known to promote maleness in flowering plants?

- (A) Gibberellic acid (B) Kinetin
(C) IAA (D) 2, 4-D

97. Internodal elongation is stimulated by—

- (A) Auxin (B) Cytokinin
(C) Gibberellin (D) Phenol

98. The gibberellin which is of wide distribution in higher plants are-

- (A) GA₂₉ (B) GA₃₂
(C) GA₁ (D) GA₂₂

99. Apical dominance in higher plants is due to—

- (A) Phytohormones (B) Enzymes
(C) Carbohydrates (D) Photoperiodism

100. Dormancy in potato can be induced by —

- (A) IBA (B) NAA
(C) Maleic hydrazide (D) All the above

101. Which of the following exerts profound effect on the reproductive growth of a flowering plant—

- (A) Quality of light (B) Quantity of light
(C) Direction of light (D) Duration of light cycles

102. During the transport of sugar or amino acid through cell membrane

- (A) Na⁺ ions move against the direction of concentration
(B) Na⁺ ions move in both directions irrespective of its concentration gradient
(C) No net Na⁺ ions movement
(D) Na⁺ ions move in the direction of its concentration gradient

103. Avena coleoptile test to find out the quantity of growth promoting hormones was discovered by –

- (A) F.W. Went
- (B) L.J. Oudus
- (C) K.V. Thimann
- (D) F. Skoog

104. Which of the following is an antitranspirant?

- (A) Silicone oil
- (B) ABA
- (C) Both (1) and (2)
- (D) TIBA

105. Lateral axillary buds are not allowed to grow by–

- (A) Auxin
- (B) Ethylene
- (C) Gibberellin
- (D) Cytokinin

106. Uptake of K^+ in guard cell from subsidiary is balanced by

- (A) Uptake of Cl^- in Guard cell
- (B) Negative charge on organic acid (Malate)
- (C) Transport of H^+ from Guard cell to subsidiary cell
- (D) All of these

107. Hydrotropism have seen in-

- (A) Flowers
- (B) Seedlings
- (C) Stem
- (D) None

108.

Leaf fall occurs when the content of–

- (A) Auxin increase
- (B) Auxin decreases
- (C) Absciscic acid decreases
- (D) Gibberellic acid decreases

109. Which enzyme is synthesized de-novo in aleurone layers of germinating seeds due to the effect of gibberellins ?

- (A) α -Amylase
- (B) Protease
- (C) Lipase
- (D) None of the above

110. What happens during delay of senescence ?

- (A) Chlorophyll breakdown stops in the treated area
- (B) Transfer of proteins, amino acids and auxins towards the treated area
- (C) More protein synthesis in the treated area
- (D) All the above

111. Which of the following plant hormone substitutes for long photoperiod in flowering plant–

- (A) Auxin
- (B) Gibberellin
- (C) Cytokinin
- (D) Ethylene

112. Due to the effect of which substance flowering can be induced even in the absence of vernalisation?

- (A) Gibberellin
- (B) Auxin
- (C) Cytokinin
- (D) Ethylene

113. Stomata open at night and close during day in

- (A) Xerophytes
- (B) Gametophytes
- (C) Mesophytes
- (D) Hydrophytes

114. Transpiration efficiency refers to

- (A) Water absorption transpiration ratio
- (B) Transpiration in relation to ascent of sap
- (C) Weight of dry matter produced per kg of water transpired
- (D) None of these

115. In the process osmosis in the cell

- (A) Both cell wall and protoplasm will act as a membrane
- (B) Entire protoplast act as a membrane
- (C) Only outermost layer of protoplasm act as a membrane
- (D) Only cell wall act as a membrane

116. Chemically abscisic acid is –

- (A) Terpenoid (B) Fatty acid
(C) Precursor of typical fat (D) Steroid

117. Seedless fruits can be obtained by treating the unpollinated ovaries with—

- (A) Colchicine (B) Sucrose solution
(C) Hormones (D) Pure lanolin

118.

Substance which originate at the tip of stem to control growth—

- (A) Vitamins (B) Enzymes
(C) Food materials (D) Auxins

119. 2, 4-D is a synthetic—

- (A) Auxin (B) Gibberellin
(C) Cytokinin (D) Florigen

120. Hormone involved in photoperiodism is—

- (A) IAA (B) Gibberellin
(C) Kinetin (D) 2, 4-D

121. The most common cytokinin is—

- (A) IAA (B) Kinetin
(C) Isopentanyl adenine (D) Dehydrozeatin

122. Parthenocarpy can be achieved by—

- (A) Zeatin (B) ABA
(C) Auxins (D) Kinetin

123. In germinating seeds Amylase, Proteases, Lipases are stimulated by—

- (A) Auxin (B) Gibberellin
(C) Cytokinin (D) Ethylene

124. Bolting hormone is—

- (A) Auxin
- (B) Gibberellin
- (C) ABA
- (D) Ethylene

125. What causes a green plant to bend towards light as it grows?

- (A) Because green plants need light to carry on photosynthesis
- (B) Because green plants are phototropic
- (C) Light stimulates plant cells on the lighted side to grow faster
- (D) Auxin accumulates on the shaded side

126. The growth regulator that retards ageing of plant organ is—

- (A) Auxin
- (B) Gibberellin
- (C) Cytokinin
- (D) Abscissic acid

127. In which plants, flowering can be induced by gibberellins even in the absence of appropriate photo period required for them?

- (A) In LDP
- (B) In SDP
- (C) In LDP & SDP
- (D) None of these

128. Critical day length of plant 'A' is 2 hrs. It flowers when light duration exceeds 2 hr. Critical day length of plant 'B' is 5 hrs. It stops flowering after 5 hrs duration of light. Conclusion from this is

- (A) Plant 'A' is SDP
- (B) Plant 'B' is LDP
- (C) Plant 'A' and 'B' are SLDP
- (D) None of these

129. Meaningful girdling (Ringing) experiment cannot be done on sugarcane because

- (A) Phloem is present inside the xylem
- (B) It cannot tolerate the xylem
- (C) Vascular bundles are scattered
- (D) Plants are very delicate

130. Plants bend toward the light because—

- (A) They need light for photosynthesis
- (B) They need light for respiration
- (C) Light attracts them

(D) Cells on the shaded side elongate more

131. The classical experiments on growth were performed by–

- (A) Lamarck & Boysen Jensen (B) Boysen Jensen & Darwin
(C) Darwin and Lamarch (D) Darwin and Paal

132. Which of the following is weed killer?

- (A) 2, 4-D (B) NAA
(C) GA (D) ABA

133. The movement of auxin is largely–

- (A) Acropetal (B) Basipetal
(C) Lateral (D) Centripetal

134. Which of the following breaks the dormancy of seeds?

- (A) IAA (B) GA₃
(C) Ethylene (D) All the above

135. Ethylene synthesis occur in –

- (A) Fruit (B) Stem
(C) Leaf (D) All the above

Zoology XI

SECTION 1 - (SCQ) (Maximum Marks : 180)

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136. Which one is the most soluble in water.

- | | |
|-----------------|------------|
| (A) Uric acid | (B) Urea |
| (C) Fatty acids | (D) Casein |

137. If the human kidneys filter 150 litres of plasma in a 24 hour period, what is the typical amount of urine produced and eliminated in that time period?

- | | |
|-----------------|----------------|
| (A) 0.15 litres | (B) 1.5 litres |
| (C) 15 litres | (D) 30 litres |

138. One of the following substance is not found in mammalian urine –

- | | |
|---------------------|-------------|
| (A) Ammonium salt | (B) Sucrose |
| (C) Sodium chloride | (D) Water |

139. Kidney is not distinguished into cortex and renal medulla in

- | | |
|------------|-----------|
| (A) Frog | (B) Man |
| (C) Rabbit | (D) Camel |

140. Which one of the following blood vessel in mammals contains least amount of urea–

- | | |
|-------------------------|------------------|
| (A) Hepatic portal vein | (B) Hepatic vein |
| (C) Dorsal aorta | (D) Renal vein |

141. In the kidney of the rabbit, the Loop of Henle is the part of –

- | | |
|------------------------|----------------------|
| (A) Collecting duct | (B) Glomerulus |
| (C) Uriniferous tubule | (D) Bowman's capsule |

142. Part not belonging to uriniferous tubule is–

- | | |
|------------------------------|---------------------|
| (A) Glomerulus | (B) Henle's |
| (C) Distal convoluted tubule | (D) Collecting duct |

143. What will happen if one kidney is removed from the body of a human being–

- (A) Death due to poisoning (B) Uraemia and death
- (C) Stoppage of urination
- (D) Nothing, the person will survive and remain normal kidney will become hypertrophied

144. The presence of arginase confirms that :

- (A) Urea cycle is operating (B) Urea cycle may be operating
- (C) Arginine is being converted into ornithin
- (D) Arginine is being converted into citrulline

145. When certain marine organisms are placed in distilled water, they ultimately die. Which could be the most likely explanation –

- (A) Excess of water in the tissues (B) Loss of water from the tissue
- (C) Loss of permeability of some membranes
- (D) Loss of salts

146. A nephron does not have loop of Henle in –

- (A) Rabbit (B) Dog
- (C) Frog (D) Man

147. Which one of the following is correctly matched pair of the given secretion and its primary role in human physiology?

- (A) Sebum — Sexual attraction (B) Sweat — Thermoregulation
- (C) Saliva — Tasting food (D) Tears — Excretion of salts

148. Which of the following is totally reabsorbed in renal tubes?

- (A) Na (B) K
- (C) H₂O (D) C₆H₁₂O₆

149. Urine under normal conditions does not contain glucose because

- (A) The normal blood sugar is fructose
- (B) Glucose of blood is not filtered in the glomerulus

- (C) Glucose in glomerular filtrate is reabsorbed in the uriniferous tubules
- (D) Glucose in glomerular filtrate is converted into glycogen.

150. Main function of glomerulus is :-

- (A) Filtration of blood
- (B) Reabsorption of H₂O
- (C) Reabsorption of Na⁺
- (D) Concentration of urine

151. The yellow colour of urine is due to –

- (A) Urea
- (B) Melanin
- (C) Uric acid
- (D) Urochrome

152. Which of the following describes the route of urine out of the body after it leaves the kidney?

- (A) Renal vein-urinary bladder-urethra-ureter
- (B) Urethra-urinary bladder-ureter
- (C) Renal vein-ureter-urinary bladder-urethra
- (D) Ureter-urinary bladder-urethra

153. A person who is on a long hunger strike and is surviving only on water, will have : -

- (A) Less urea in his urine
- (B) More sodium in his urine
- (C) Less amino acids in his urine
- (D) More glucose in his blood

154. ADH will be released from the posterior pituitary when there is a decrease in –

- (A) Plasma potassium concentration
- (B) Plasma pH
- (C) Plasma sodium concentration
- (D) Plasma volume

155. Toxic substances are detoxified in human body in

- (A) Kidney
- (B) Lungs
- (C) Liver
- (D) Stomach

156. What is “renal threshold” –

- (A) The highest concentration of substances upto which it is totally reabsorbed from glomerular filtrate
- (B) At which all the substances are reabsorbed
- (C) At which the filtration of a substance starts
- (D) At which no substance is filtered in the glomerulus

157. Urinary excretion of Na is regulated by:

- (A) Anterior pituitary
- (B) Posterior pituitary
- (C) Adrenal cortex
- (D) Adrenal medulla

158. The least toxic nitrogenous waste is –

- (A) Ammonia + urea
- (B) Ammonia
- (C) Uric acid
- (D) Urea

159. In diabetes mellitus, the patient drinks more water as there is urinary loss of –

- (A) Protein
- (B) Salt
- (C) Insulin
- (D) Glucose

160. Ultrafiltration occurs in a glomerulus when-

- (A) Osmotic pressure exceeds hydrostatic pressure
- (B) Hydrostatic pressure exceeds osmotic pressure
- (C) Colloidal osmotic pressure plus capsular pressure remain less than glomerular hydrostatic pressure
- (D) Capsular hydrostatic pressure exceeds glomerular hydrostatic pressure

161. The loop of Henle is most highly developed in-

- (A) Mammals
- (B) Desert lizards
- (C) Fresh water fishes
- (D) Salamanders

162. Uric acid is chief excretory product in –

- (A) Insects (B) Earthworms
(C) Amphibians (D) Mammals

163. Reabsorption of chloride ions from glomerular filtrate in kidney tubule occurs by

- (A) Active transport (B) Diffusion
(C) Osmosis (D) Brownian movement

164.

Select the option which shows correct matching of animal with excretory organs and excretory product

	Animal	Excretory organs	Excretory product
(a)	Housefly	Renal tubules	Uric acid
(b)	<i>Labeo</i> (Rohu)	Nephridial	Ammonia tubes
(c)	Salamander	Kidney	Urea
(d)	Peacock	Kidney	Urea

- (A) A (B) B
(C) C (D) D

165. Fresh water bony fishes maintain water balance by–

- (A) Excreting a hypotonic urine (B) Excreting salt across their gills
(C) Drinking small amount of water
(D) Excreting wastes in the form of uric acid

166. Which one of the following substance is completely reabsorbed from the filtrate in the renal tubule under normal condition –

- (A) Urea (B) Uric acid
(C) Salt and water (D) Glucose

167. The amount of the original filtrate volume which is reabsorbed by the time the tubular fluid enters the Henle's loop is approximately–

- (A) 75% (B) 95%
(C) 85% (D) 90%

168. Two examples in which the nitrogenous wastes are excreted from body in the form of uric acid are–

- (A) Birds and lizards (B) Mammals and mollusc
(C) Insects and bony fishes (D) frogs and cartilaginous fishes

169. Met nephric kidneys are found in

- (A) Reptiles only (B) Birds only
(C) Mammals only (D) All of these

170. Kidney are not only the organs of excretion their work is supplemented by –

- (A) Large intestine (B) Lungs
(C) Liver (D) Skin

171. Hormones aid in the reabsorption of substances in DCT and CD

- (A) Vasopressin and Aldosterone (B) Insulin and ADH
(C) Aldosterone and MSH (D) Testosterone and Aldosterone

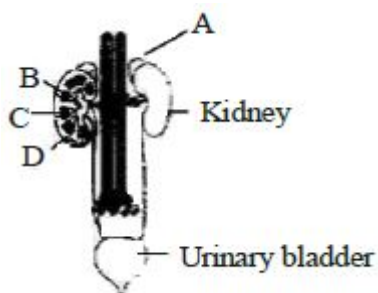
172. Reabsorption of water in distal parts of kidney tubules/urine formation is controlled by

- (A) Relaxin (B) Calcitonin
(C) Oxytocin (D) Vasopressin

173. A severe fall in blood pressure disturbs the function of kidneys and reduces –

- (A) Reabsorption of useful substances (B) Glomerular filtration
(C) Secretion of nitrogenous waste (D) Renal filtration

174. Figure shown human urinary system with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and /or functions.



(A) B-pelvis-broad funnel shaped space inner to hilum, directly connected to loops of Henle.

(B) C-Medulla-inner zone of kidney and contains complex nephrons.

(C) D - Cortex - outer part of kidney and do not contain any part of nephrons

(D) A-Adrenal gland - located at the anterior part of kidney. Secrete Catechol amines which stimulate glycogen breakdown.

175. Column of Bertini is found in –

(A) Liver

(B) Kidney

(C) Ovaries

(D) Testes

176. Which region of the kidney nephron is the main site of amino acid reabsorption?

(A) Glomerulus

(B) Bowman's capsule

(C) Proximal convoluted tubule

(D) Distal convoluted tubule

177. In a glomerulus –

(A) Afferent capillaries are thicker than efferent capillaries

(B) Afferent arteriole is thicker than efferent arteriole

(C) Afferent arteriole is thinner than efferent arteriole

(D) Afferent capillaries are thinner than efferent capillaries

178. In which part of excretory system of mammals can you first use the term 'urine' for contained fluid –

(A) Urinary bladder

(B) Collecting tubule

(C) Bowman's capsule

(D) Loop of Henle

179. Blood vessel leading to glomerulus is called

(A) Afferent arteriole

(B) Renal artery

(C) efferent arteriole

(D) Renal vein

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