C TSE
## TALENT SEARCH EXAM

INSTRUCTIONS

1. Immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.
2. Test duration is ONE HOUR(60MINUTES)
3. The Test Booklet consists of 40 questions of 4 marks each. The maximum marks are 160.
4. There are four sections in the question paper.
   The distribution of questions, subject wise in each part is mentioned below:-
   PHYSICS   – 10 Questions
   CHEMISTRY   – 10 Questions
   MATHEMATICS/BIOLOGY   – 10 Questions
   MENTAL ABILITY   – 10 Questions
5. Candidates will be awarded Four marks (+4) each for indicated correct response of each Question& One mark (-1) will be deducted for indicated incorrect response. There will be No deduction from the total score if no response is indicated.
6. No candidate is allowed to carry any textual material, printed or written, bits of paper, mobile phone, any electronic device etc.
7. After the completion of the test, the candidate must hand over the Answer Sheet to the Invigilator On duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.
8. Do not fold or make any stray marks on the Answer sheet.

Name : _____ Class : _____ Roll No. _____
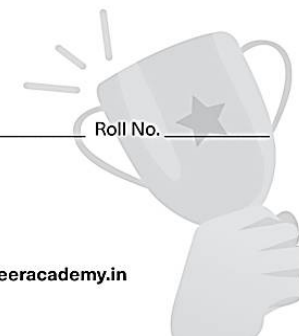
PHYSICS

1. The unit of power is-
(a) kilowatt
(b) kilowatt-hour
(c) dyne
(d) joule

2. The velocity v of a particle at time t is given by $v = at + \dfrac{b}{t+c}$, where a, b and c are constants. The dimensions of a, b and c are respectively.
(a) LT^{-2}, L and T
(b) L^2, T and LT^2
(c) LT^2, LT and L
(d) L, LT and T^2

3. The v-t graph of a linear motion is shown in adjoining figure. The displacement after 8 seconds is –
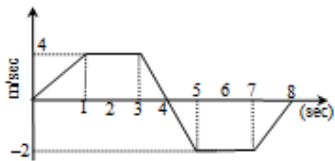

(a) 18 meters
(b) 16 meters
(c) 8 meters
(d) 6 meters

4. A particle moves from the position of rest and attains a velocity of 30 m/sec after 10sec. The acceleration will be
(a) 9 m/sec^2
(b) 18 m/sec^2
(c) 3 m/sec^2
(d) 4 m/sec^2

5. Which one of the following represents the time-displacement graph of two objects A and B moving with zero relative velocity ?
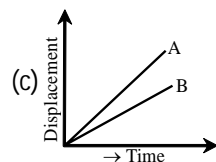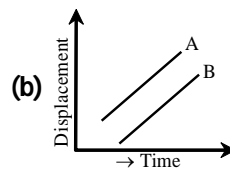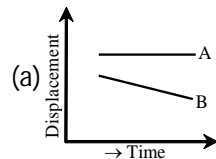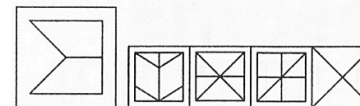

36. If @ is −, * is +, × is −, + is × and % is ÷, then the value of
$[\{(5 \oplus 2)@1\}\%3] * 2$ is
(a) 30
(b) 28
(c) 32
(d) 5

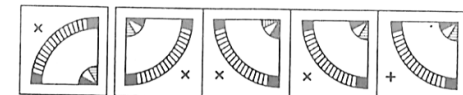**37.** How many triangles are there in the following figure?
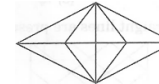
(a) 10
(b) 14
(c) 24
(d) 20

38. In the given question, you are given a figure (X) followed by four figures (a), (b), (c) and (d) such that (X) is embedded in one of them. Trace out

(x)   (a)   **(b)**   (c)   (d)

39. In these question, a problem figure is given on the left side of the line, which is incomplete. One out of the four answer figures (a), (b), (c) and (d) can complete the same. You have to locate the answer figure which is inserted in the problem figure, without changing the direction, complete women containing at Problem figure
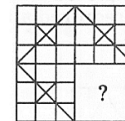
Answer figure
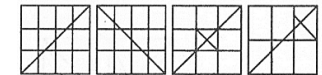
(a)   (b)   **(c)**   (d)

40. In the following question, choose the correct water image of the figure(Z) from amongst the four alternative (a), (b), (c) and (d) given below with it.

(Z)   (a)   (b)   **(c)**   (d)

29. The coefficient of x^{-17} in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$ is
(a) 1365
(b) -1365
(c) 3003
(d) -3003

30. The 10th common term between the series $2 + 6 + 10 + \cdots$ and $1 + 6 + 11 + \cdots$
(a) 180
(b) 186
(c) 196
(d) 206

MENTAL ABILITY

31. If 'TEAM' is coded as 'VGCO', then 'LIFE' will be coded as
(a) NJGE
(b) NLIH
(c) NKHH
(d) NKHG

32. 1, 4, 2, 8, 6, 24, 22, 88, ?
(a) 86
(b) 90
(c) 154
(d) 352

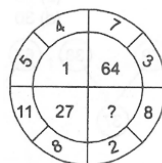**33.** Pointing to Keshav, Priyanka said, " His mother's brother is the father of my son Nikhil". How is Keshav related to Priyanka?
(a) Niece
(b) Aunt
(c) Nephew
(d) Sister-in-law

34. Insert the missing number or letter from among the given alternative.
(a) 0
(b) 8
(c) 125
(d) 216

35. In a row of students Prabhu is 9th from left and Padma is 12th from right. In the same row, Ram is 12th from left and Radha is 9th from right. How many students are there between Prabhu and Radha?
(a) 18
(b) 21
(c) 24
(d) Data inadequate
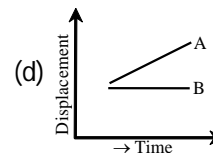
(d)

6. Which of the following is a one dimensional motion
(a) Landing of an aircraft
(b) Earth revolving around the sun
(c) Motion of wheels of a moving trains
(d) Train running on a straight track

7. The ratio of the numerical values of the average velocity and average speed of a body is always
(a) Unity
(b) Unity or less
(c) Unity or more
(d) Less than unity

8. A body is moving with velocity 30 m/s towards east. After 10 seconds its velocity becomes 40 m/s towards north. The average acceleration of the body is :
(a) 1 m/s²
(b) 7 m/s²
(c) 4 m/s²
(d) 5 m/s²

9. The Newton's laws of motion are valid in-
(a) inertial frames
(b) non-inertial frames
(c) rotating frames
(d) accelerated frames

10. A man is at rest in the middle of a pond on perfectly smooth ice. He can get himself to the shore by making use of Newton's-
(a) first law
(b) second law
(c) third law
(d) all the laws

CHEMISTRY

11. Which one of the following will have largest numbers of atoms?
(a) 1 g Au
(b) 1 g Na
(c) 1 g Li
(d) 1 g Cl_2

12. The correct order of increasing energy of

atomic orbitals is
(a) $5p < 4f < 6s < 5d$
(b) $5p < 6s < 4f < 5d$
(c) $4f < 5p < 5d < 6s$
(d) $5p < 5d < 4f < 6s$

13. Which of the following order is correct of reducing strength?
(a) Cs > Rb > K > Na > Li
(b) Li > Na > K > Rb > Cs
(c) Li > Cs > Rb > K > Na
(d) None of these.

14. In the resonating structure f benzene, the number of σ and π bonds are
(a) 3π and 12σ
(b) 3σ and 12π
(c) 6π and 6σ
(d) 12π and 12σ

15. The bond order for a species with the configuration, $\sigma1s^2, \sigma^*1s^2, \sigma2s^2, \sigma^*2s^2, \pi2p_x^1$ will be
(a) 1
(b) $\frac{1}{2}$

(c) zero
(d) None.

16. Capillary action of the liquid can be explained on the basis of its
(a) resistance to flow
(b) surface tension
(c) heat of vaporization
(d) refractive index

17. When the temperature is raised, the viscosity of the liquid decreases. This is because
(a) of decreased volume of solution
(b) increase in temperature increases the average kinetic energy of molecules which overcomes the attractive force between them
(c) of decrease covalent and hydrogen bond forces
(d) of increased attraction between molecules.

(a) 8
(b) 7
(c) 15
(d) 16

23. The value of $\sin78° - \sin66° - \sin42° + \sin6°$ is
(a) 1/2
(b) $-1/2$
(c) -1
(d) none of these

24. If $tanA + cotA = 4$, then $tan^4A + cot^4A$ is equal to
(a) 110
(b) 191
(c) 80
(d) 194

25. If $z = \frac{1}{(2+3i)^2}$, then $|z| =$
(a) $\frac{1}{13}$
(b) $\frac{1}{5}$
(c) $\frac{1}{12}$
(d) none of these

26. If a, b are the roots of

the equation $x^2 + x + 1 = 0$, then $a^2 + b^2 =$
(a) 1
(b) 2
(c) -1
(d) 3

27. The cost and revenue function of a product are given by $C(x) = 20x + 4000$ and $R(x) = 6x + 2000$ respectively, where x is the number of items produced and sold. Then, the number of items must be sold to realise some profit is given by
(a) $x = 50$
(b) $x > 50$
(c) $x < 50$
(d) None of these

28. In how many ways can a committee of 5 be made out of 6 men and 4 least one women?
(a) 246
(b) 222
(c) 186
(d) none of these

(c) A-(vi), B-(iv), C-(v), D-(iii), E-(i), F-(ii)

(d) A-(iv), B-(v), C-(iii), D-(ii), E-(i), F-(vi).

29. Match the animals list with names under Column – I with the animals listed with regular zoological name given under Column – II; choose the answer which gives the correct combination of the alphabets of the two columns.

	Column I (Animals with common name)		Column II (Animals with zoological name)
(A)	Star fish	(i)	Sepia
(B)	Jellyfish	(ii)	Asterias
(C)	Devilfish	(iii)	Aurelia
(D)	Cuttlefish	(iv)	Octopus

(a) A-(iii), B-(iv), C-(i), D-(ii)

(b) A-(iii), B-(i), C-(iv), D-(ii)

(c) A-(ii), B-(iii), C-(iv), D-(i)

(d) A-(ii), B-(i), C-(iv), D-(iii)

30. In flower formula % stands for:
(a) Bisexual flower
(b) Actinomorphic flower
(c) Zygomorphic flower
(d) Asymmetrical flower

MATHEMATICS

21. Two finite sets have m and n elements. The number of elements in the power set of first set is 48 more than the total number of elements in power set of the second set. Then, the values of m and n are:
(a) 7,6
(b) 6,3
(c) 6,4
(d) 7,4

22. If $A = \{a, b, c, d\}$. The number of elements in the power set of A

18. According to the second law of thermodynamics, a process (reaction) is spontaneous, if during the process
(a) $\Delta S_{universe} > 0$
(b) $\Delta S_{universe} = 0$
(c) $\Delta H_{system} > 0$
(d) $\Delta S_{universe} = \Delta S_{system}$

19. The oxidation number of P in $HP_2O_7^-$ ion is
(a) +5
(b) +6
(c) +7
(d) +3

20. Equilibrium concentration species of reaction A+B⇌C+D are 2, 3, 10 and 6 $molL^{-1}$ respectively at 300 K. ΔG° for reaction is (R=2ca/mol k)
(a) -13.73 cal
(b) 1372.60 cal
(c) -137.26 cal
(d) -1381.80 cal

BIOLOGY

21. Match the entities in Column I with Column II:

	Column I		Column II
(A)	Dogs	(i)	Species
(B)	Systematics	(ii)	Genus
(C)	Lowest category	(iii)	Family
(D)	Mangifera	(iv)	Evolutionary relationship
(E)	Solanaceae	(v)	Taxa

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

22. Which of the following not true for basidiomycetes?
(a) The asexual spores are generally not found
(b) The sex organs are present and plasmogamy is brought about by fusion of two vegetative or somatic cells

(c) Karyogamy and meiosis takes place in the basidium producing four basidiospores

(d) The basidia are arranged in fruiting bodies called basidiocarps.

23. Which of the following is correct for brown alga?
(a) Flagella – 2-8 in number, equal in length, apical in position
(b) Flagella – 2 in number, unequal in length, lateral in position
(c) Flagella – 2 in number, equal I length, apical in position
(d) Flagella absent.

24. Which one of the following groups of the three animals each is correctly matched with their one characteristic morphological feature?

	Animals	Morphological feature
(a)	Liver fluke, Sea anemone, Sea cucumber	Bilateral
(b)	Centipede, Prawn, Sea urchin	Joint appendeges
(c)	**Scorpion, Spider, Cockroach**	**Ventral solid central nervous system**
(d)	Cockroach, Locust, Taenia	Metameric segmentation

25. Choose the incorrect match:
(a) Zygomorphic flowers (Bilateral symmetry) – pea-gulmohur, bean cassia.
(b) Asymmetric (irregular flower) – canna
(c) Inferior ovary – pea
(d) Superior ovary/Hypogynous flowers – mustard china rose and brinjal.

26. Identify given diagram and choose the correct answer from given options.
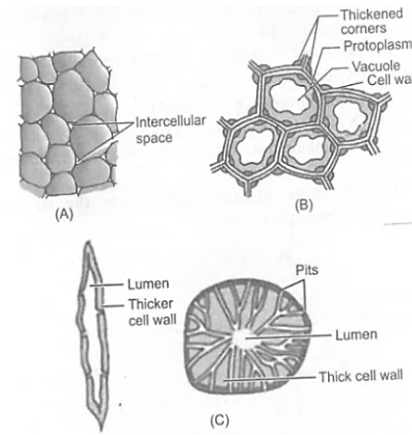
(a) (A)-Parenchyma, (B)-Sclerenchyma, (C)-Collenchyma
(b) (A)-Parenchyma, (B)-Collenchyma, (C)-Sclerenchyma
(c) (A)-Meristem, (B)-Fibre, (C)-Collenchyma
(d) All are correct.

27. If frog the gaseous exchange during hibernation takes place through:
(a) Skin
(b) Buccal cavity
(c) Lungs
(d) Buccal cavity and lungs both.

28. Match the entities in Column I with their character in Column II

regarding cell cycle:

	Column I		Column II
(A)	G_1 – phase	(i)	Cell is preparing for division
(B)	G_2 – phase	(ii)	Actual cell division or mitosis
(C)	S – phase	(iii)	Cells in this stage remain metabolically active but no longer proliferate
(D)	G_0 – phase	(iv)	Proteins are synthesised in preparation for mitosis
(E)	Interphase	(v)	DNA becomes 4C from 2C
(F)	M - phase	(vi)	Cell is metabolically active and continuously grows but does not replicate its DNA

(a) A-(iv), B-(v), C-(vi), D-(i), E-(ii), F-(iii)k
(b) A-(vi), B-(iv), C-(v), D-(i), E-(ii), F-(iii)