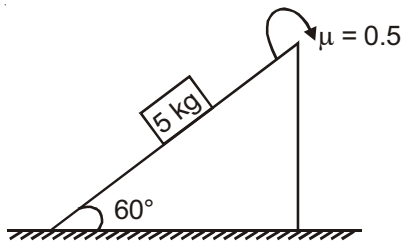


# PHYSICS

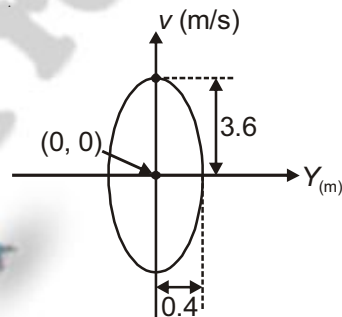
Choose the correct answer :

- A body falls from a height of 120 m. After 2 s of fall, if gravity disappears then total time taken to reach the ground is ( $g = 10 \text{ m/s}^2$ )
  - 9 s
  - 5 s
  - 7 s
  - 10 s
- A block of mass 5 kg is placed on an inclined plane as shown in the figure. Force applied by incline plane on the block is ( $g = 9.8 \text{ m/s}^2$ )



- 25 N
  - 49 N
  - $25\sqrt{3}$  N
  - $\frac{25}{\sqrt{3}}$  N
- Select correct statement(s) regarding collision.
    - During collision momentum of a colliding body is conserved along line of impact
    - During collision momentum of a colliding body is not conserved along a line perpendicular to line of impact
    - Momentum of a body along line perpendicular to line of impact is conserved
    - Momentum of a colliding body is not conserved along any time
  - If a force  $\vec{F}$  acting on a body at a position  $\vec{r}$  produces a torque  $\vec{\tau}$  about origin, then choose the incorrect option
    - $\vec{\tau} = \vec{r} \times \vec{F}$
    - $\vec{r} \cdot \vec{\tau} \neq 0$
    - $\vec{\tau} \cdot \vec{r} = 0$
    - $\vec{\tau} \cdot \vec{F} = 0$

- When a weight of 10 kg is suspended from a copper wire of length 3 m and diameter 0.4 mm, its length increases by 2.4 cm. If the diameter of wire is doubled then extension in the length will be
  - 1.2 cm
  - 4.8 cm
  - 9.6 cm
  - 0.6 cm
- Velocity of a particle is plotted against displacement as shown. The time period of oscillation



- $2\pi$  s
  - $\pi$  s
  - $\frac{2\pi}{3}$  s
  - $\frac{2\pi}{9}$  s
- An explosion blows a rock into three parts. Two parts go off at right angles to each other. These two are, 1 kg first part moving with velocity  $12 \text{ ms}^{-1}$  and 2 kg, second part moving with velocity of  $8 \text{ ms}^{-1}$ . If the third part flies off with a velocity of  $4 \text{ ms}^{-1}$ , its mass would be
    - 14 kg
    - 3 kg
    - 5 kg
    - 8 kg
  - In a gravity free space the liquid in a capillary tube will rise to
    - Slightly more height as on earth
    - Height equal to capillary outside liquid
    - Same height as on earth
    - Less height as on earth



16. Which of the following statement is in accordance with Kirchhoff's law of thermal radiation?
- (1) A good emitter is also a good absorber
  - (2) The rate of radiation depends on the fourth power of absolute temperature
  - (3) All bodies radiates as well as absorb thermal radiation at all temperatures except 0 K
  - (4) The wavelength corresponding to maximum intensity in thermal radiation decreases with increase in temperature

17. An object is moving toward east with speed 5 m/s. After  $t = 5$  s, it is found to be moving towards north with speed 5 m/s, then average acceleration is

- (1)  $\frac{1}{\sqrt{2}} \text{ ms}^{-2}$  N - W
- (2)  $\sqrt{2} \text{ ms}^{-2}$  N - W
- (3)  $\sqrt{2} \text{ ms}^{-2}$  N - E
- (4)  $\frac{1}{\sqrt{2}} \text{ ms}^{-2}$  N - E

18. A ball strikes at an angle of incidence  $\theta$  on a plane as shown in the figure. If it rebounds at right angle to the direction of incidence then value of  $\theta$  is

[Take Coefficient of restitution =  $\frac{1}{3}$ ]



- (1)  $60^\circ$
- (2)  $53^\circ$
- (3)  $30^\circ$
- (4)  $45^\circ$

19. A flywheel of mass 50 kg is rotating with angular speed  $5 \text{ rad s}^{-1}$ . If radius of gyration of the wheel is 2 m then its angular momentum will be

- (1)  $1000 \text{ kgm}^2\text{s}^{-1}$
- (2)  $500 \text{ kgm}^2\text{s}^{-1}$
- (3)  $2000 \text{ kgm}^2\text{s}^{-1}$
- (4)  $200 \text{ kgm}^2\text{s}^{-1}$

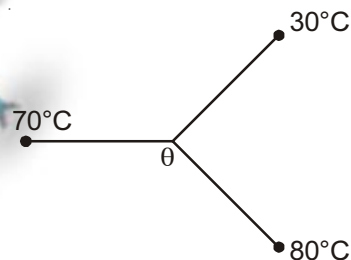
20. Eight identical spherical drops are falling a homogenous viscous medium with constant velocity 4 m/s. If all combines to form a single big drop, then the terminal velocity of big drop will be

- (1) 8 m/s
- (2) 12 m/s
- (3) 16 m/s
- (4) 24 m/s

21. Relation between time ( $t$ ) and position ( $x$ ) of a particle moving along x-axis is  $t = ax^2 + bx$ , where  $a$  and  $b$  are constants. Acceleration of the particle is

- (1)  $-2abv^2$
- (2)  $2bv^3$
- (3)  $-2av^3$
- (4)  $2av^2$

22. Three identical conductors are connected as shown. The temperature  $\theta$  is



- (1)  $40^\circ\text{C}$
- (2)  $50^\circ\text{C}$
- (3)  $60^\circ\text{C}$
- (4)  $70^\circ\text{C}$

23. The minimum time in which a particle performing S.H.M can travel distance equal to one amplitude.

- (1)  $\frac{T}{2}$
- (2)  $\frac{T}{4}$
- (3)  $\frac{T}{6}$
- (4)  $\frac{T}{3}$



35. Which of the following given set of quantum numbers is incorrect?

(1)  $n = 1, l = 0, m = -1, s = -\frac{1}{2}$

(2)  $n = 4, l = 3, m = -4, s = +\frac{1}{2}$

(3)  $n = 2, l = 2, m = 0, s = -\frac{1}{2}$

(4) All of these

36. Cerium ( $Z = 58$ ) is placed in

(1) d-block, 7th period (2) f-block, 6th period

(3) d-block, 5th period (4) d-block, 6th period

37. The bond energies of H—H, Br—Br & HBr are 433, 192 & 365 kJ/mol respectively. The  $\Delta H$  for the reaction,  $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$  is

(1) + 26 kJ (2) - 105 kJ

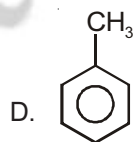
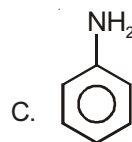
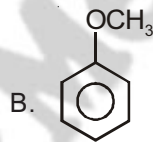
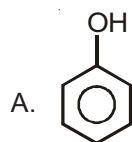
(3) - 26 kJ (4) + 105 kJ

38. Hardness of water is because of the presence of

(1)  $Mg(HCO_3)_2$  (2)  $CaCl_2$

(3)  $CaSO_4$  (4) All of these

39. For the following compounds



Correct order for rate of electrophilic substitution reaction is

(1)  $B > A > D > C$  (2)  $C > A > B > D$

(3)  $D > B > A > C$  (4)  $B > A > C > D$

40. Hybridisation of N in  $NH_3$  is

(1)  $sp^3$  (2)  $sp^2$

(3)  $sp$  (4) Both  $sp^3$  and  $sp^2$

41. The hybridisation and shape of Xe is  $XeO_2F_2$  respectively are

(1)  $sp^3d$ , angular (2)  $sp$ , linear

(3)  $sp^3d^2$ , angular (4)  $sp^3d$ , non-planar

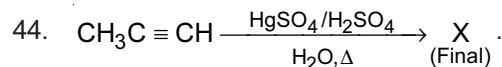
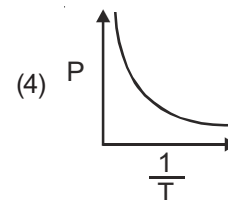
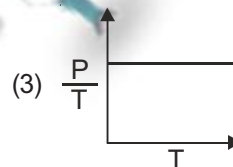
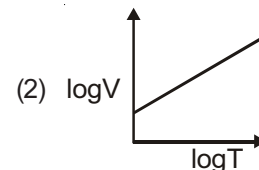
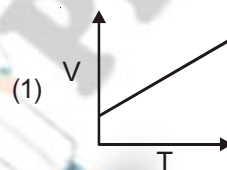
42. The planar structure is shown by

(1)  $CO_3^{2-}$  (2)  $BCl_3$

(3)  $N(SiH_3)$  (4) All of these

43. Correct graph for Charles' law

$V =$  Volume,  $T =$  temperature in Kelvin.

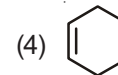
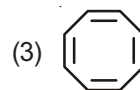
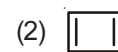
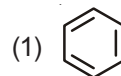


The product X is

(1)  $CH_3CH_2COOH$  (2)  $CH_2=CH.OH$

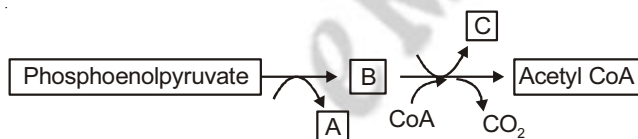
(3)  $CH_3COOH$  (4)  $CH_3 - \overset{O}{\parallel} C - CH_3$

45. In which of the following glyoxal is not the only product of reductive ozonolysis?



# BIOLOGY

46. The organelle concerned with photorespiration is
- (1) Lysosomes                      (2) Sphaerosomes  
(3) Peroxisome                    (4) Centrosome
47. The most dramatic period of the cell cycle involves
- (1) A major reorganisation of virtually all components of the cell  
(2) Replication of DNA  
(3) Duplication of most organelle  
(4) Synthesis of tubulin proteins
48. The lens shaped opening, which occur in most woody trees and permit exchange of gases between atmosphere and internal tissue of stem is
- (1) Stomata                          (2) Lenticels  
(3) Bulliform cells                (4) Bark
49. The phytohormone which stimulates the closure of stomata is
- (1) Ripening hormone            (2) Stress hormone  
(3) Adenine derivative            (4) Terpene derivative
50. Identify the A, B and C in the given reaction of respiration



- | A            | B            | C     |
|--------------|--------------|-------|
| (1) ADP + Pi | PGA          | FADH  |
| (2) ATP      | Citrate      | NADH  |
| (3) NADH     | Pyruvic acid | NADPH |
| (4) ATP      | Pyruvic acid | NADH  |

51. Which of the following is vascular archegoniates?
- (1) *Pea*                                      (2) *Marchantia*  
(3) *Cycas*                                    (4) *Ectocarpus*
52. The lowest category in taxonomic hierarchy is
- (1) Genus                                    (2) Species  
(3) Class                                      (4) Order
53. In biological  $N_2$ -fixation mechanism, to fix one molecular nitrogen into two molecules of ammonia, the number of electrons, protons and ATP required are respectively
- (1)  $6e^-$ ,  $6H^+$ , 12 ATP            (2)  $8e^-$ ,  $8H^+$ , 16 ATP  
(3)  $16e^-$ ,  $16H^+$ , 32 ATP        (4)  $12e^-$ ,  $12H^+$ , 24 ATP
54. The feature present in plant cell but absent in animal cell is
- (1) Presence of membrane bound organelles  
(2) Presence of rigid cell wall  
(3) Absence of plastid  
(4) Presence of centrosome
55. Proteinaceous endosperm layer in monocot seed is known as
- (1) Aleurone layer                        (2) Scutellum  
(3) Hilum                                      (4) Storage region
56. Read the following statement carefully
- “The organisms belonging to the same taxa have a common ancestor.”
- This statement is related to
- (1) Artificial system of classification  
(2) Natural system of classification  
(3) Both (1) & (2)  
(4) Phylogenetic system of classification
57. Whorled type of phyllotaxy found in
- (1) China rose                                (2) Calotropis  
(3) Guava                                        (4) Alstonia

58. Ovary is half inferior in
- (1) Hypogynous flower – Rose
  - (2) Perigynous flower – Guava
  - (3) Epigynous flower – Cucumber
  - (4) Perigynous flower – Plum
59. Cristae increases surface area and is present in
- (1) Golgi bodies
  - (2) Mitochondria
  - (3) ER
  - (4) Chloroplast
60. Which of the following nitrogen metabolism microbe is not a chemoautotrophs?
- (1) *Nitrococcus*
  - (2) *Nitrosomonas*
  - (3) *Rhizobium*
  - (4) *Nitrobacter*
61. Which of the following statement is correct?
- (1) Conjoint open vascular bundles are common in stem and leaves
  - (2) All tissues on the innerside of the endodermis except pericycle constitute the stele
  - (3) There may be no variation in the length of filaments within a flower, as in *Salvia* and mustard
  - (4) Secondary meristems are derived from primary permanent tissues
62. Find the **correct** match w.r.t. mineral elements and their function
- (1) Potassium – Opening and closing of stomata
  - (2) Sulphur – Carbohydrate translocation
  - (3) Zinc – Synthesis of chlorophyll
  - (4) Magnesium – Water splitting reactions
63. Which of the following is most obvious and technically complicated defining feature of life forms?
- (1) Consciousness
  - (2) Reproduction
  - (3) Metabolism
  - (4) Growth
64. In which of the following pair of plants zygotic meiosis occurs?
- (1) *Ulothrix* and *Pinus*
  - (2) *Riccia* and *Spirogyra*
  - (3) *Anthoceros* and *Selaginella*
  - (4) *Volvox* and *Chlamydomonas*
65. The cell membrane of erythrocyte has approximately \_\_\_\_\_ percent protein and \_\_\_\_\_ percent lipids.
- (1) 50, 50
  - (2) 40, 52
  - (3) 52, 40
  - (4) 40, 60
66. Which of the following are excluded from five kingdom system of classification?
- (1) Mycoplasma
  - (2) *Chlamydomonas*
  - (3) Slime moulds
  - (4) Viroids
67. Kranz anatomy refers to
- (1) Arrangement of cells in leaves of  $C_4$  plants
  - (2) Arrangement of cells in leaves of  $C_3$  plants
  - (3) Thin walled bundle sheath cell forming wreath
  - (4) Thick walled mesophyll cell with intercellular spaces
68. Swelling of wood in water is an example of
- (1) Active absorption
  - (2) Imbibition
  - (3) Exosmosis
  - (4) Deplasmolysis
69. During urine formation, in which part of nephron, minimum reabsorption takes place
- (1) DCT
  - (2) PCT
  - (3) Glomerulus
  - (4) Loop of Henle
70. Rapid spasm in muscle due to low  $Ca^{++}$  in body fluid occurs in
- (1) Arthritis
  - (2) Muscular dystrophy
  - (3) *Myasthenia gravis*
  - (4) Tetany

71. Which of the muscle is under the control of autonomic nervous system?
- (1) Skeletal muscle      (2) Smooth muscle  
(3) Cardiac muscle      (4) Both (2) & (3)
72. Acromion process is the part of
- (1) Clavicle      (2) Humerus  
(3) Scapula      (4) Radius
73. Which of the following coelentrates exist in polyp and medusa forms and exhibit metagenesis?
- (1) *Hydra*      (2) *Obelia*  
(3) *Aurelia*      (4) Both (2) & (3)
74. Which of the following has been **correctly** matched?
- (1) Bilateral symmetry : Ctenophora  
(2) Eucoelomate : Aschelminthes  
(3) Acoelomate : Platyhelminthes  
(4) Schizocoelomate : Echinodermata
75. Enzyme carbonic anhydrase helps in
- (1) Binding of O<sub>2</sub> and haemoglobin  
(2) Transportation of O<sub>2</sub>  
(3) Binding of CO<sub>2</sub> and haemoglobin  
(4) Transportation of CO<sub>2</sub>
76. Which type of epithelium is found in ducts of glands and tubular part of nephrons in kidneys?
- (1) Squamous epithelium  
(2) Cuboidal epithelium  
(3) Columnar epithelium  
(4) Ciliated epithelium
77. In which of the following animal, both notochord and vertebral column are absent?
- (1) *Doliolum*      (2) *Branchiostoma*  
(3) *Petromyzon*      (4) *Scoliodon*

78. Adult haemoglobin has
- (1) Primary structure of protein  
(2) Secondary structure of protein  
(3) Tertiary structure of protein  
(4) Quaternary structure of protein
79. In *Periplaneta*, a pair of jointed, filamentous structures are present called anal cerci which arise from
- (1) 9<sup>th</sup> sternum in male only  
(2) 10<sup>th</sup> tergum in both male and female  
(3) 9<sup>th</sup> tergum in male only  
(4) 9<sup>th</sup> sternum in both male and female
80. Which of the following is brush border enzyme?
- (1) Carboxypeptidase      (2) Amylase  
(3) Maltase      (4) Nuclease
81. Amount of air left in lungs after normal expiration
- (1) TV + ERV      (2) TV + IRV  
(3) TV + IRV + ERV      (4) ERV + RV
82. A symptom of acute chest pain appears when no enough oxygen is reaching the heart muscle
- (1) Heart failure      (2) Heart attack  
(3) Atherosclerosis      (4) Angina
83. Tubular secretion is an important step in urine formation. In PCT their is selective secretion of
- (1) H<sup>+</sup>      (2) K<sup>+</sup>  
(3) NH<sub>3</sub>      (4) All of these
84. Which of the following is a characteristic feature of red muscle fibres?
- (1) More quantity of myoglobin  
(2) Number of mitochondria are less  
(3) Amount of sarcoplasmic reticulum is more  
(4) Depend on anaerobic process for energy
85. Which of the following part of brain consists of fibre tract that interconnect different regions of the brain?
- (1) Corpus callosum      (2) Pons  
(3) Cerebellum      (4) Medulla



86. Which of the following structure of human ear helps in equalising the pressures on either sides of ear drum?

- (1) Ear ossicles                      (2) Tympanic membrane  
(3) Eustachian tube                  (4) Vestibular apparatus

87. Enzymes which catalyse linking of C–O, C–S, C–N, P–O etc bonds, belong to which of the following category?

- (1) Isomerase                          (2) Ligases  
(3) Lyases                                (4) Transferases

88. Choose the correct sequence of layer in the wall of alimentary canal from inside to outside

- (1) Submucosa, serosa, muscularis and mucosa  
(2) Muscularis, serosa, submucosa and mucosa  
(3) Mucosa, muscularis, submucosa and serosa  
(4) Mucosa, submucosa, muscularis and serosa

89. Which of the following does not excrete nitrogenous wastes as uric acid?

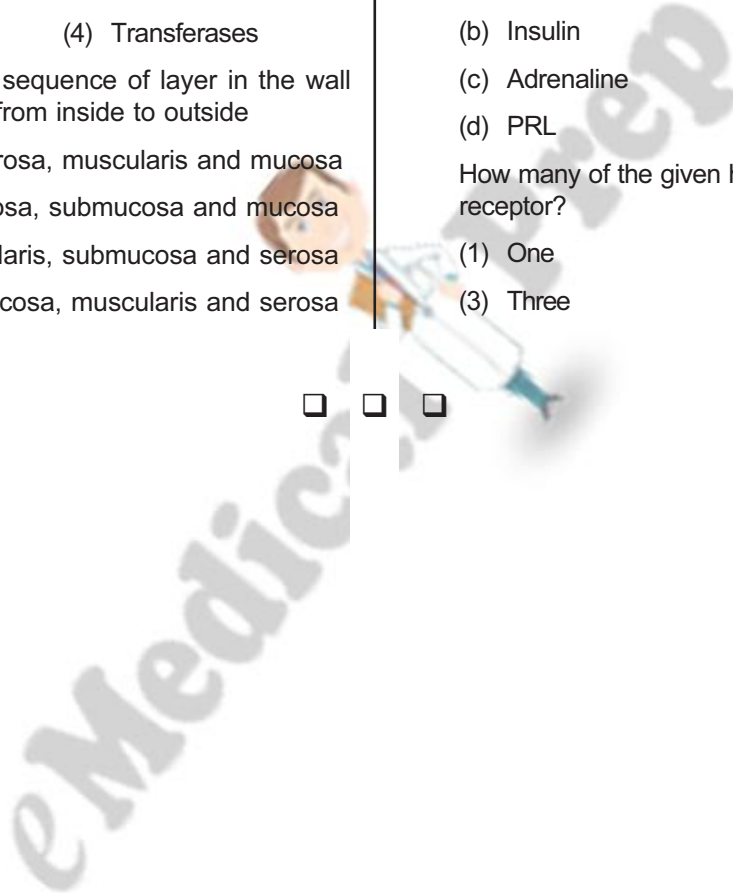
- (1) *Columba*  
(2) *Chelone*  
(3) *Apis*  
(4) *Prawn*

90. Given below is a list of some hormone

- (a) Cortisol  
(b) Insulin  
(c) Adrenaline  
(d) PRL

How many of the given hormones have extracellular receptor?

- (1) One                                      (2) Two  
(3) Three                                    (4) Four



**(Sample Paper)**  
**(XII-cum-Medical Course for AIPMT - 2015)**

**Answers**

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (3)  | 19. (1) | 37. (2) | 55. (1) | 73. (2) |
| 2. (2)  | 20. (3) | 38. (4) | 56. (4) | 74. (3) |
| 3. (3)  | 21. (3) | 39. (2) | 57. (4) | 75. (4) |
| 4. (2)  | 22. (3) | 40. (1) | 58. (4) | 76. (2) |
| 5. (4)  | 23. (3) | 41. (4) | 59. (2) | 77. (1) |
| 6. (4)  | 24. (4) | 42. (4) | 60. (3) | 78. (4) |
| 7. (3)  | 25. (4) | 43. (2) | 61. (4) | 79. (2) |
| 8. (2)  | 26. (3) | 44. (4) | 62. (1) | 80. (3) |
| 9. (3)  | 27. (1) | 45. (4) | 63. (1) | 81. (4) |
| 10. (4) | 28. (3) | 46. (3) | 64. (4) | 82. (4) |
| 11. (1) | 29. (3) | 47. (1) | 65. (3) | 83. (4) |
| 12. (4) | 30. (3) | 48. (2) | 66. (4) | 84. (1) |
| 13. (3) | 31. (3) | 49. (2) | 67. (1) | 85. (2) |
| 14. (3) | 32. (4) | 50. (4) | 68. (2) | 86. (3) |
| 15. (3) | 33. (3) | 51. (3) | 69. (4) | 87. (2) |
| 16. (1) | 34. (2) | 52. (2) | 70. (4) | 88. (4) |
| 17. (2) | 35. (4) | 53. (2) | 71. (4) | 89. (4) |
| 18. (3) | 36. (2) | 54. (2) | 72. (3) | 90. (3) |