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P-TQE 2024

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For 6th to 11th Class Students

STAGE - 1 & STAGE - 2

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What Makes Pinnacle Unique?

- 1 Best Faculty Team
- 2 Hi-Tech Classrooms
- 3 Customized Study material
- 4 Personal Attention
- 5 Unlimited Doubt Sessions
- 6 Best Testing Methodology



Classroom Program

1 Comprehensive Classroom Lectures

All classes at Pinnacle are conducted by highly qualified and experienced faculty members, mostly IITians. Each chapter is started at the grass root level and is dealt to an extent which is the requirement of competitive examinations, with an aim of enabling the students to develop a comprehensive view of the whole chapter with a thorough understanding.



Doubt Clearance 2

"If you ask a question, you may appear fool for some time, but if you don't, you'll remain a fool for whole life." System at Pinnacle encourages all students to ask their doubts and questions.

3 Regular Tests Online and Offline

As JEE Mains and Advanced have gone completely online and NEET is in the pipeline, we have launched a dedicated online testing platform where students can practise over CBT (Computer Based Tests). The combination of online and offline testing modes based on latest JEE/NEET patterns ensure that students are at par with the recent changes. Students can check their test reports and performance analysis via a unique online login ID. Their results are also communicated to parents via SMS.



Addressing the Board Exam 4

Pinnacle has a very distinct methodology for preparing the students for competitive examinations while in full synchronization with Board Exams as well. Board level tests are conducted alongside the regular JEE/NEET tests and the copies are graded at very meticulous level by teachers. Students receive methodological tips so as to perform excellent in the board Exams as well.

Section – A Science

This section contains **30 Multiple Choice Questions**. Each question has four options out of which **ONLY ONE** is correct.

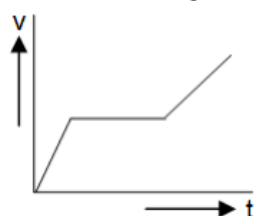
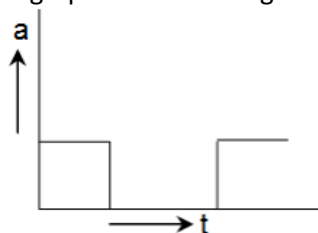
1. The speed of a train increases at a constant rate α from zero to v , and then remains constant for an interval, and finally decreases to zero at a constant rate β . If L be the total distance travelled, then the total time taken is:

- (a) $\frac{L}{v} + \frac{v}{2} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$
 (b) $\frac{L}{v} + \frac{2}{v} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$
 (c) $\frac{L}{v} + 2v \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$
 (d) $\frac{L}{v} + \frac{1}{v} \left(\frac{1}{\alpha} + \frac{1}{\beta} \right)$

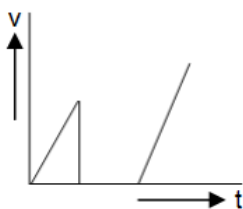
2. A ball is dropped on to the floor from a height of 20 m. It rebounds to a height of 10 m. If the ball is in contact with the floor for 0.2 seconds, what is the average acceleration during contact?

- (a) 169 ms^{-2}
 (b) 285 ms^{-2}
 (c) 338 ms^{-2}
 (d) 564 ms^{-2}

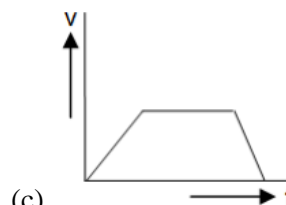
3. Which of the following would probably show the velocity-time graph for a body whose acceleration time graph is shown in figure?



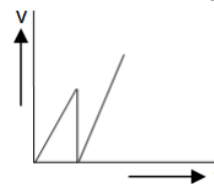
(a)



(b)

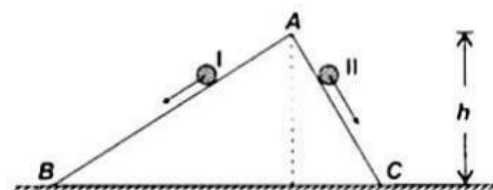


(c)



(d)

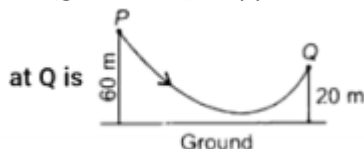
4. Two inclined frictionless tracks, one gradual and the other steep meet at point A from where two stones (I and II) are allowed to slide down from rest, one on each track as shown in figure. Which of the following statements is correct?



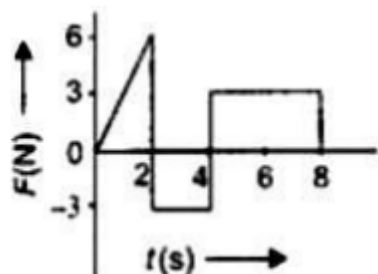
- (a) Both the stones reach the bottom at the same time but not with the same speed
 (b) Both the stones reach the bottom with the same speed and stone I reaches the bottom earlier than stone II
 (c) Both the stones reach the bottom with the same speed and stone II reaches the bottom earlier than stone I
 (d) Both the stones reach the bottom at different times and with different speeds.
5. A mass of M kg is suspended by a weightless string. The horizontal force that is required to displace it until the string making an angle of 30° with the initial vertical direction is:

- (a) $Mg(\sqrt{2} - 1)$
 (b) $Mg(\sqrt{2} + 1)$
 (c) $Mg(2 - \sqrt{3})$
 (d) $\frac{Mg}{\sqrt{2}}$

6. A skier of mass 50 kg stands at point P at the top of the ski jump and moves from P to Q and takes off his jump at Q as shown in figure. If 60% of the change in the gravitational potential energy of the skier between points P and Q becomes the kinetic energy at Q then the speed at which the skier arrives ($g = 10 \text{ m/s}^2$) is approximately



- (a) 11
(b) 22
(c) 20
(d) 40
7. Rahul is travelling in a retarding bus. At one point of his journey, he throws a ball vertically upwards to a height 40 cm, the ball will fall (Neglect air friction)
- (a) A short distance behind where he is standing
(b) A short distance in front of where he is standing
(c) A long distance behind where he is standing
(d) At the same spot where he is standing
8. The force F acting on a particle of mass m is indicated by the force-time graph shown below. The change in momentum of the particle over the time interval from zero to 6 s is:

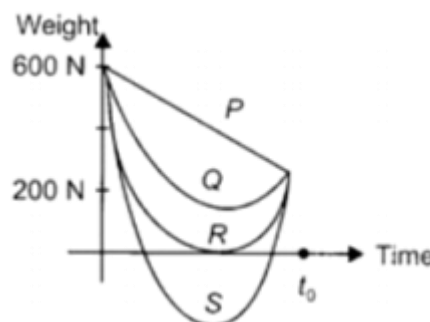


- (a) 24 N s
(b) 20 N s
(c) 12 N s
(d) 6 N s
9. Match the column – I with column – II select the correct option from the codes given below:

Column-I	Column-II
(a) g at height h	(i) $g \left(1 - \frac{2h}{R}\right)$
(b) g at depth h	(ii) $\frac{GM}{R^2}$
(c) g_{poles}	(iii) $g \left(1 - \frac{h}{R}\right)$
(d) g	(iv) Maximum

- (a) a - i; b - ii; c - iii; d - iv
(b) a - ii; b - iii; c - iv; d - i
(c) a - i; b - iii; c - iv; d - ii
(d) a - ii; b - iv; c - i; d - iii

10. If, the acceleration due to gravity at the Earth's surface is 10 m/s^2 and at the surface of Mass is 4 m/s^2 . A 60 kg passenger goes from the Earth to the Mass in a spaceship moving with a constant velocity. Neglect all other objects in the sky. Which part of figure best represents the weight (net gravitational force) of the passenger as a function of time?



- (a) P
(b) Q
(c) R
(d) S
11. A brief information about three substances is given in the table.

Substance	Melting point	Boiling point
P	23°C	60°C
Q	10°C	20°C
R	65°C	110°C

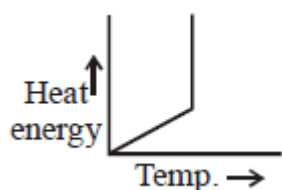
Which of the following is incorrect about these substances?

- (a) At room temperature, substance P will have fixed volume but no fixed shape.
(b) At room temperature substance Q will have maximum space between the particles.
(c) At room temperature substance R will have maximum kinetic energy.
(d) At room temperature, the substance Q will diffuse faster as compared to substance P and R
12. Riya heated a mixture of iodine and common salt in a china dish by keeping an inverted funnel on it. After some time, she observed that

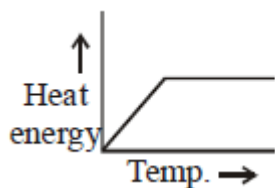


- (a) White fumes come out from the mixture
(b) Violet particles deposit on the neck of the funnel
(c) White particles deposit on the neck of the funnel

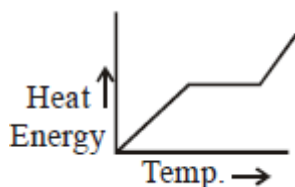
- (d) A gas with popping sound comes out.
13. The number of electrons in an atom carrying 3 negative charge is X and number of neutrons are Y, its mass number is
- $X + Y + 3$
 - $2X - 3$
 - $X - Y + 3$
 - $X + Y - 3$
14. Which of the following statements is/are correct?
- Centrifugation method can be used to separate cream from milk
 - Different colored components of blue ink can be separated by evaporation
 - Chromatography can be used to detect drugs in blood
 - Camphor cannot be separated from salt by sublimation
- ii only
 - i, ii, iii only
 - i and iii only
 - ii and iv only
15. Which of the following is a correct graphical representation of latent heat of fusion of water with respect to temperature?



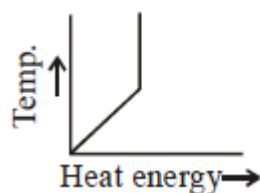
(a)



(b)



(c)



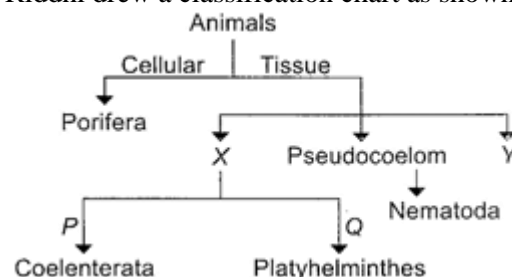
(d)

16. Our hand feels cold when we put some acetone on it, because
- Heat of vaporization of acetone is exothermic process

- Acetone release heat of vaporization on our hand
 - Acetone absorb latent heat of vaporization from our hand
 - Acetone become cooled
17. Which of the following conditions would increase the interparticle distance of a gas?
- Increase of pressure
 - Leaking of some of the gas
 - Increase the volume of container
 - Increase the temperature of the gas
- i and ii
 - ii, iii and iv
 - i and iii
 - ii, iv
18. 15 g of methyl alcohol is present in 100ml of solution. If the density of solution is 0.96 g/ml, Calculate the mass percentage of methyl alcohol in solution
- 15.625%
 - 25.625%
 - 45.625%
 - 35.625%
19. Melting & freezing point of water:
- Are same
 - Have large difference between them
 - Have close difference between them
 - None of these
20. At a constant temperature, volume of a gas was found to be 400 cm^3 at a pressure of 760 mm Hg. Of one pressure of one gas is increased by 25%. Find one new volume is
- 300 cm^3
 - 320 cm^3
 - 200 cm^3
 - None of these
21. Cells are of different shapes and sizes. Some cells are irregular in shape such as
- Amoeba
 - Red Blood Cell
 - Leucocyte
 - Both a and c
22. X is a double membraned organelle that oxidises food present in cell to release energy. X is _____.
- Nucleus
 - Endoplasmic reticulum
 - Mitochondrion
 - Chloroplast

23. Read the following statements carefully. Which of them are true (T) and which of them are false (F)?
- RER function as cytoplasmic framework and is site for lipid synthesis
 - Lysosomes are formed by the joint activity of endoplasmic reticulum and Golgi complex
 - Vacuoles are storage sacs for solid or liquid contents
 - Meiosis involves two consecutive divisions forming 4 daughter cells
- | | (i) | (ii) | (iii) | (iv) |
|-----|-----|------|-------|------|
| (a) | T | F | F | F |
| (b) | F | T | T | F |
| (c) | F | F | F | T |
| (d) | T | F | T | F |
24. Which of the following tissues lines body cavities and covers the body surface?
- Nervous
 - Epithelial
 - Muscle
 - Connective
25. Which of the following substances are present as deposition in the cell walls of sclerenchyma?
- Cellulose
 - Pectin
 - Lignin
 - Hemicellulose
26. Which of the following contains living cells in conducting tissue?
- Meristem
 - Phloem
 - Xylem
 - Collenchyma

27. Which of the following does not make a criterion for classification of animals?
- Body cavity organization
 - Symmetry
 - Cell wall structure
 - Presence or absence of notochord
28. Which of the following is an incorrect match?
- Meristematic tissue – Growing regions of the plants
 - Xylem and Phloem – Complex tissues
 - Cardiac muscles – Uninucleate and branched
 - Tendons – Fibrous connective tissue with flexibility
29. Riddhi drew a classification chart as shown below.



Now, select the option that correctly identifies the characters X, Y, P or Q

- X is with eucoelomic body cavity.
 - P is with bilateral body symmetry.
 - Q is with radial body symmetry.
 - Y is with coelomic cavity lined by mesoderm
30. Select the incorrect statement out of the following
- Fungi are called saprophytes
 - Thallophytes include algae.
 - Locomotory organs of hydra are cilia.
 - Lichens are symbiotic transient association of fungi and Blue Green Algae

Section - B Mathematics

This section contains **20 Multiple Choice Questions**. Each question has four options out of which **ONLY ONE** is correct.

31. If $x^4 + 1 = 1297$, $y^4 - 1 = 2400$, then $y^2 - x^2 =$

- _____.
 (a) 10
 (b) 25
 (c) 13
 (d) 43

32. The surds $\sqrt{2}, \sqrt[3]{3}$ and $\sqrt[5]{5}$, in their descending order are

- (a) $\sqrt[3]{3}, \sqrt[5]{5}, \sqrt{2}$
 (b) $\sqrt{2}, \sqrt[3]{3}, \sqrt[5]{5}$
 (c) $\sqrt{2}, \sqrt[5]{5}, \sqrt[3]{3}$
 (d) $\sqrt[3]{3}, \sqrt{2}, \sqrt[5]{5}$

33. The value of $(x-a)^3 + (x-b)^3 + (x-c)^3 - 3(x-a)(x-b)(x-c)$, when $a+b+c=3x$ is _____

- (a) 3
 (b) 2
 (c) 1
 (d) 0

34. If $x^n + 1$ is divisible by $x + 1$, n must be

- (a) Any natural number
 (b) An odd natural number
 (c) An even natural number
 (d) None of these

35. The rationalizing factor of $\sqrt[5]{a^2b^3c^4}$ is _____

- (a) $\sqrt[5]{a^3b^2c}$
 (b) $\sqrt[4]{a^3b^2c}$
 (c) $\sqrt[3]{a^3b^2c}$
 (d) $\sqrt{a^3b^2c}$

36. Find the square root of $\frac{x^2}{9} + \frac{9}{4x^2} - \frac{x}{3} - \frac{3}{2x} + \frac{5}{4}$.

- (a) $\frac{2x}{3} + \frac{3}{2x} - \frac{1}{2}$
 (b) $\frac{x}{3} - \frac{3}{2x} + 1$

(c) $\frac{3}{x} + \frac{2}{3x} - \frac{1}{2}$

(d) $\frac{x}{3} + \frac{3}{2x} - \frac{1}{2}$

37. If x be a negative integer, then the solution of the in equation $1 \leq 2x + 8 \leq 11$ is

- (a) $\{-5, -3, -4, -2, -1\}$
 (b) $\{-4, -2, -1\}$
 (c) $\{-6, -3, -1\}$
 (d) $\{-3, -2, -1\}$

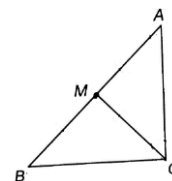
38. If x and y are positive real numbers, then which of the following is CORRECT?

- (a) $x > y \Rightarrow -x > -y$
 (b) $x > y \Rightarrow -x < -y$
 (c) $x > y \Rightarrow \frac{1}{x} > \frac{1}{y}$
 (d) $x > y \Rightarrow \frac{1}{x} < \frac{-1}{y}$

39. Krishna and Sudheer have some marbles with them. If sudheer gives 10 marbles to Krishna, Krishna will have 40 more marbles than Sudheer. If Sudheer gives 40 marbles to Krishna, Krishna will have 5 times as many marbles as Sudheer. Find the number of marbles with Sudheer.

- (a) 65
 (b) 55
 (c) 70
 (d) 50

40. In the following figure, $\triangle ABC$ is right – angled at C, and M is the mid point of hypotenuse AB. If $AC = 32$ cm and $BC = 60$ cm, then find the length of \overline{CM} .



- (a) 32 cm
 (b) 30 cm
 (c) 17 cm
 (d) 34 cm

Section – C
Mental Ability

This section contains **10 Multiple Choice Questions**. Each question has four options out of which **ONLY**

Logical Puzzles

Directions (Q.No. 1 to 6): Study the following information carefully and answer the questions given below:

Seven persons T, U, V, W, X, Y and Z are sitting around a circular table. Two of them are not facing the center and the rest are facing the center. V is sitting third to the left of W and both are facing the center. X is not an immediate neighbor of W or V. The one who is exactly between W and Y is not facing the center. Z is sitting third to the right of T and is facing the center. One of the immediate neighbors of U is not facing the center.

41. Who among the following are not facing the center?
(a) U and X (b) Y and V (c) **T and X** (d) Can't be determined
42. Who among the following is second to the left of X?
(a) **V** (b) W (c) T (d) Y
43. Who among the following is third to the left of V?
(a) Y (b) **U** (c) T (d) Can't be determined
44. What is the position of Y with respect to U?
(a) Third to the right (b) Second to the left (c) **Third to the left** (d) Fifth to the right
45. Which of the following statements is true?
(a) Y sits on the immediate left of T.
(b) The person who is exactly between Y and Z is facing the center.
(c) The person who is exactly between U and Z is not facing the center
(d) **Both b and c**
46. Who among the following are immediate neighbors of X?
(a) **UZ** (b) WY (c) TZ (d) VY

Directions (Q.No. 47 to 48): Study the following information carefully and answer the questions given below:
A is 10 m to the north of Z, who is to the northwest of Y, Z is 15 m to the west of B. C is 10 m to the east of Y, who is 10 m to the south of B.

47. In which direction is Y with respect to A?

- (a) South (b) **Southeast** (c) Southwest (d) West

48. What is the distance between point A and Y?

- (a) 35 m (b) **25 m** (c) 30 m (d) 20 m

Directions (Q. No. 49 to 50): Study the following information carefully and answer the questions given below:
Ten members Q, R, S, T, U, V, W, X, Y and Z are made to sit in two rows – 1 and 2, five members in each row. They are facing each other in such a way that the members of row 1 are facing the members of row 2. The members of row 1 are facing south. T is third to the right of Q and is exactly opposite W. R sits on the immediate right of W and is facing south. X is third to the right of R and is exactly opposite V. S sits between Q and U and is opposite Y.

49. Who among the following sits second to left of S?

- (a) T (b) **V** (c) Q (d) Z

50. Which of the following groups of persons sit in the same row?

- (a) U, X, Y (b) Q, R, S (c) **W, Y, Z** (d) W, T, Y

Mathematical Puzzle

51. Anjali puts into the basket one banana when ordered 'one', one kiwi when ordered 'Two', one litchi when ordered 'Three', and is asked to take out from the basket one banana and kiwi when ordered 'Four'.

A sequence of order is given as: 12342231124124213

How many total fruits will be in the basket at the end of the above order sequence?

52. On a dark night, 15 soldiers and 2 boys are on one side of a bridge which they need to cross. The soldiers weigh 80 kg each and the boys weigh 40 kg each. The bridge can bear a maximum load of 80 kg. It is mandatory for at least one person to carry a torch. Unfortunately, they have only 1 torch between them and the bridge is so long that they cannot throw the torch to the other side of it. Each of the 17 people takes exactly 1 minute to cross the bridge. What is the minimum possible time in which all 17 of them can cross the bridge? (Assume the weight of the torch to be negligible)

53. A customer bought a book worth Rs. 20 from a book store. She gave the book store owner a Rs. 50 note. As the book store owner did not have change he took the change from the owner of a nearby grocery store. He then returned the customer the balance Rs. 30. As it turned out, the Rs. 50 note that the customer had given to the book store owner was fake. Grocery store owner came next day and gave it back to the book store owner and took back his Rs. 50. The book store owner could obviously not return the note to the customer as he was not aware of her whereabouts. In this whole process, book store owner lost how much money?
54. There are two dice without any numbers written on any of the faces. Write numbers 0 to 9 on all faces of both dice (one number on each face) such that any day of a month (1 to 31) can be represented using the two dices. For Ex. 27th should be represented by 2 on one dice & 7 on other, 7th should be represented by 0 on one dice & 7 on other. Find the minimum sum of all the numbers appearing on the both dices (as there are total 12 faces on 2 dice)
55. A number can be constructed from any date of the year by adding the number of the month to the number of the day. For example: November 22nd would become the number 33, since November is the eleventh month, and $22 + 11 = 33$. May 14 would become 19, and so on. How many different numbers can you make, using dates of the normal calendar?

56. In a building there are 999 doors and 999 residents. Each door is assigned a number from 1 to 999. Initially all doors are open. On day 1, resident no. 1 reverses the positions of all the doors. On day 2, resident no. 2 reverses the positions of door numbers 2, 4, 6..... On day 3 resident no. 3 reverses the positions of door numbers 3, 6, 9.... And so on. This happens till day no. 999. How many doors are closed at the end of day 999?
57. Sam bought a box which contained some bananas for his 5 friends. None of his friends knew how many bananas are there. Sam asked them to guess the number of bananas in the box. Their guesses were 33, 37, 41, 51 and 39 but none of the guesses were correct. Sam then told them that their guesses deviated from the actual number of bananas by 5, 9, 1, 9 and 3 in no particular order. Can you tell the number of bananas in the box?
58. Anvita and Tripti have the following conversation –
- Tripti:** My age is not more than 37.
- Anvita:** I am 35.
- Anvita:** You are at least 5 years elder to me.
- Tripti:** you are at least 36.

As usual, both women are lying about their ages in all the four statements. What is sum of their actual ages?

59. Two friends decided to spend their vacation in Manali, during their vacation however, it rained on 17 days. But when it rained in the morning, the afternoon was fine, and every rainy afternoon was preceded by a fine morning. There were 13 fine mornings and 14 fine afternoons. How long was the vacation? It is given that during the vacation, the number of afternoons and morning were equal.
60. Two trains are running at the speed of 50 km/hr on the same track towards each other. When they were 50 km apart a fly sitting on one of the trains starts flying to and fro between the two trains until the trains collide and the fly gets killed. Fly moves to and fro with the constant speed of 140 km/hr. Assuming that fly does not take any time in changing its direction after reaching one train, Then how many km's has the fly travelled before it got killed?



SPACE FOR ROUGH WORK

Answer Key					
1	a	21	d	41	b
2	a	22	c	42	a
2	a	23	b	43	a
4	c	24	b	44	c
5	c	25	c	45	d
6	b	26	b	46	a
7	b	27	c	47	a
8	d	28	d	48	c
9	c	29	d	49	b
10	c	30	c	50	a
11	c	31	c	51	8
12	b	32	d	52	61
13	d	33	d	53	50
14	c	34	b	54	39
15	c	35	a	55	42
16	c	36	d	56	31
17	b	37	d	57	42
18	a	38	b	58	72
19	a	39	a	59	22
20	b	40	d	60	70