Admission - Cum - Scholarship Test
SAMPLE PAPER
(XII-cum-Medical Course for AIPMT - 2016-17)

(Syllabus of the Test : Physics, Chemistry & Biology of Class XI)

Roll No.: _____

Test Booklet Code : D

Time : 1½ Hrs.   **Max.Marks : 360**

INSTRUCTIONS TO THE CANDIDATES

1. The initial 10 minutes are earmarked for the candidates to carefully read the instructions. (Note : The candidates are not allowed to either look inside the question booklet or start answering during these initial 10 minutes.)

2. The question booklet and the answer sheet are issued separately at the start of the examination.

3. This question booklet contains 90 questions.

4. Read each question carefully.

5. Determine the correct answer, one out of the four available choices given under each question.

6. It is mandatory to use a Ball Point Pen to darken the appropriate circle in the answer sheet.

7. For each correct answer, **four** marks will be awarded. For each wrong answer, **one** mark will be deducted.

   For Example

   Q. 12 in the Question Booklet is: Which one of the following is linear in geometry?

   (Answer Sheet)

   (1) SO_2 Q.12. ① ❷ ③ ④
   (2) CO_2
   (3) NO_2
   (4) KO_2

   Thus as the correct answer is choice 2, the candidate should darken completely (with a blue/black Ball point pen only) the circle corresponding to choice 2 against Question No. 12 on the Answer Sheet. If more than one circle is darkened for a given question such answer will be rejected

8. Do not use white-fluid or any other rubbing material on the answer sheet. No change in the answer once marked is allowed. Before handing over the answer sheet to the invigilator, the candidate should check that **Roll No.** and **Test-Booklet code** have been filled and marked correctly.

9. Rough work should be done only on the space provided in the question booklet.

10. Immediately after the prescribed examination time is over, the **Answer sheet and Question booklet are to be returned to the invigilator.** If the candidate wants to leave the examination hall before time, he/she should hand over the question paper and answer sheet to the invigilator. However, no student can leave the examination hall before half time.

PHYSICS

Choose the correct answer :

1. Dimensional formula of angular momentum is same as

   (1) Gravitational constant

   (2) Viscosity

   (3) Planck's constant

   (4) Velocity of light

2. If percentage error in volume of sphere is 3%, then percentage error in its surface area

   (1) 1%   (2) 2%

   (3) 3%   (4) 4%

3. If system as shown in figure is released, then tension in string *AB*

   (1) $\dfrac{mg}{3}$ (2) $\dfrac{mg}{2}$

   (3) mg (4) $\dfrac{2mg}{3}$
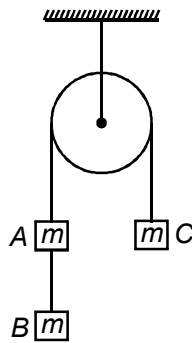
4. A ball of mass *m* is released from height *h* under gravity. If it strikes to ground with speed $\sqrt{gh}$ m/s then work done due to air resistance is

   (1) $\dfrac{1}{2}mgh$ (2) $-\dfrac{1}{2}mgh$

   (3) mgh (4) $-mgh$

5. An object starts from rest under constant acceleration. If object covers 10 m in first 3 seconds then displacement in next 3 seconds is

   (1) 10 m   (2) 20 m

   (3) 5 m   (4) 30 m

6. A body is projected vertically upward with speed 100 m/s under gravity, distance travelled by body during last second of its upward motion is

   (g = 10 m/s^2)

   (1) 10 m   (2) 5 m

   (3) 20 m   (4) 30 m

7. Moment of inertia of circular disc of mass *M* and radius *R* about axis which is tangent of disc and parallel to the plane of disc

   (1) $\dfrac{5}{4}MR^2$ (2) $\dfrac{3}{2}MR^2$

   (3) $\dfrac{1}{2}MR^2$ (4) MR^2

8. If disc of mass '*m*' and radius '*R*' is unwinding under gravity as shown in figure, then tension in string is

   (1) $\dfrac{2}{3}mg$ (2) $\dfrac{5}{3}mg$

   (3) mg (4) $\dfrac{mg}{3}$
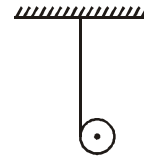
9. In two mass system, two masses are placed at separation *a*. If magnitude of masses are m_1 and m_2 then moment of inertia about its centre of mass is

   (1) $I = m_1 a^2$ (2) $I = m_2 a^2$

   (3) $I = (m_1 + m_2)a^2$ (4) $I = \dfrac{m_1 m_2}{(m_1 + m_2)}a^2$

10. Solid sphere and disc both are allowed to roll on rough inclined plane, which reach the ground earlier?

    (1) Solid sphere   (2) Disc

    (3) Both in same time   (4) Data insufficient

11. A particle starts SHM from mean position. Average acceleration of particle during its one time period (*A* = amplitude, ⊣ = angular frequency)

    (1) $3A\omega^2$ (2) $-A\omega^2$

    (3) $2A\omega^2$ (4) Zero

12. If a particle performs SHM according to relation $X = A\sin\omega t + B\cos\omega t$, then amplitude and time period of motion

    (1) $\sqrt{A^2 + B^2},\ \dfrac{2\pi}{\omega}$ (2) $\sqrt{A^2 + B^2},\ \dfrac{\pi}{\omega}$

    (3) $A,\ \dfrac{2\pi}{\omega}$ (4) $B,\ \dfrac{2\pi}{\omega}$

13. If fundamental frequency of closed organ pipe is equal to first overtone of open organ pipe then ratio of length of closed pipe to open pipe

    (1) 1 : 2   (2) 1 : 4

    (3) 1 : 1   (4) 4 : 1

14. Volume of n moles of a gas is changed as shown, the work done by system
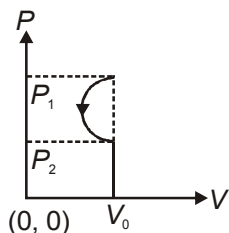
    (1) Zero
    (2) Finite negative
    (3) Finite positive
    (4) Infinite

15. If r.m.s. velocity of hydrogen molecule at t K is equal to r.m.s. velocity of O_2 at $47°C$, then t is

    (1) 20 K
    (2) 40 K
    (3) 30 K
    (4) 50 K

16. Temperature of sink of carnot engine of efficiency 50% is $27°C$. If temperature of source is changed by $X°C$ so that efficiency of engine increases by 20%. The value of X

    (1) $750°C$
    (2) 750 K
    (3) $150°C$
    (4) $100°C$

17. Bar of mass m and length l is hinged from centre C. Two point masses m and $2m$ are rigidly attached at the ends of bar. If arrangement is released from rest, then angular velocity when bar becomes vertical
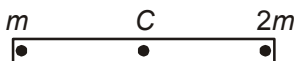
    (1) $\sqrt{\dfrac{g}{5l}}$
    (2) $\sqrt{\dfrac{2g}{5l}}$
    (3) $\sqrt{\dfrac{g}{l}}$
    (4) $\sqrt{\dfrac{6g}{5l}}$

18. If a small body of mass m is released from height $h = 2R$, then on reaching the surface of earth it will acquire a velocity (R = radius of earth)

    (1) $\sqrt{\dfrac{4}{3}gR}$
    (2) $\sqrt{gR}$
    (3) $\sqrt{2gR}$
    (4) $\sqrt{\dfrac{gR}{2}}$

19. A thick rope of density d and length l is hung from a rigid support, the increase in length due to its own weight is (Y = Young's modulus)

    (1) $\dfrac{dl^2Y}{4g}$
    (2) $\dfrac{dl^2g}{2Y}$
    (3) $\dfrac{dl^2g}{Y}$
    (4) Zero

20. The surface energy of liquid drop is E. It is sprayed into 64 equal drops. Now surface energy

    (1) $64E$
    (2) E
    (3) $\dfrac{E}{2}$
    (4) $4E$

21. An observer records a drop of 10% in frequency of horn of a stationary car as he crosses it. If the speed of sound is 330 m/s, then the speed of observer is

    (1) 20 m/s
    (2) 18 m/s
    (3) 25.4 m/s
    (4) 17.4 m/s

22. A particle is placed at rest inside a hollow hemisphere of radius R. If coefficient of friction between the particle and the hemisphere is $\dfrac{1}{\sqrt{3}}$, then maximum height upto which particle remains stationary is

    (1) $\dfrac{\sqrt{3}}{2}R$
    (2) $\left(1-\dfrac{\sqrt{3}}{2}\right)R$
    (3) R
    (4) $\dfrac{R}{2}$

23. The fraction of block immersed in water during free fall, will

    (1) Increase
    (2) Decrease
    (3) Remain same
    (4) Zero

CHEMISTRY

24. Mass of Al required to react with 1.28 g of O_2 will be

    (1) 1.28 g
    (2) 1.44 g
    (3) 1.56 g
    (4) 1.66 g

25. KE of electron in 2nd shell of H-atom is

    (1) –3.4 eV
    (2) 3.4 eV
    (3) 6.8 eV
    (4) –6.8 eV

26. Maximum number of electrons which can be present in 3P orbital is

    (1) 6
    (2) 4
    (3) 2
    (4) 1

27. Most electronegative element out of the following

    (1) Al
    (2) Ga
    (3) In
    (4) Tl

28. 'd' orbital present in dsp^2 hybrid orbital is

    (1) d_{xy}
    (2) d_{yz}
    (3) $d_{x^2-y^2}$
    (4) d_{z^2}

29. What is the partial pressure of H_2 in a mixture having equal weight of H_2, He and CH_4? Given, the total pressure of mixture is 10 atm

    (1) 3.23 atm
    (2) 4.1 atm
    (3) 5 atm
    (4) 6.15 atm

30. The ratio of KE of SO_2 and O_2 molecule will be

    (1) 2 : 1   (2) 1 : 2

    (3) 1 : 1   (4) 4 : 1

31. The vapour pressure of ethanol, becomes equal to atmospheric pressure at 77°C and its ΔH_{vap} = 400 kJ/mol. The value of ΔS_{vap} will be

    (1) 1142.85 J/K   (2) 1042.85 J/K

    (3) 942.8 J/K   (4) 1242.8 J/K

32. If pH of an acidic buffer is 4.5 and pK_a of weak acid is 3.5, then the ratio of [salt] [acid] will be equal to

    (1) 1   (2) 10

    (3) 100   (4) 1000

33. n-factor of nitrobenzene in following reaction

    $C_6H_5NO_2 \longrightarrow C_6H_5NH_2$ will be

    (1) 1   (2) 2

    (3) 4   (4) 6

34. Which of the following will not form superoxide?

    (1) K   (2) Mg

    (3) Rb   (4) All of these

35. Normality of "5.6 volume" H_2O_2 will be

    (1) 2   (2) 3

    (3) 1   (4) 1.66

36. Temporary hardness of water is due to

    (1) $CaCl_2$ (2) $Ca(OH)_2$

    (3) $Ca(HCO_3)_2$ (4) $CaCO_3$

37. Best thermal conductor out of the following

    (1) Diamond   (2) Graphite

    (3) Pb   (4) Sn

38. Most stable carbocation out of the following

    (1) $CH_3^{\equiv}$ (2) $CH_3CH_2^{\equiv}$

    (3) $CH_3-\overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}}{}^{\oplus}$ (4) $CH_3 \cdot \overset{\oplus}{C}HCH_3$

39. IUPAC name of $CH_3 - O - CH_2CH_2CHO$ is

    (1) 2-Methoxy propanone

    (2) 3-Methoxy propanal

    (3) Methoxy propaldehyde

    (4) 3-Methoxy propnan-1-one

40. Which of the following is aromatic?

    (1)   (2)

    (3)   (4)

41. Most acidic out of the following

    (1) $\underset{F}{\overset{|}{CH_2}} - COOH$ (2) $\underset{Cl}{\overset{|}{CH_2}} - COOH$

    (3) $\underset{NO_2}{\overset{|}{CH_2}} - COOH$ (4) CH_3COOH

42. Least basic out of the following

    (1)   (2)

    (3)   (4)

43. The product of the reaction

     $+ CH_3CH_2CH_2Cl \xrightarrow[\text{Anhyd.}]{AlCl_3}$?

    (1)   (2)

    (3)   (4)

44. Carbocation is formed during the following reaction

    (1) $CH_3 - CH = CH_2 + HCl \longrightarrow$

    (2) $CH_3 - CH = CH_2 + H_2O \longrightarrow$

    (3) $CH_3 - \underset{OH}{\overset{|}{CH}} - CH_3 \xrightarrow{Conc. H_2SO_4}$

    (4) All of these

45. $CH_3 - C \equiv CH \xrightarrow{Fe/\Delta}$ Product.

    The product of above reaction is

    (1) Xylene

    (2) Toluene

    (3) Mesitylene

    (4) Benzene

BIOLOGY

46. Select the incorrect match w.r.t. Mango
    (1) Genus – *Mangifera*
    (2) Family – Anacardiaceae
    (3) Order – Polymoniales
    (4) Class – Dicotyledonae

47. NBRI is located at
    (1) New Delhi
    (2) Dehradun
    (3) Howrah
    (4) Lucknow

48. In slime moulds the spores are dispersed by
    (1) Air currents
    (2) Water currents
    (3) Aphids
    (4) Birds

49. All are asexual structures of fungi, except
    (1) Ascospores
    (2) Zoospores
    (3) Conidia
    (4) Oidia

50. _____ is used extensively in biochemical and genetic work.
    (1) *Claviceps*
    (2) *Aspergillus*
    (3) *Penicillium*
    (4) *Neurospora*

51. Match the following

Column I		Column II	
a.	White rust	(i)	*Puccinia*
b.	Black rust	(ii)	*Ustilago*
c.	Smut fungi	(iii)	*Agaricus*
d.	Edible fungus	(iv)	*Albugo*

    (1) a(iv), b(ii), c(i), d(iii)
    (2) a(iv), b(i), c(ii), d(iii)
    (3) a(iv), b(i), c(iii), d(ii)
    (4) a(i), b(ii), c(iii), d(iv)

52. Zygote does not undergo reduction division immediately in
    (1) *Spirogyra, Chara, Volvox*
    (2) *Riccia, Chara, Funaria*
    (3) *Marchantia, Funaria, Riccia*
    (4) *Ulothrix, Spirogyra, Funaria*

53. Select a correct set of requirements to fix a molecule of atmospheric nitrogen (N_2)
    (1) $8e^-$, $8H^+$, 8 ATP
    (2) $8e^-$, $8H^+$, 16 ATP
    (3) $16e^-$, $16H^+$, 8 ATP
    (4) $16e^-$, $16H^+$, 16 ATP

54. Which of the following is/are diazotrophs?
    (1) *Anabaena*
    (2) *Frankia*
    (3) *Azotobacter*
    (4) All of these

55. Which of the following nutrients help in translocation of sugars?
    (1) Boron
    (2) Potassium
    (3) Calcium
    (4) Zinc

56. How many additional ATPs are used during synthesis of three molecules of glucose in sugarcane than rice?
    (1) 24   (2) 36   (3) 90   (4) 54

57. During C_3 cycle the first stable product is
    (1) PEP
    (2) Pyruvate
    (3) PGA
    (4) PGAL

58. During oxidative phosphorylation, the terminal donor of electron is
    (1) Oxygen
    (2) Cytochrome-a
    (3) Cytochrome-a_3
    (4) Cytochrome-b

59. Select the incorrect match w.r.t. R.Q
    (1) Carbohydrate   -   1
    (2) Lipids   -   0.7
    (3) Protein   -   0.9
    (4) Tripalmitin   -   1.33

60. Which of the following hormones help to produce chloroplasts in leaves?
    (1) Cytokinins
    (2) Ethylene
    (3) Gibberellins
    (4) Auxins

61. Chiasmata is observed in _____ of meiosis-I.
    (1) Diakinesis
    (2) Diplotene
    (3) Pachytene
    (4) Zygotene

62. Select the incorrect statement w.r.t. function.
    (1) RER is actively involved in protein synthesis
    (2) Amyloplasts store protein
    (3) Mitochondrial matrix is site for Kreb's cycle
    (4) The stroma of chloroplast contains enzymes required for the synthesis of carbohydrates and proteins

63. Among potato, tomato, rice, wheat, pea, mustard, onion, how many plants have axile placentation?
    (1) Three
    (2) Four
    (3) Two
    (4) Five

64. Superior ovary and swollen placenta are the features of which of the following families?
    (1) Fabaceae
    (2) Brassicaceae
    (3) Solanaceae
    (4) Liliaceae

65. Actinomorphic flower is found in all plants, except
    (1) Mustard
    (2) Pea
    (3) Potato
    (4) Tomato

66. Match the following :

	Column-I		Column-II
a.	Leaf tendril	(i)	Gulmohur
b.	Stem tendril	(ii)	Watermelon
c.	Sucker	(iii)	Pineapple
d.	Pulvinus	(iv)	Pea

(1) a(iv), b(ii), c(iii), d(i)   (2) a(iv), b(iii), c(i), d(ii)

(3) a(i), b(ii), c(iii), d(iv)   (4) a(ii), b(iii), c(iv), d(i)

67. Endosperm is not present in mature seeds of

(1) Bean, gram, maize   (2) Maize, rice, wheat

(3) Gram, bean, pea   (4) Wheat, bean, rice

68. The edible part of coconut fruit is

(1) Mesocarp   (2) Endocarp

(3) Endosperm   (4) Epicarp

69. Animals of which of the following phylum are bilaterally symmetrical and schizocoelomate?

(1) Annelida   (2) Platyhelminthes

(3) Aschelminthes   (4) Echinodermata

70. Find the mismatch w.r.t. organism and an associated character

(1) *Limulus*   –   Living fossil

(2) *Unio*   –   Radula

(3) *Nereis*   –   Dioecious

(4) *Ascaris*   –   Muscular pharynx

71. Mark the organism in which following characters exist.

(a) Skin is without glands

(b) Bones are hollow

(c) Scales in the hind limb

(d) Additional sacs to supplement respiration

(1) *Neophron*   (2) *Chelone*

(3) *Pteropus*   (4) *Ichthyophis*

72. Which junctions facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells for rapid transfer of ions and molecules?

(1) Gap junction   (2) Tight junction

(3) Adhering junction   (4) Desmosome

73. Identify the figure and find the incorrect character related to it

a. Multinucleated

b. Show striations

c. Sheath of tough connective tissue covers them

d. Contract slowly and remains contracted for long duration

(1) a & b   (2) b & c

(3) c & d   (4) d only

74. The respiratory system in cockroach consists of a network of trachea, that open through ___A___ pairs of spiracles present on ___B___ side of the body.

	A	B
(1)	10	Lateral
(2)	20	Dorsal
(3)	10	Ventral
(4)	5	Ventrolateral

75. Enzymes catalysing the linking together of two compounds by joining of C – O, C – S, C – N bonds etc. belong to which class

(1) Class I – Lyase

(2) Class VI – Ligase

(3) Class IV – Hydrolase

(4) Class II – Transferase

76. Identify the structure

$$SH$$
$$|$$
$$CH_2$$
$$|$$
$$H_2N - CH - COOH$$
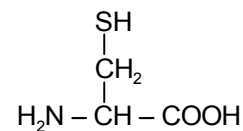
(1) Serine

(2) Cysteine

(3) Tyrosine

(4) Glutamic acid

77. How many of the following glands are located inside the buccal cavity and secrete salivary juice?

| Sub-maxillary, sub-lingual |
|---|
| Parotid,   Submandibular |

(1) Three   (2) Two

(3) One   (4) Zero

78. If the expiratory reserve volume is 1000 mL, find the expiratory capacity of a person

(1) 500 ml   (2) 1500 ml

(3) 700 ml   (4) 1000 ml

79. CO_2 is carried by haemoglobin as carbamino haemoglobin. The more binding of CO_2 occurs if

    (1) $pCO_2\uparrow$, $pO_2\downarrow$ (2) $pCO_2\downarrow$, $pO_2\uparrow$

    (3) $\downarrow$DPG, $\uparrow pO_2$ (4) pH high, $\uparrow$DPG

80. Mark the state of heart when it is not pumping blood effectively enough to meet the needs of the body

    (1) Angina pectoris   (2) Heart failure

    (3) Heart attack   (4) Cardiac arrest

81. Desert mammals are adapted to water shortage by having nephrons with longer

    (1) Loop of Henle   (2) Vasa recta

    (3) Collecting duct   (4) Both (1) & (2)

82 Ribs are connected to sternum and to the vertebral column. How many articular surfaces it has and on which side?

    (1) Two; dorsal

    (2) One; dorso lateral

    (3) Two; one dorsal and one ventral

    (4) One; ventral

83. Velocity of action potential increases if

    (1) Diameter of axon is more

    (2) Nerve fibre is medullated

    (3) Nerve fibre is non-myelinated

    (4) Both (1) & (2)

84. Which part of brain contains centre to control urge for drinking, eating, body temperature?

    (1) Thalamus   (2) Hypothalamus

    (3) Cerebral hemisphere (4) Medulla

85. Which of the following hormones is a steroid?

    (1) Testosterone   (2) Glucagon

    (3) Insulin   (4) Adrenalin

86. Which activity will be disturbed if parathyroid gland degenerates?

    (1) BMR   (2) Micturation

    (3) Sleep wake cycle   (4) Bone thickness

87. Following is the duct system of liver
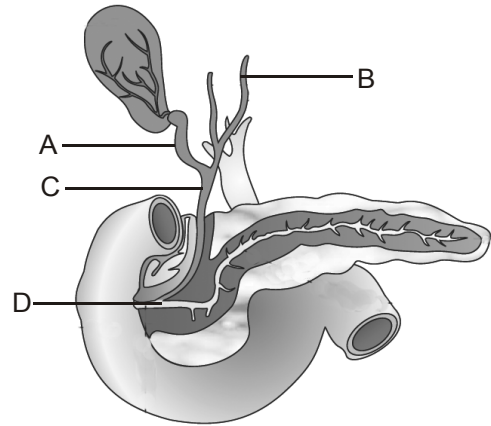
    Blockage of which duct disturbs fat digestion

    (1) A   (2) B

    (3) C   (4) Both C & D

88. If we cut the section of earthworm from segment 4, which contents will not be visible?

    (1) Blood glands

    (2) Septal nephridia

    (3) Pharyngeal nephridia

    (4) Dorsal blood vessel

89. At the base of the cochlea, the scala vestibuli ends at

    (1) Fenestra rotunda   (2) Oblique window

    (3) Fenestra ovalis   (4) Round window

90. Each myofibril has alternate light and dark bands on it. The size of which band will decrease when contraction occurs?

    (1) I-band   (2) O-band

    (3) A-band   (4) Z-line

❏ ❏ ❏

TRIPTI AGRAWAL CLASSES

NSEJS | NTSE | KVPY | OLYMPIAD | BOARD | IIT-JEE | MEDICAL

105,ZONE-II,M.P.NAGAR BHOPAL (M.P.)Ph.:0755-4064999,8818883926

Admission-cum-Scholarship Test

Sample Paper
(XII-cum-Medical Course for AIPMT 2016-17)

Answers

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