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|  | | |
| **Class: 8th SCO** | **JEE-ADV (222) MODEL** | **Date: 10-09-22** |
| **Time: 3hrs** | **PAPER-B\_CTA-02** | **Max. Marks: 222** |

IMPORTANT INSTRUCTIONS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CHEMISTRY** | | | | | |
| **Section** | **Question Type** | **+Ve**  **Marks** | **- Ve**  **Marks** | **No.of Qs** | **Total marks** |
| Sec – I (Q.N : 1 –8) | Questions with Single Correct Choice | 3 | –1 | 8 | 24 |
| Sec – II (Q.N : 9 –12) | Questions with Multi Answer Type | 4 | 0 | 4 | 16 |
| Sec – III (Q.N : 13 – 18) | Questions with Comprehension Type  (2 Comprehensions – 3 + 3 = 6Q) | 3 | -1 | 6 | 18 |
| Sec – IV (Q.N : 19 – 20) | Questions with Matrix Matching | 8 | 0 | 2 | 16 |
| **Total** | | | | **20** | **74** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **MATHEMATICS** | | | | | |
| **Section** | **Question Type** | **+Ve**  **Marks** | **- Ve**  **Marks** | **No.of Qs** | **Total marks** |
| Sec – I (Q.N : 21 – 28) | Questions with Single Correct Choice | 3 | –1 | 8 | 24 |
| Sec – II (Q.N : 29 – 32) | Questions with Multi Answer Type | 4 | 0 | 4 | 16 |
| Sec – III (Q.N : 33 – 38) | Questions with Comprehension Type  (2 Comprehensions – 3 + 3 = 6Q) | 3 | -1 | 6 | 18 |
| Sec – IV (Q.N : 39 – 40) | Questions with Matrix Matching | 8 | 0 | 2 | 16 |
| **Total** | | | | **20** | **74** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PHYSICS** | | | | | |
| **Section** | **Question Type** | **+Ve**  **Marks** | **- Ve**  **Marks** | **No.of Qs** | **Total marks** |
| Sec – I (Q.N : 41 – 48) | Questions with Single Correct Choice | 3 | –1 | 8 | 24 |
| Sec – II (Q.N : 49 – 52) | Questions with Multi Answer Type | 4 | 0 | 4 | 16 |
| Sec – III (Q.N : 53 – 58) | Questions with Comprehension Type  (2 Comprehensions – 3 + 3 = 6Q) | 3 | -1 | 6 | 18 |
| Sec – IV (Q.N : 59 – 60) | Questions with Matrix Matching | 8 | 0 | 2 | 16 |
| **Total** | | | | **20** | **74** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Subject** | **Physics** | **Chemistry** | **Mathematics** |
| **Preparation Branch** | CHE-CO-VEDAVYAS | HYD-SUPER-CO-SINDHU | HYD-NG-SCO |
| **Phone Number** | 8297334545 | 99486 97911 | 8179880239 |

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**Section – I (01 to 08)**

**(SINGLE CORRECT ANSWER TYPE)**

This section contains **8 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

1. Total number of electrons, protons and neutrons in  ion is

A) 92 B) 90 C) 94 D) 96

2. Select iso electronic set

A)  B) 

C)  D) 

3. How many Faraday are needed to reduce a mole of  to Mn+2

A) 4 B) 5 C) 3 D) 2

4. The number of electrons involved in electro deposition of 6.35 g of Cu from a solution of CuSO4

A) 6 x 1023 B) 3.011 x 1023 C) 12.04 x 1023  D) 6.02 x 1022

5. Which of the following is anodic reaction

A)  B) 

C)  D) All the above

6. Which of the following is a good conductor of electricity?

A) Diamond B) Plastic

C) Solid NaCl D) C (Graphite)

7. First member of alkyne series is

A) Acetylene B) Allylene C) Crotonylene D) Methyne

8. Which of the following is the molecular mass of methanoic acid

A) 6 B) 46 C) 60 D) 74

**Section – II (09 to 12)**

**(MULTIPLE CORRECT CHOICE TYPE)**

This section contains **4 multiple choice questions**. Each question has 4 options (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE than ONE** option can be correct.

9. Which of the following is 100 % ionised at any dilution ?

A) KCl B) HCN C) NaCl D) HCl

10. Isotone/s of  is/are

A)  B)  C)  D) 

11. Which of the following contains no.of electrons equal to Ar ?

A) P-3 B) S-2 C) O-2 D) Cl-

12. Which of the following is /are monohydric alcohols

A) Methanol

B) Isopropyl alcohol

C) Glycol

D) Glycerol

**Section – III (13 to 18)**

**(Comprehension TYPE)**

This section contains **2 Paragraphs**, each paragraph followed by **3 questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ON**E is correct.

**Paragraph for Questions 13 to 15**

When same quantity of charge is passed through different electrolytes, then the masses of different substances deposited at respective electrodes will be in the proportion of their equivalent weights.



 = constant



When m = E, then charge Q = 96500 columns

13. One Faraday of electricity will liberate 1 gram atom of the metal from the solution of

A) CuSO4 B) AgCl C) AuCl3 D) AlCl3

14. If 0.224 L of H2 (g) is formed at the cathode of one cell at STP, how much of Mg is formed at cathode of the other electrolytic cell arranged in series

A) 0.24 g B) 2.4 g C) 0.48 g D) 4.8 g

15. How many Faradays are required to reduce 1 mole of Al+3 ions into Al metal

A) 2 B) 3 C) 4 D) 1

**Paragraph for Questions 16 to 18**

Alkynes have extensive uses in real life.

16. Which of the following is used in manufacture of rubber ?

A) Methane B) Ethane C) Ethyne D) Formic acid

17. HC CH + xH2 CH3 – CH3. What is the value of x ?

A) 1 B) 4 C) 3 D) 2

18. Which of the following is alkyne ?

A) C2H4 B) C3H8 C) C3H4 D) C4H10

**Section – IV (19 to 20)**

**(Matrix -Match TYPE)**

This section contains **2 questions**. Each question has four statements **(a, b, c and d) given in Column - I** and **five statements (p, q, r, s and t) in Column - II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column - II. For example, if for a given question, statement b matches with the statements given in q and r, then for the particular question, against statement b, darken the bubbles corresponding to q and r in the ORS.

19. Match Column-I with column-II.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column-I** | | **Column-II** | |
| a) | Faraday’s first law | p) | 96500 C |
| b) | Chemical equivalent | q) | m = ZQ |
| c) | Faraday’s second law | r) | eF |
| d) | 1 Faraday | s) | = constant |
|  |  | t) | m = Zit |

20. Match Column-I with column-II.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column-I** | | **Column-II** | |
| a) | Isotopic number of 9F19 | p) | – COOR |
| b) | Marsh gas | q) | 13 |
| c) | Functional group of Ester | r) | 1 |
| d) | Vapour density of ethyne | s) | CH4 |
|  |  | t) | – COOH |

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Description automatically generated**

**Section – I (21 to 28)**

**(SINGLE CORRECT ANSWER TYPE)**

This section contains **8 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

21. The quadratic equation with rational coefficients whose one of the roots is  is

A)  B)  C)  D) 

22. Sum of the intercepts of the line passing through the points  is

A)  B)  C)  D) 

23. If the sum of the roots of the equation is equal to half of their product, then k =

A) 6 B) 7 C) 1 D) 5

24. Equation of the line which passes through the point (-4, 3) and the portion of the line intercepted between the axes is divided internally in the ratio 5: 3 by this point is

A) B) 

C)  D) 

25. Quadratic equation with roots 2 and -3 is

A)  B)  C)  D) 

26. The value of k, for which the system of equations  and  has a unique solution is

A)  B)  C)  D) 

27. The points (k, 3), (2, -4) and (-k +1, -2) are collinear. Then the value of k is

A)  B)  C)  D) 

28. The difference between two numbers is 26 and one number is three time the other. The numbers are

A) 39, 13 B) 41, 67 C) 96, 70 D)52, 26

**Section – II (29 to 32)**

**(MULTIPLE CORRECT CHOICE TYPE)**

This section contains **4 multiple choice questions**. Each question has 4 options (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE than ONE** option can be correct.

29. The solution set of the system of linear equations 2x +y = 6 and 4x + 6y = 4 is   
A) (4, -2) B) (6,4) C)  D) 

30. If the roots of the equation  are equal, then the value of m may be

A) 3 B) -4 C) -2 D) 5

31. If  are the roots of the equation x2 + 3x + 5 = 0, then

A)  B) 

C)  D) 

32. Which of the following is/are a solution of .

A) (4, 0) B) (–4, 6) C) (0, 3) D) (6, 4)

**Section – III (33 to 38)**

**(Comprehension TYPE)**

This section contains **2 Paragraphs**, each paragraph followed by **3 questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ON**E is correct.

**Paragraph for Questions 33 to 35**

If and  are the roots of the equation , then

33. =

A)  B)  C)  D) 

34. =

A)  B)  C)  D) 

35. =

A)  B)  C)  D) 

**Paragraph for Questions 36 to 38**

Consider the equation . Answer the following questions.

36. Sum of roots is

A) –8 B) 8 C) 4 D) –4

37. Product of roots is

A) 6 B) 8 C) 10 D) 12

38. The discriminant is

A) 4 B) 8 C) 16 D) 12

**Section – IV (39 to 40)**

**(Matrix -Match TYPE)**

This section contains **2 questions**. Each question has four statements **(a, b, c and d) given in Column - I** and **five statements (p, q, r, s and t) in Column - II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column - II. For example, if for a given question, statement b matches with the statements given in q and r, then for the particular question, against statement b, darken the bubbles corresponding to q and r in the ORS.

39. Match the column-I with column-II

The value of , if the lines  are

|  |  |  |  |
| --- | --- | --- | --- |
| **Column-I** | | **Column-II** | |
| a) | parallel to *y*-axis is | p) |  |
| b) | perpendicular to  is | q) |  |
| c) | passes through (1, 2) is | r) |  |
| d) | parallel to x axis is | s) |  |
|  |  | t) |  |

40 Match the column-I with column-II

Given  are the roots of the equation . Answer the following

|  |  |  |  |
| --- | --- | --- | --- |
| **Column-I** | | **Column-II** | |
| a) | = | p) | 18 |
| b) | = | q) | 13 |
| c) | = | r) |  |
| d) | = | s) | 36 |
|  |  | t) | -36 |

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**Section – I (41 to 48)**

**(SINGLE CORRECT ANSWER TYPE)**

This section contains **8 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

41. An object ‘A’ is moving with and ‘B’ is moving with in the same direction (positive x-axis). Find velocity of ‘B’ with respect to ‘A’

A)  B) 

C)  D) None

42. A man is running in the north direction while his child is running in the east direction at the same speed then, the relative velocity of the man with respect to the child will be in

A) South - east direction B) North - west direction

C) East direction D) South - west direction

43. Rain is falling vertically with a velocity of 10 ms–1 and a man is moving with velocity . Find the angle with the vertical at which the main should hold his umbrella to avoid getting wet.

A)  B) 

C)  D) 

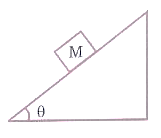
44. A boat crosses a river of width 200 m in the shortest time and is found to experience a drift of 100 m in reaching the opposite bank. The time taken now is ‘t’. If the same boat is to cross the river by shortest path, the time taken to cross will be

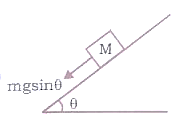
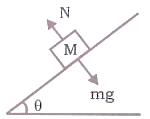
A) 2t B)  C) 3t D) 

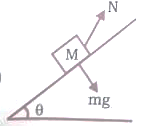
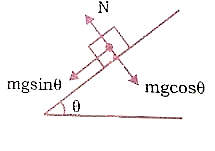
45. An Aeroplane has to travel 160 km due east to point ‘B’ from point ‘A’. it can fly at 100 kmph in still air. There is a wind at 60 kmph blowing from the south find the time taken for the trip.

A) 1h B) 2h C) 3h D) 5h

46. The free body diagram of a block ‘M’ placed on a smooth inclined plane as shown



A) B)

C)  D) 

47. When a horse pulls a cart the force that helps the horse to move forward is the force exerted by

A) The cart on the horse B) The ground on the horse

C) The ground on the cart D) The horse on the ground

48. A body of weight w1 is suspended from the ceiling of a room through a chain of weight w2. The ceiling pulls the chain by a force

A) w1 B) w2 C) w1 +w2 D) 

**Section – II (49 to 52)**

**(MULTIPLE CORRECT CHOICE TYPE)**

This section contains **4 multiple choice questions**. Each question has 4 options (A), (B), (C) and (D) for its answer, out of which **ONE OR MORE than ONE** option can be correct.

49. Which of the following statements are correct for action and reaction forces.

A) Theses acts on two different bodies.

B) These are equal in magnitude but opposite in direction

C) These act on a single body

D) These are equal in magnitude but same in direction

50. A 3kg mass is moving in a plane with it’s  and co-ordinates given by and . Then at seconds

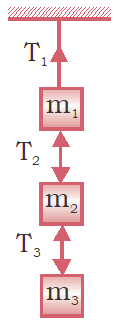
A) The net acceleration is 

B) The net acceleration is 

C) The net force acting on 3kg mass is 112.8N

D) The net force acting on 3kg mass is 146N

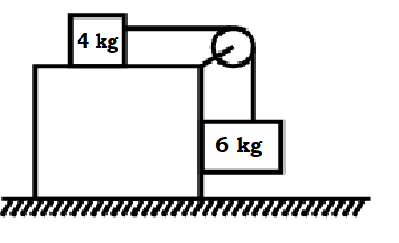
51. A system consists three bodies of different masses are in contact as shown in the figures then



A) T3 = m3 g B) T2 = T1 + (m3 + m2)g

C) T2 = (m2+ m3)g 4 D) T1 = (m1+ m2 + m3)g

52. In the given arrangement all the surfaces friction less then



A) Tension in the string is 24 N

B) Force exerted by string on pulley is 

C) The acceleration of the blocks is 6 m/s2

D) The net force on 4 kg block is 12 N

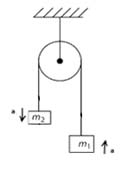
**Section – III (53 to 58)**

**(Comprehension TYPE)**

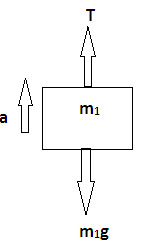
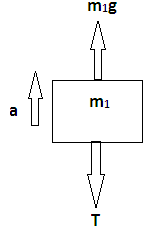
This section contains **2 Paragraphs**, each paragraph followed by **3 questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ON**E is correct.

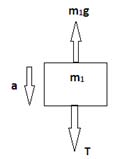
**Paragraph for Questions 53 to 55**

Two masses ‘’ and ‘’ are attached to a flexiable inextensible massless rope which passes our a frictionless and mass less pully as shown 

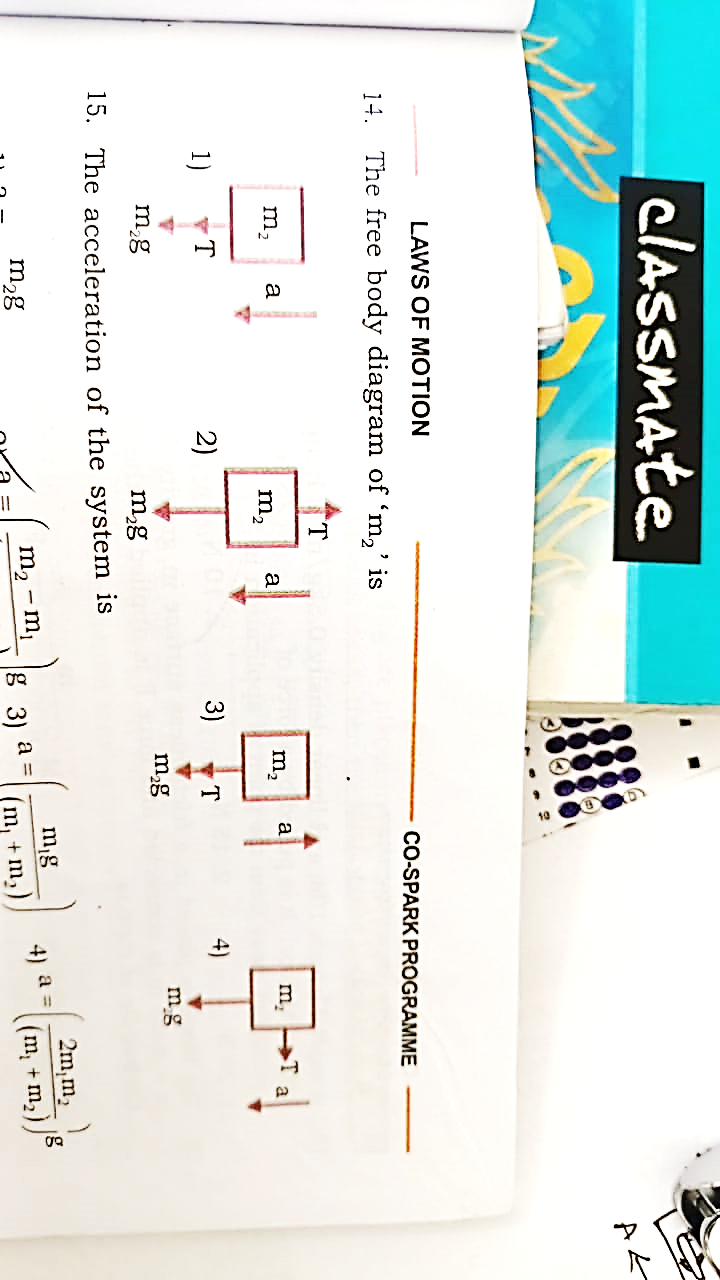
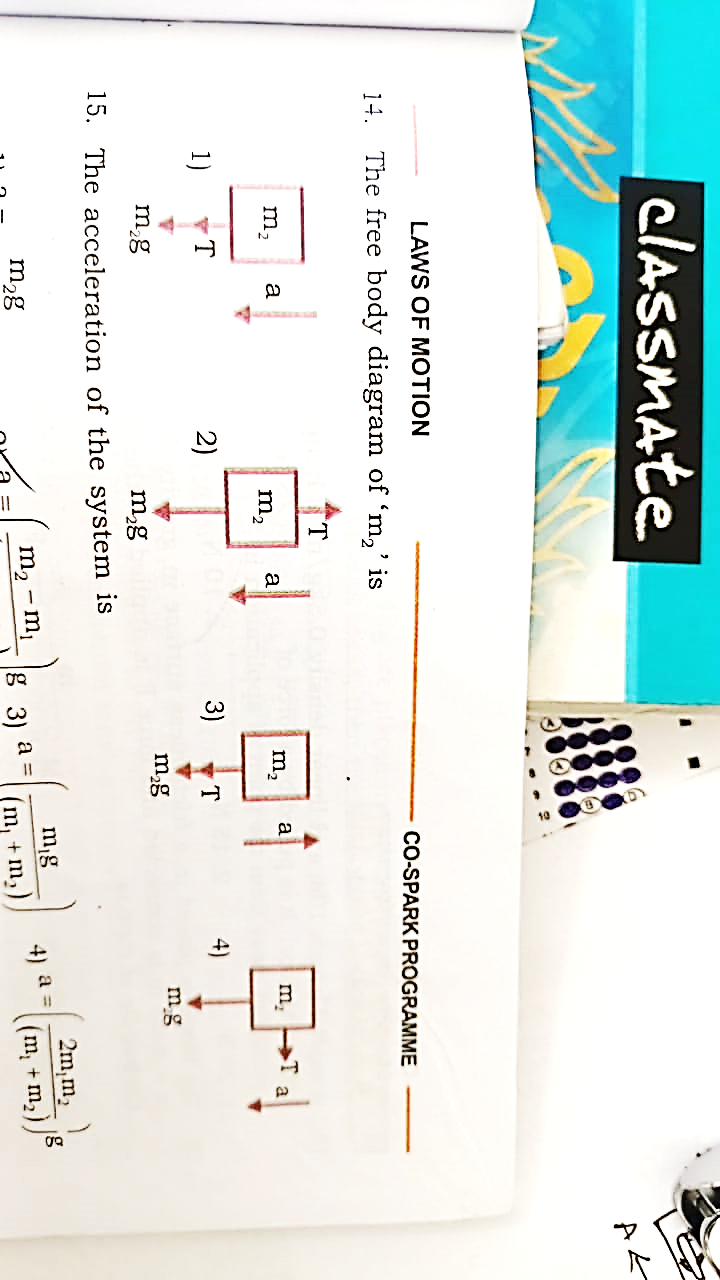


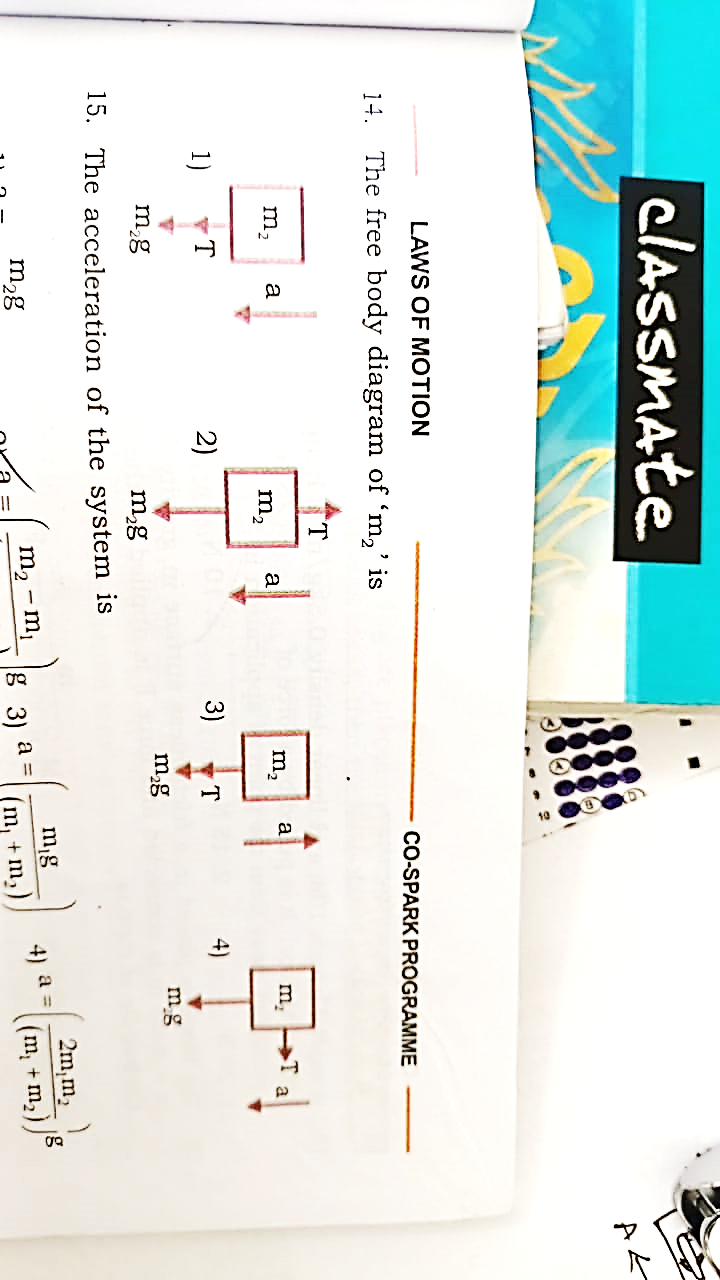
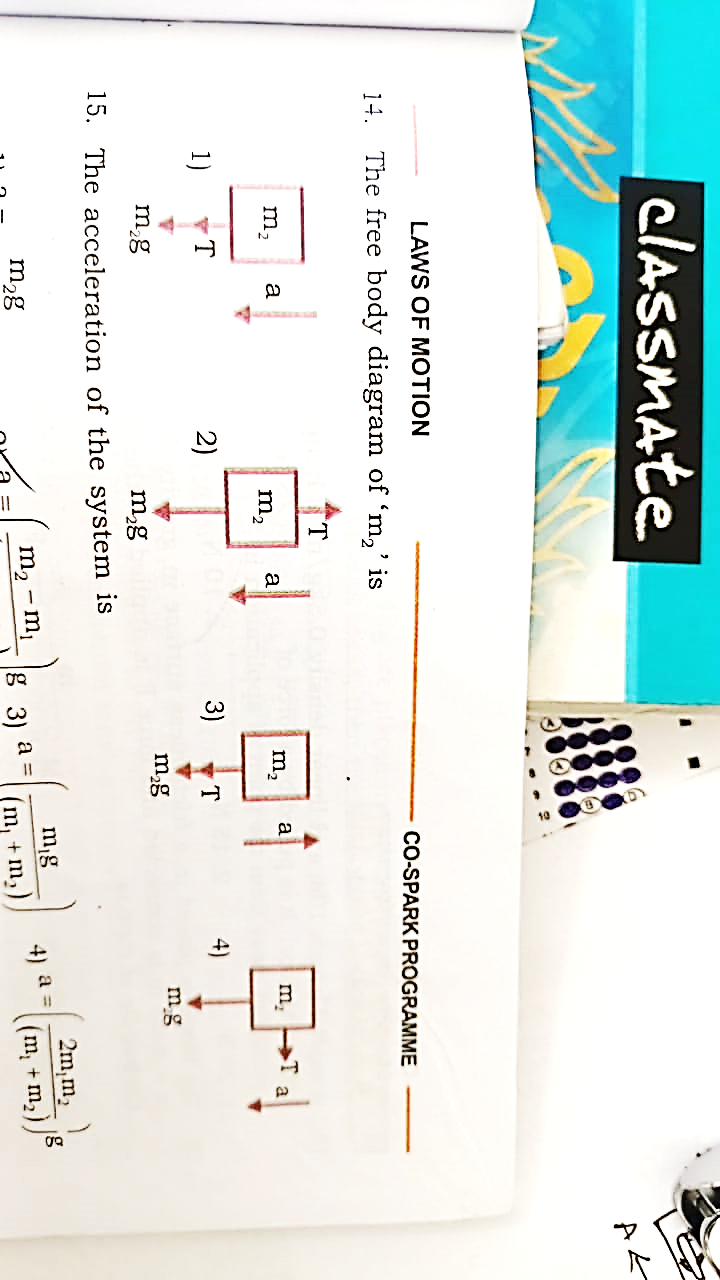
53. The force body diagram of 

A) B)

C)  D) None

54. The free body diagram of ‘’is

A) B) 

C)  D) 

55. The acceleration of the system is

A)  B) 

C)  D) 

**Paragraph for Questions 56 to 58**

Relative velocity of a particle (objects) A with respect to B is defined as the velocity with which A appears to moved is B if considered to be at rest. In other words, it is the velocity with which A appears to moves as seen by the B considering itself to be at rest.

56. A boy is climbing vertically a tree with a speed of 5ms–1 and a man is running towards the tree with 10ms–1. Velocity of man relative to boy is

A) 5ms–1 B) 15ms–1

C) ms–1 D) ms–1

57. A ship A streams due north at a speed of 8kmph and a ship B due west at a speed of 6kmph. The velocity of ‘A’ relative to B is

A) 10kmph B) 20 kmph

C) 14 kmph D) 2 kmph

58. A motor car A is moving north east with velocity 200 km/hr and another car B is moving north - west with a velocity 100 km/hr. What is the relative velocity of B w.r.t A?

A) 400 km/hr B) 291.5 km/hr

C) 100 km/hr D)  km/hr

**Section – IV (59 to 60)**

**(Matrix -Match TYPE)**

This section contains **2 questions**. Each question has four statements **(a, b, c and d) given in Column - I** and **five statements (p, q, r, s and t) in Column - II**. Any given statement in Column I can have correct matching with **ONE or MORE** statement(s) given in Column - II. For example, if for a given question, statement b matches with the statements given in q and r, then for the particular question, against statement b, darken the bubbles corresponding to q and r in the ORS.

59. Match Column-I with column-II.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column-I** | | **Column-II** | |
| a) | Newton’s I law | p) | Inertia |
| b) | Newton’s II law | q) |  |
| c) | Newton’s III law | r) | Mass × velocity |
| d) | Momentum | s) | Action = –reaction |
|  |  | t) | F = ma |

60. If is the velocity of first body and is the velocity of the second body, then match the column-I with column-II

|  |  |  |  |
| --- | --- | --- | --- |
| **Column-I** | | **Column-II** | |
| a) | Relative velocity of 1st body with respect to 2nd body | p) |  |
| b) | Relative velocity of 2nd body with respect to 1st body | q) |  |
| c) | Magnitude of relative velocity if ‘’ is the angle between them | r) |  |
| d) | Magnitude of relative velocity if angle between the velocities is | s) |  |
|  |  | t) |  |

