AUROUS ACADEMY
IIT-JEE | NEET | FOUNDATION

PRAGYAN

Class – XI (Going to XII) – Sample Paper
Duration : 2 hrs. | Maximum Marks : 180

IMPORTANT INSTRUCTIONS

1. This Booklet is your Question Paper. DO NOT break seal of Booklet until the invigilator instructs to do so.
2. Fill your APRE Roll No. & Answer Sheet No. in the space provided on the cover page.
3. Please make sure that paper you received is of your class only.
4. The Answer Sheet is provided to you separately which is a machine-readable Optical Response Sheet (ORS).

   You have to mark your answers in the ORS by darkening bubble, as per your answer choice, by using black or blue ball point pen.
5. After breaking the Question Paper seal, check there are 8 pages in the booklet. This Question Paper contains 60 MCQs with 4 choices (Subjects: Physics: 15, Chemistry: 15, Botany: 15, Zoology: 15)
6. Think wisely before darkening bubble as there is negative marking for wrong answer. Answer once marked by pen cannot be cancelled.
7. Marking Scheme:
   a. If darkened bubble is RIGHT answer: 3 Marks.
   b. If darkened bubble is WRONG answer: 1 Mark (Minus One Mark).
   c. If no bubble is darkened in any question: No Mark.
8. If you are found involved in cheating or disturbing others, then your ORS will be cancelled.
9. Do not put any stain on ORS and hand. It over back properly to the invigilator.

Name of the Candidate: _____

Registration Number: _____

PHYSICS

1. MLT^{-1} represents the dimensional formula of

(A) Power (B) Momentum (C) Force (D) Couple

2. A train has a speed of 60 *km/h*. for the first one hour and 40 *km/h* for the next half hour. Its average speed in *km/h* is

(A) 50 (B) 53.33 (C) 48 (D) 70

3. The position of a particle moving in the *xy*-plane at any time t is given by $x = (3t^2 - 6t)$ *metres*, $y = (t^2 - 2t)$ *metres*. Select the correct statement about the moving particle from the following

(A) The acceleration of the particle is zero at $t = 0$ second

(B) The velocity of the particle is zero at $t = 0$ second

(C) The velocity of the particle is zero at $t = 1$ second

(D) The velocity and acceleration of the particle are never zero

4. The displacement is given by $x = 2t^2 + t + 5$, the acceleration at $t = 2s$ is

(A) $4\ m/s^2$ (B) $8\ m/s^2$ (C) $10\,m/s^2$ (D) $15\,m/s^2$

5. A boat is moving with velocity of $3\hat{i} + 4\hat{j}$ in river and water is moving with a velocity of $-3\hat{i} - 4\hat{j}$ with respect to ground. Relative velocity of boat with respect to water is :

(A) $-6\hat{i} - 8\hat{j}$ (B) $6\hat{i} + 8\hat{j}$ (C) $8\hat{i}$ (D) $6\hat{i}$

6. The horizontal range is four times the maximum height attained by a projectile. The angle of projection is ____.

(A) 90^o (B) 60^o (C) 45^o (D) 30^o

7. A particle is moving with a constant speed along a straight line path. A force is not required to

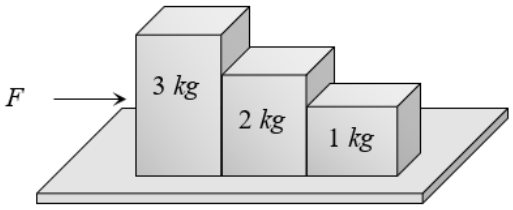
(A) Increase its speed (B) Decrease the momentum

(C) Change the direction (D) Keep it moving with uniform velocity

8. A lift of mass 1000 *kg* is moving with an acceleration of 1 m/s^2 in upward direction. Tension developed in the string, which is connected to the lift, is (g = 9.8 m/s^2)

(A) 9,800 *N* (B) 10,000 *N* (C) 10,800 *N* (D) 11,000 *N*

9. Consider the following statements about the blocks shown in the diagram that are being pushed by a constant force on a frictionless table



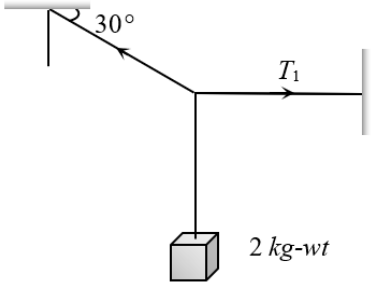
A. All blocks move with the same acceleration

B. The net force on each block is the same Which of these statements are/is correct

(A) A only (B) B only

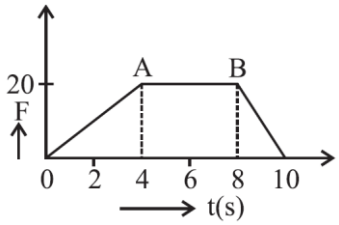
(C) Both A and B (D) Neither A nor B

10. A body of weight 2*kg* is suspended as shown in the figure. The tension T_1 in the horizontal string (in *kg wt*) is



(A) $2/\sqrt{3}$ (B) $\sqrt{3}/2$ (C) $2\sqrt{3}$ (D) 2

11. A body of mass 5 kg is acted on by a net force F which varies with time t as shown in graph, then the net momentum in SI units gained by the body at the end of 10 seconds is



(A) 0 (B) 100 (C) 140 (D) 200

12. A force $\boldsymbol{F} = (5\hat{\boldsymbol{i}} + 3\hat{\boldsymbol{j}})$ *newton* is applied over a particle which displaces it from its origin to the point $\boldsymbol{r} = (2\hat{\boldsymbol{i}} - 1\hat{\boldsymbol{j}})$ *metres*. The work done on the particle is

(A) – 7 *joules* (B) + 13 *joules* (C) + 7 *joules* (D) + 11 *joules*

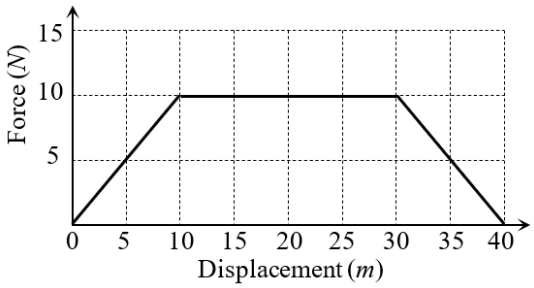
13. A light and a heavy body have equal momenta. Which one has greater K.E

(A) The light body (B) The heavy body (C) The K.E. are equal (D) Data is incomplete

14. An electric motor exerts a force of 40 *N* on a cable and pulls it by a distance of 30 *m* in one minute. The power supplied by the motor (in *Watts*) is

(A) 20 (B) 200 (C) 2 (D) 10

15. Adjacent figure shows the force-displacement graph of a moving body, the work done in displacing body from $x = 0$ to $x = 35\,m$ is equal to



(A) 50 *J* (B) 25 *J* (C) 287.5 *J* (D) 200 *J*

CHEMISTRY

16. The number of radial and angular nodes in 4d orbital are respectively

(A) 1 and 2 (B) 3 and 2 (C) 1 and 0 (D) 2 and 1

17. The oxide which contains an odd electron at the nitrogen atom is

(A) N_2O (B) NO_2 (C) N_2O_3 (D) N_2O_5

18. Which one of the following is an example of disproportionation reaction?

(A) $3MnO_4^{2-} + 4H^+ \longrightarrow 2MnO_4^- + MnO_2 + 2H_2O$

(B) $MnO_4^{2-} + 4H^+ + 4e^- \longrightarrow MnO_2 + 2H_2O$

(C) $10I^- + 2MnO_4^- + 16H^+ \longrightarrow 2Mn^{2+} + 8H_2O + 5I_2$

(D) $8MnO_4^- + 3S_2O_3^{2-} + H_2O \longrightarrow 8MnO_2 + 6SO_4^{2-} + 2OH^-$

19. A commercially sold conc. HCl is 35% HCl by mass. If the density of this commercial acid is 1.46 g/mL, the molarity of this solution is:

(Atomic mass : Cl = 35.5 amu, H = 1 amu)

(A) 10.2 M (B) 12.5 M (C) 14.0 M (D) 18.2 M

20. If the radius of the 3rd Bohr's orbit of hydrogen atom is r_3 and the radius of 4th Bohr's orbit is r_4. Then

(A) $r_4 = \frac{9}{16} r_3$ (B) $r_4 = \frac{16}{9} r_3$ (C) $r_4 = \frac{3}{4} r_3$ (D) $r_4 = \frac{4}{3} r_3$

21. Consider the ions/molecule O_2^+, O_2, O_2^-, O_2^{2-}

For increasing bond order the correct option is:

(A) $O_2^{2-} < O_2^- < O_2 < O_2^+$ (B) $O_2^- < O_2^{2-} < O_2 < O_2^+$

(C) $O_2^- < O_2^{2-} < O_2^+ < O_2$ (D) $O_2^- < O_2^+ < O_2^{2-} < O_2$

22. The minimum energy must be possessed be photons in order to produce the photoelectric effect with platinum metal is:

[Given: The threshold frequency of platinum is $1.3 \times 10^{15}\ s^{-1}$ and $h = 6.6 \times 10^{-34}$ J s.]

(A) 3.21×10^{-14} J (B) 6.24×10^{-16} J (C) 8.58×10^{-19} J (D) 9.76×10^{-20} J

23. The correct order of electron gain enthalpies of Cl, F, Te and Po is

(A) F < Cl < Te < Po (B) Po < Te < F < Cl

(C) Te < Po < Cl < F (D) Cl < F < Te < Po

24. Given below are two statements one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : The amphoteric nature of water is explained by using Lewis acid/base concept.

Reason R : Water acts as an acid with NH_3 and as a base with H_2S.

In the light of the above statements choose the correct answer from the options given below:

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is NOT the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

25. The metal ion (in gaseous state) with lowest spin only magnetic moment value is

(A) V^{2+} (B) Ni^{2+} (C) Cr^{2+} (D) Fe^{2+}

26. A protein 'A' contains 0.30% of glycine (molecular weight 75). The minimum molar mass of the protein 'A' [nearest integer]

(A) 25 (B) 28 (C) 12 (D) 18

27. Amongst BeF_2, BF_3, H_2O, NH_3, CCl_4 and HCl the number of molecules with non-zero net dipole moment is _____.

(A) 3 (B) 6 (C) 9 (D) None

28. Bonding in which of the following diatomic molecule(s) becomes(s) stronger, on the basis of MO Theory, by removal of an electron?

(A) NO (B) N_2 (C) O_2 (D) C_2 (E) B_2

Choose the most appropriate answer form the options given below:

(A) A, B, C only (B) B, C, E only (C) A, C only (D) D only

29. The pair, in which ions are isoelectronic with Al^{3+} is:

(A) Br^- and Be^{2+} (B) Cl^- and Li^+ (C) S^{2-} and K^+ (D) O^{2-} and Mg^{2+}

30. Number of electron deficient molecules among the following PH_3, B_2H_6, CCl_4, NH_3, LiH and BCl_3 is

(A) 0 (B) 1 (C) 2 (D) 3

BOTANY

31. Consider the given below processes.

Classification, Identification, Characterisation, Nomenclature

Arrange the following processes in their correct chronological order.

(A) Identification → Classification → Nomenclature → Characterisation

(B) Identification → Nomenclature → Characterisation → Classification

(C) Characterisation → Identification → Nomenclature → Classification

(D) Characterisation → Identification → Classification → Nomenclature

32. All taxonomic categories together constitute

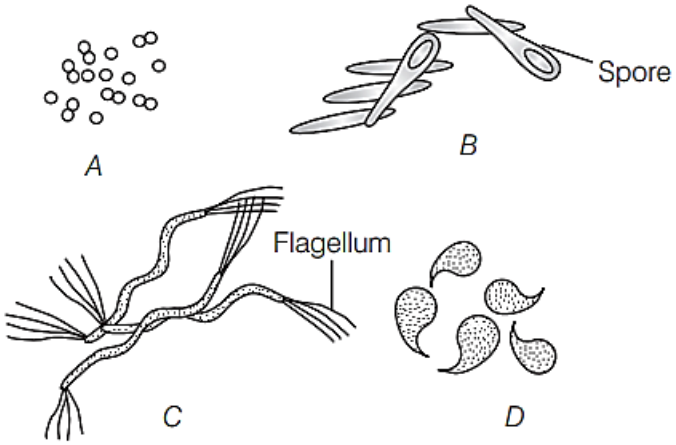
(A) classification (B) key (C) taxonomy (D) hierarchy

33. In hierarchical classification, class is placed between

(A) kingdom and phylum (B) order and family

(C) phylum and order (D) family and genus

34. Bacteria are grouped under four categories based on their shape. Refer to the given figure and identify A, B, C and D.



(A) A – Vibrio, B – Cocci, C – Bacilli, D – Spirilla

(B) A – Cocci, B – Bacilli, C – Spirilla, D – Vibrio

(C) A – Bacilli, B – Spirilla, C – Vibrio, D – Cocci

(D) A – Spirilla, B – Vibrio, C – Cocci, D – Bacilli

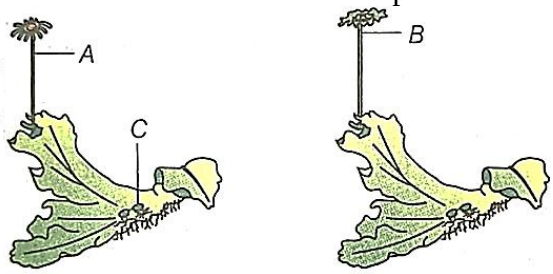
35. Chrysophytes are _____ which float passively in water current.

(A) planktons (B) nektons (C) benthic organisms (D) active organisms

36. Fungi that absorb soluble organic matter from dead substrates are called
(A) saprophytes (B) parasites (C) obligate parasite (D) lichens

37. Anisogamous means both gametes are
(A) similar in size and non-motile (B) dissimilar in size
(C) similar in size and motile (D) dissimilar in function

38. Observe the diagram given below and choose the correct option for the labelled part A, B and C.



(A) A – Antheridiophore, B – Archegoniophore, C – Endospore
(B) A – Archegoniophore, B – Antheridiophore, C – Gemma cup
(C) A – Antheridiophore, B – Archegoniophore, C – Gemma cup
(D) A – Archegoniophore, B – Antheridiophore, C – Seta cup

39. In pteridophyte, the sporophyte consists of leaf-like appendages called
(A) megaphylls (B) sporophylls (C) thalli (D) sporangia

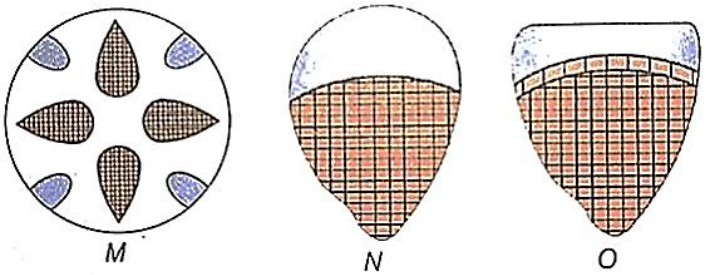
40. Which plant amongst following bears fibrous root system?
(A) Mustard plant (B) Wheat plant (C) *Monstera* (D) Banyan tree

41. _____ is the swollen leaf base observed in some leguminous plants.
(A) Lamina (B) Petiole (C) Pulvinus (D) Stipule

42. A leaf X have incised lamina and the incision do not touch the midrib. Which type of leaf X is?
(A) Compound (B) Simple (C) Pinnate (D) Palmate

43. Radial vascular bundles characteristically occur in
(A) monocot and dicot stems (B) monocot and dicot leaves
(C) monocot and dicot roots (D) phelloderm and phellem

44. Identify type of vascular bundle with respect to M, N and O figures and choose the correct option which represents the appropriate feature of given vascular bundles.



(A) N – Xylem and phloem and jointly present along the same radius
(B) O – Phloem is located on the inside of xylem
(C) M – Forms secondary tissue
(D) N – Arranged alternately in different radii

45. The water containing cavities in vascular bundles are found in
(A) sunflower (B) maize (C) *Cycas* (D) *Pinus*

ZOOLOGY

46. A diglyceride has
(A) 2 Fatty acids and 2 Glycerol
(B) 1 Fatty acids and 2 Glycerol
(C) 1 Fatty acid and 1 Glycerol
(D) 2 Fatty acids and 1 Glycerol

47. The volume of air inspired or expired during normal breathing i
(A) 500 ml (B) 1000 – 1100 ml (C) 1100 – 1200 ml (D) 2500 – 3000 ml

48. Unique character of sponges is
(A) Choanocytes or collar cells, line the spongocoel and the canals
(B) That they are hermaphrodite
(C) That they live in marine water
(D) They reproduce by asexual means only

49. Which among the following ions plays a crucial role in blood clotting?
(A) Na^{+} (B) Cu^{+2} (C) Mg^{+2} (D) Ca^{+2}

50. Choose the biomolecule which is not a polymer but is present in acid-insoluble pool
(A) Protein (B) Lipid (C) Ions (D) Glycogen

51. In columnar epithelium, where is nucleus located?
(A) At the base (B) In the middle (C) At the top (D) It is enucleated

52. Choose the incorrectly matched pair

i. Frog	Pulmonary respiration
ii. Fishes	Branchial respiration
iii. Frog	Cutaneous respiration
iv. Aves	Tracheal respiration

(A) i (B) ii (C) iii (D) iv

53. Certain big molecules can be transported to the neighbouring cell by which of the following junction?
(A) Adhering junction
(B) Gap junction
(C) Both (1) and (2)
(D) Not possible for big molecules

54. What will be the pO_2 and pCO_2 in the atmospheric air compared to those in the alveolar air?
(A) pO_2 lesser, pCO_2 higher
(B) pO_2 higher, pCO_2 lesser
(C) pO_2 higher, pCO_2 higher
(D) pO_2 lesser, pCO_2 lesser

55. An exclusive mammalian trait is
(A) Diaphragm
(B) 4 – chambered heart
(C) Thecodont dentition
(D) Vivipary

56. The enzyme that catalyses oxidoreduction belongs to class _____ and are called _____
(A) 1, Oxidoreductase
(B) 2, Oxidoreductase
(C) 1, Dehydrogenase
(D) Both (A) & (C)

57. Trachea bifurcates into primary bronchi at the level of
(A)) 5th Cervical vertebra
(B) 5th pair of ribs
(C) 5th Thoracic vertebra
(D) 5th Lumbar vertebra

58. Branched, Striated, voluntary, fusiform, unstriated, involuntary
How many of the above mentioned features related to cardiac muscles?
(A) 2 (B) 3 (C) 4 (D) 5

59. Select from the following the total number of useful insects.
Apis, *Bombyx*, *Anopheles*, *Culex*, *Aedes*, Prawn, Scorpion, *Laccifer*, *Locusta*, *Limulus*
(A) 3 (B) 4 (C) 1 (D) 5

60. Which among the following is acidic amino acid?
(A) Acetic acid (B) Lactic acid (C) Pyruvic acid (D) Glutamic acid

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