TAKSHILA®
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Test Code: 111

TNTSE

Takshila's National Talent Scholarship Examination

For Students of Class XI MEDICAL

This booklet contains 6 Pages

PHYSICS	:	**15 QUESTIONS**
CHEMISTRY	:	**15 QUESTIONS**
BIOLOGY	:	**15 QUESTIONS**
REASONING	:	**15 QUESTIONS**

General Instructions:

Please do not write anything on question paper.

1. *The candidates will use their own ball point pens, HB pencils, erasers etc.*
2. *Candidates will find out the right answer of the question and will darken the appropriate circle completely with Blue or Black Pen Only.*
3. *Total No. of Question = 60*
4. *All questions carry equal marks. Physics, Chemistry, Biology & Reasoning are compulsory.*
5. *For each correct Answer = 2 marks, there is no negative marking.*
6. *Please bring separate sheet for Rough work.*
7. *Total Time : 1 Hour*
8. *Maximum Marks : 120*

PHYSICS

Q.1 At a metro station, a girl walks up a stationary escalator in time t_1. If she remains stationary on the escalator, then the escalator take her up in time t_2. The time taken by her to walk up on the moving escalator will be

(a) $(t_1 + t_2)/2$ (b) $t_1 t_2 / (t_2 - t_1)$

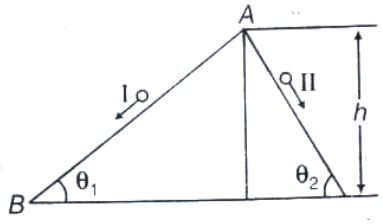
(c) $t_1 t_2 / (t_2 + t_1)$ (d) $t_1 - t_2$

Q.2 A body with mass 5 kg is acted upon by a force $\mathbf{F} = (-3\hat{\mathbf{i}} + 4\hat{\mathbf{j}})$ N. If its initial velocity at t =0 is $v = (6\mathbf{i} - 12\hat{\mathbf{j}})\,ms^{-1}$, the time at which it will just have a velocity along the Y – axis is

(a) Never (b) 10s

(c) 2 s (d) 15 s

Q.3 Two inclined frictionless tracks, one gradual and the other steep meet at A from where two stones are allowed to slide down from rest, one on each track as shown in figure. Which of the following statement is correct ?



(a) Both the stones reach the bottom at the same time but not with the same speed

(b) Both the stones reach the bottom with the same speed and stone I reaches the bottom earlier than stone II

(c) Both the stones reach the bottom with the same speed and stone II reaches the bottom earlier than stone I

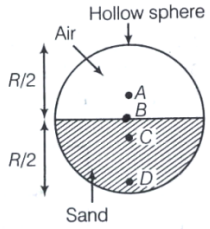
(d) Both the stones reach the bottom at different times and with different speeds

Q.4 A mass of 5 kg is moving along a circular path of radius 1m. If the mass moves with 300 rev/ min, its kinetic energy would be

(a) $250\pi^2$ (b) $100\pi^2$

(c) $5\pi^2$ (d) 0

Q.5 Which of the following points is the likely position of the centre of mass of the system shown in figure ?



(a) A (b) B

(c) C (d) D

Q.6 The resistance R = V / I, where V = (100 ± 5) V and I = (10 ± 0.2) A. Find the percentage error in R.

(a) 5% (b) 10%

(c) 7% (d) 12%

Q.7 A drunkard is walking along a straight road. He takes 5 steps forward and 3 steps backward and so on. Each step is 1 m long and takes 1 s. There is a pit on the road 13 m away from the starting point. The drunkard will fall into the pit after

(a) 21 s (b) 29s

(c) 31 s (d) 37 s

Q.8 If a person can throw a stone to maximum height of h metre vertically, then the maximum distance through which it can be thrown horizontally by the same person is

(a) $\frac{h}{2}$ (b) h

(c) 2h (d) 3h

Q.9 An electric fan has blades of lengths 30 cm as measured from the axis of rotation. If the fan is rotating at 1200 rpm, the acceleration of a point on the tip of the blade is about

(a) 1600 ms^{-2} (b) 4740 ms^{-2}

(c) 2370 ms^{-2} (d) 5055 ms^{-2}

Q.10 A brick of length L is placed on the horizontal floor. The bricks of same length and size are placed on this brick, one above the other by providing a margin of $\frac{1}{8}$ from the edge of the brick placed just below, in the same direction. Find the correct option

(a) Fifth brick will fall down

(b) Sixth brick alone will fall down

(c) Sixth brick along with fifth brick will fall down

(d) Fifth brick along with fourth brick will fall down

Q.11 A ball of mass M falls from a height h on a floor which the coefficient of restitution is e. The height attained by the ball after two rebounds is

(a) e^2h (b) eh^2

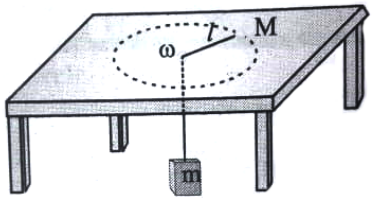
(c) e^4h (d) $\frac{h}{e^4}$

Q.12 The potential energy between two atoms in a molecule is given by $U(x)=\frac{a}{x^{12}}-\frac{b}{x^6}$; where a and b are positive constants and x is the distance between the atoms. The atom is in stable equilibrium when

(a) $x=\sqrt[6]{\frac{11a}{5b}}$ (b) $x=\sqrt[6]{\frac{a}{2b}}$

(c) $x=0$ (d) $x=\sqrt[6]{\frac{2a}{b}}$

Q.13 A block of mass M is situated on a smooth horizontal frictionless table. A thread tied to the block passes through a hole in the table and carries a mass *m* at its other end. If the length of the above the table is *l*, what should be the value of *m* so that it may remain suspended at a constant height and the block *m* moves in a circular path with an angular velocity ω on the table



(a) $\frac{Ml\omega^2}{g}$ (b) $\frac{Ml\omega^2}{3g}$

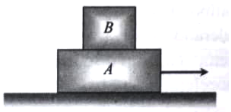
(c) $\frac{Ml\omega^2}{5g}$ (d) $\frac{2Ml\omega^2}{g}$

Q.14 A heavy uniform chain lies on a horizontal table top. If the coefficient of friction between the chain and the table surface is 0.25, then the maximum fraction of the length of the chain that can hang over one edge of the table is

(a) 20% (b) 25%

(c) 35% (d) 15%

Q.15 A body A of mass 1 kg rests on a smooth surface. Another body B of mass 0.2 kg is placed over A as shown. The coefficient of static friction between A and B is 0.15. B will begin to slide on A if A is pulled with a force greater than



(a) 1.764 N
(b) 0.1764 N
(c) 0.3 N
(d) It will not slide for any F

CHEMISTRY

Q.16 If kinetic energy of a proton is increased nine times, the wavelength of the de – Broglie wave associated with it would become

(a) 3 times (b) 9 times

(c) 1/3 times (d) 1/9 times

Q.17 To which block of the periodic table does element with atomic number 46 belongs

(a) s - block (b) p-block

(c) d-block (d) f-block

Q.18 The number of d-electrons in $Fe^{+2}(Z=56)$ is not equal to the number of electrons in which one of the following

(a) p- electrons in Cl (Z = 17)
(b) d – electrons in Fe (Z = 56)
(c) p – electrons in Ne (Z = 10)
(d) s – electrons in Mg (Z = 12)

Q.19 The weight of one molecule of a compound $C_{60}H_{122}$ is

(a) 1.3×10^{-20} g (b) 5.01×10^{-21} g

(c) 3.72×10^{23} g (d) 1.4×10^{-21} g

Q.20 If 30 mL of H_2 and 20 mL of O_2 react to form water, what is left at the end of the reaction

(a) 10 mL of H_2 (b) 5 mL of H_2

(c) 10 mL of O_2 (d) 5 mL of O_2

Q.21 6.02×10^{20} molecules of urea are present in 100 mL of its solution. The concentration of urea solution is

(a) 0.001 M (b) 0.1 M

(c) 0.02 M (d) 0.01 M

Q.22 Maximum number of electrons in a subshell of an atom is determined by following

(a) $2n^2$ (b) $4l+2$

(c) $2l+2$ (d) $4l-2$

Q.23 The correct sequence of decrease in the bond angles of the following hydrides is
(a) $NH_3 > PH_3 > AsH_3 > SbH_3$
(b) $NH_3 > AsH_3 > PH_3 > SbH_3$
(c) $SbH_3 > AsH_3 > PH_3 > NH_3$
(d) $PH_3 > NH_3 > AsH_3 > SbH_3$

Q.24 Which one of the following has maximum number of nodal planes
(a) σ^*_{1s} (b) $\sigma^*_{2_{Pz}}$
(c) $\pi_{2_{Px}}$ (d) $\pi^*_{2_{Py}}$

Q.25 A certain gas takes three times as long to effuse out as helium. Its molecular mass will be
(a) 64 u (b) 9 u
(c) 27 u (d) 36 u

Q.26 In order to increase the volume of a gas by 10%, the pressure of the gas should be
(a) decreased by 10% (b) decreased by 1%
(c) increased by 10% (d) increased by 1%

Q.27 What is the value of standard Gibb's free energy change if its equilibrium constant is 100
(a) 11.41 kJ (b) -11.41 kJ
(c) 41.11 kJ (d) -41.11 kJ

Q.28 A solution of pH = 8 is diluted 100 times. pH of the final solution is
(a) between 7 to 8 (b) 7
(c) 6 (d) 5

Q.29 Correct order of electron affinities of halogens is
(a) F >Cl> I > F (b) Cl> Br > I > F
(c) Cl> F > Br > I (d) Br > F >Cl> I

Q.30 The set with correct acid strength among HClO (I), $HClO_2$ (II), $HClO_3$ (III) and $HClO_4$ (IV) is
(a) I < II < III < IV (b) II < III < IV < I
(c) IV < II < I < III (d) IV < III < I < II

BIOLOGY

Q.31 Match the following and choose the correct option

(A) Family	(i) Tuberosum
(B) Kingdom	(ii) Polymoniales
(C) Order	(iii) Solanum
(D) Species	(iv) Plantae
(E) Genus	(v) Solanacea

(a) A – (v), B – (iv), C – (ii), D – (i), E – (iii)
(b) A – (v), B – (iv), C – (iii), D – (ii), E – (i)
(c) A – (iv), B – (iii), C – (v), D – (i), E – (ii)
(d) A – (iv), B – (iii), C – (ii), D – (v), E – (i)

Q.32 Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of
(a) Monographs (b) Flora
(c) Both (a) and (b) (d) None of these

Q.33 Select the true statement
(i) The number and types of organisms present on earth is referred to biodiversity
(ii) Nomenclature or naming is only possible when the organism is described correctly
(iii) For plants, scientific names are based on International Code of Zoological Nomenclature (ICZN)
(iv) Animal taxonomists have evolved International Code for Botanical Nomenclature (ICBN)
(a) (i), (ii) and (iv) (b) (i), (ii), (iii) and (iv)
(c) (i) and (ii) (d) (i), (ii) and (v)

Q.34 Choose wrong statement for bacteria
(i) Methanogens are present in the gut of several ruminant animals such as cows and buffaloes.
(ii) Some of the bacteria are autotrophic.
(iii) They may be photosynthetic autotrophic or chemosynthetic autotrophic.
(iv) The vast majority of bacteria are heterotrophs.
(v) Eubacteria is halophiles, thermoacidophiles and methanogens.
(vi) Archaebacteria differ from other bacteria in having a different cell membranestructure.
(a) (iv), (v) and (vi) (b) (ii), (iv) and (vi)
(c) (i), (ii), (iii) and (iv) (d) (v) and (vi)

Q.35 Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes ?
(a) λ phage (b) Ti plasmid
(c) Retrovirus (d) pBR 322

Q.36 Secondary xylem and phloem in dicot stem are produced by
(a) Phellogen (b) Vascular cambium
(c) Apical meristems (d) Axillary meristems

Q.37 Plants having little or no secondary growth are
(a) Conifers (b) Deciduous angiosperm
(c) Grasses (d) Cycads

Q.38 Which of the following statements is correct ?
(a) Horsetails are gymnosperms.
(b) Selaginella is heterosporous, while Salvinia is homosporous.
(c) Ovules are not enclosed by ovary wall in gymnosperms.
(d) Stems are usually unbranched in both Cycas and Cedrus.

Q.39 Ciliates differ from all other protozoans in
(a) using pseudopodia for capturing prey
(b) having a contractile vacuole for removing excess water
(c) using flagella for locomotion
(d) having two types of nuclei

Q.40 Identify the vertebrate group of animals characterized by crop and gizzard in its digestive system.
(a) Aves (b) Reptilia
(c) Amphibia (d) Osteichthyes

Q.41 Which of the following features is used to identify a male cockroach from a female cockroach ?
(a) Forewings with darker tegmina
(b) Presence of caudal styles
(c) Presence of a boat shaped sternum on the 9th abdominal segment.
(d) Presence of anal cerci

Q.42 Which one of these animals is not a homeotherm
(a) Camelus (b) Chelone
(c) Macropus (d) Psittacula

Q.43 Nissl bodies are mainly composed of
(a) Nucleic acids and SER
(b) DNA and RNA
(c) Proteins and lipids
(d) Free ribosomes and RER

Q.44 Select the incorrect match
(a) Submetacentric - L – shaped chromosomes chromosomes
(b) Allosomes - Sex chromosomes
(c) Lampbrush - Diplotene bivalents chromosomes
(d) Polytene - Oocytes of amphibians Chromosomes

Q.45 Which of the statement is incorrect
(a) Glycolysis operates as long as it is supplied with NAD that can pick up hydrogen atoms.
(b) Glycolysis occurs in cytosol.
(c) Enzymes of TCA cycle are present in mitochondrial matrix.
(d) Oxidative phosphorylation takes place in outer mitochondrial membrane.

REASONING

Q.46 Wine : Grapes : : Vodka : ?
(a) Potatoes (b) Apples
(c) Oranges (d) Flour

Q.47 Kinde : Burn : : Angry : _____?
(a) Annoyed (b) Determined
(c) Resentful (d) Furious

Q.48 Lotus : Cuticle : : Fish : ?
(a) Scales (b) Tills
(c) Tail (d) Surplus

Q.49 Income : Profit : : Expenditure : ?
(a) Balance (b) Loss
(c) Sale (d) surplus

Complete the following series :-

Q.50 c_b a a_a c a _c a c ab__a c a c__b c a
(a) a c b a a (b) b b c a a
(c) b c c a b (d) c b a a c

Q.51 J2Z, K4X, I7V, ? , H16R, M22P
(a) I11T (b) L11S
(c) L12T (d) L11T

Q.52 1, 1,2, 6, 24, __, 720.
(a) 100 (b) 104
(c) 108 (d) 120

Q.53 4, 10, __, 82, 244, 730.
(a) 24 (b) 28
(c) 77 (d) 218

There are 6 persons A, B, C, D, E and F. C is the sister of F. B is the brother of E's husband. D is the father of A and grandfather of F. There are 2 fathers, three brother and a mother in the group.

Q.54 Who is the mother?
(a) A (b) B
(c) D (d) E

Q.55 Who is E's husband?
(a) B (b) C
(c) A (d) F

Q.56 How many male members are three in the group?
(a) One (b) Two
(c) Three (c) Four

Q.57 How is F related to E?
(a) Son (b) Uncle
(c) Husband (d) Daughter

According to a certain code.
A) 'min fin bin gin' means 'trains are always late'
B) 'gin din cin him' means 'drivers were always punished'
C) 'bin cin vin rin' means 'drivers stopped all trains'
D) 'din kin fin vin' means 'all passengers were late'

Q.58 'Drivers were late' would be written as?
(a) mincin din (b) fin cin din
(c) fin din gin (d) gin hin min

Q.59 Which word is represented by 'vin'?
(a) all (b) late
(c) trains (d) drivers

Q.60 'hin min kin' would mean?
(a) Always late trains
(b) Passengers are punished
(c) All passenger trains