FIITJEE Talent Reward Exam

for student presently in
Class 9

A

PAPER–2

Time: 3 Hours | **CODE A9** | ***Maximum Marks: 258***

Instructions:

Caution: Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.

1. You are advised to devote 1 Hour on Section-I and 2 Hours on Section-II and Section-III.

2. This Question paper consists of 3 sections. All questions will be multiple choice single correct out of four choices with marking scheme in table below:

Section			Question no.	Marking Scheme for each question	
				correct answer	wrong answer
SECTION – I (IQ)			Q. 1 to 11	**+2**	**0**
			Q. 12 to 17	**+3**	**–1**
			Q. 18 to 22	**+6**	**–2**
SECTION – II (SCIENCE & MATHEMATICS)	Part –A	Physics	Q. 23 to 27	**+4**	**–1**
	Part –B	Chemistry	Q. 28 to 32	**+4**	**–1**
	Part –C	Mathematics	Q. 33 to 37	**+4**	**–1**
	Part –D	Biology	Q. 38 to 42	**+4**	**–1**
SECTION – III (SCIENCE & MATHEMATICS)	Part –A	Physics	Q. 43 to 48	**+6**	**–2**
	Part –B	Chemistry	Q. 49 to 54	**+6**	**–2**
	Part –C	Mathematics	Q. 55 to 60	**+6**	**–2**

3. Answers have to be marked on the OMR sheet.

4. The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.

5. Blank papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

6. **Before attempting paper write your Name, Registration number** and **Test Centre** in the space provided at the bottom of this sheet.

Note:

Check all the sheets of this question paper. Please ensure the same SET is marked on header of all the sheets inside as indicated above 'Maximum Marks' of this page. In case SET marked is not the same on all pages, immediately inform the invigilator and CHANGE the Questions paper.

Registration Number : ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Name of the Candidate : _____

Test Centre : _____

Section-I

IQ

1. Amit said, "This girl is the wife of the grandson of my mother". How is Amit related to the girl?
(A) Father (B) Husband
(C) Father-in-law (D) Grandfather

2. In a certain language, If SON = 33, AMIT = 65, then RADHA = ?
(A) 113 (B) 123
(C) 103 (D) 129

Directions (Q. 3 to 5): Find the missing term.

3. 2, 5, 10, 50, 500, _____
(A) 5000 (B) 2500
(C) 50000 (D) 25000

4. 100, 144, 196, 256, _____
(A) 324 (B) 400
(C) 289 (D) 484

5. 2, 3, 5, 10, 18, 33, _____
(A) 63 (B) 61
(C) 70 (D) 66

Directions (Q. 6 to 7): Choose the odd one which is different from rest.

6. (A) 512 (B) 729
(C) 1728 (D) 3275

7. (A) LO (B) GT
(C) KQ (D) IR

8. One day Ram left office and cycled 10 km southwards, turned right and cycled 5 km then turned right and cycled 10 km and again turned left and cycled 10 km. How many kms will he have to cycle to reach his office straight?
(A) 10 km (B) 15 km
(C) 20 km (D) 25 km

Space for Rough Work

9. Each letter of the alphabet from Z to A has been given a value from 1 to 26 serially (i.e., Z = 1, Y = 2, X = 3, ……..A = 26). What is the total value of the word 'CONSEQUENCE'?
(A) 137 (B) 154
(C) 176 (D) 196

10. Radha ranks seventh from the top and twenty-sixth from the bottom in a class. How many students are there in the class?
(A) 31 (B) 32
(C) 33 (D) 34

11. In a group of cows and hens, the number of legs are 14 more than twice the number of heads. The number of cows is:
(A) 5 (B) 7
(C) 10 (D) 12

Directions (Q. 12 to 17): Study the following information and answer the questions given below:
M, N, P, R, T, W, F and H are sitting around a circle facing the centre. P is third to the left of M and second to the right of T. N is second to the right of P. R is second to the right of W, who is second to the right of M. F is not an immediate neighbour of P.

12. Who is to the immediate right of P?
(A) H (B) F
(C) R (D) Data inadequate

13. Who is to the immediate right of H?
(A) R (B) F
(C) M (D) None of these

14. Who is to the immediate left of R?
(A) P (B) H
(C) T (D) W

15. Who is third to the right of H?
(A) T (B) W
(C) R (D) F

16. Who is second to the right of F?
(A) M (B) R
(C) T (D) Data inadequate

17. In which of the following is the first person sitting in between the second and the third person?
(A) NHM (B) PHN
(C) TRP (D) TWF

Space for Rough Work

Directions (Q. 18 to 22): Study the following information carefully and answer the questions given below:
A, B, C, D, E, F, G and H are eight students of a school. They study in Standard VI, VII and VIII with not more than three in any standard. Each of them has a favourite subject from Physics, Geography, English, Marathi, Mathematics, Chemistry, Biology and Economics but not necessarily in the same order. D likes Chemistry and studies in standard VIII with only H. B does not study in standard VII. E and A study in the same standard but not with B. C and F study in the same standard. Those who study in standard VI do not like mathematics or Biology. F likes Physics. The one who studies in standard VIII likes English. C does not like Geography. A's favourite subject is Marathi and G does not like Biology.

18. Which subject does H like?
(A) English (B) Marathi
(C) Science (D) Data inadequate

19. What is G's favourite subject?
(A) Biology (B) Physics
(C) Marathi (D) Mathematics

20. What is C's favourite subject?
(A) Economics (B) Biology
(C) English (D) Geography

21. Which of the following combinations of student – standard – Subject is correct?
(A) C – VII – Economics (B) D – VI – Chemistry
(C) G – VII – Physics (D) H – VIII – English

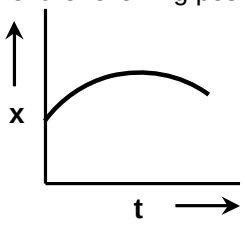
22. Which of the following group of students study in VII standard?
(A) EAF (B) EGC
(C) EAG (D) None of these

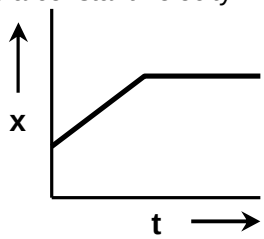
Space for Rough Work

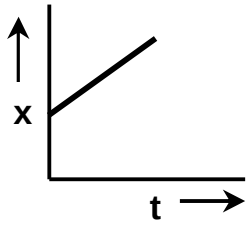
Section-II Science and Mathematics (PCMB)

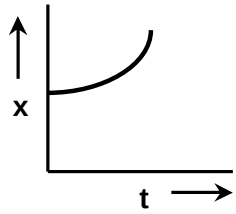
Physics (Part – A)

23. Which of the following position-time graphs represents a constant velocity motion?

(A) 

(B) 

(C) 

(D) 

24. A truck starts from rest and rolls down a hill with constant acceleration. It travels distance of 400 m in 20 sec. Its acceleration is
(A) 2 m/s^2 (B) 4 m/s^2
(C) 6 m/s^2 (D) 0.2 m/s^2

25. A resultant force of 20 N gives a body of mass m an acceleration of 8 m/s^2 and a body of mass m′ acceleration of 24 m/s^2. What acceleration will this force cause the two masses to acquire if fastened together.
(A) 6 m/s^2 (B) 12 m/s^2
(C) 18 m/s^2 (D) 24 m/s^2

26. A planet is in circular orbit around the Sun. Its distance from the Sun is four times the average distance of Earth from the Sun. The period of this planet, in Earth years, is:
(A) 4 (B) 8
(C) 16 (D) 64

27. A closed compartment containing a gas is moving with some acceleration in horizontal direction. Neglect effect of gravity. Then the pressure in the compartment is
(A) same everywhere (B) lower in the front side
(C) lower in the rear side (D) higher in the upper side

Space for Rough Work

Chemistry (Part – B)

28. The physical state of a substance depends upon its
(A) Temperature (B) Mass
(C) Volume (D) All of the above

29. Sodium sulphate and barium sulphate mixture can be separated by
(A) Crystallization (B) Chromatography
(C) Fractional Distillation (D) Filtration and crystallization

30. The formula of the phosphate of an element R is RPO_4, then the formulae of its hydroxide and sulphide respectively are _____ and _____.
(A) $R(OH)_3$ and R_3S_2 (B) $R(OH)_2$ and R_2S_3
(C) $R(OH)_2$ and R_3S_2 (D) $R(OH)_3$ and R_2S_3

31. Consider the following quantities:
(P) Mass number
(Q) Average mass of a carbon atom in amu
(R) The charge of nucleus in coulomb
(S) Atomic Mass of a carbon – 12 in grams
Now choose the correct option:
(A) Only (P) is whole number
(B) Only (P) and (R) are whole numbers
(C) Only (P) and (S) are whole numbers
(D) Only (R) and (S) are whole numbers

32. Addition of potassium nitrate to ice results in
(A) Increase in melting point (B) Decrease in melting point
(C) Change in colour of ice (D) Both (A) and (C)

Space for Rough Work

Mathematics (Part – C)

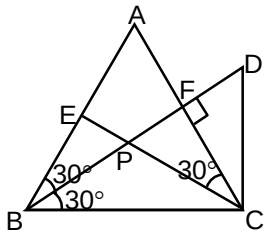
33. If both 121 and 27 are the factors of the number $2^8 \times 3^2 \times 13^{11} \times n$, then the smallest such n is
(A) 66 (B) 363
(C) 242 (D) 81

34. $x^3 - 3 = 0$ has
(A) one rational root (B) one integral root
(C) one irrational root (D) none of these

35. $x^2 - 4x = 0$ has a root α and $x^2 + 4x = 0$ has a root $(-\alpha)$, then α can be
(A) 1 (B) 2
(C) 3 (D) 4

36. Three points of a triangle ABC are A (4, 1), B (5, – 1) and C (7, 2), the triangle lies in
(A) 1st and 2nd quadrant (B) 2nd and 3rd quadrant
(C) 1st and 4th quadrant (D) 2nd quadrant

37. In the adjoining figure, find BP : PD ($\angle BCD = 90°$)
(A) 1
(B) 1/2
(C) 3/2
(D) 4/2



Space for Rough Work

Biology (Part – D)

38. "Operation flood" is related to
(A) Green Revolution
(B) Brown Revolution
(C) White Revolution (Milk Production)
(D) Flood and disaster management

39. Which of the following gas is a CFC that is used in refrigerator?
(A) Methane
(B) Ammonia
(C) Carbon dioxide
(D) Freon

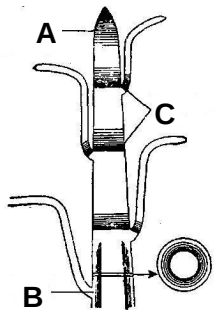
40. Match the following with correct combination

Column – I		Column – II	
(a)	Sphaerosomes	(1)	Store oils or fats
(b)	Peroxisomes	(2)	Stack of cisternae
(c)	Elaioplasts	(3)	Detoxification of drugs
(d)	Dictyosomes	(4)	Synthesis and storage of lipids

(A) (a $\rightarrow$ 1), (b $\rightarrow$ 2), (c $\rightarrow$ 4), (d $\rightarrow$ 3)
(B) (a $\rightarrow$ 4), (b $\rightarrow$ 3), (c $\rightarrow$ 2), (d $\rightarrow$ 1)
(C) (a $\rightarrow$ 4), (b $\rightarrow$ 3), (c $\rightarrow$ 1), (d $\rightarrow$ 2)
(D) (a $\rightarrow$ 4), (b $\rightarrow$ 1), (c $\rightarrow$ 3), (d $\rightarrow$ 2)

41. While doing work and running, you move your organs like hands, legs etc. which one among he following is correct?
(A) Skeletal muscles contract and pull the ligament to move the bones
(B) Skeletal muscles contract and pull the tendons to move the bones
(C) Smooth muscles contract and pull the ligament to move the bones
(D) Smooth muscles contract and pull the tendon to move the bones.

42. The given figure shows the position of different meristems as seen in a longitudinal section of the main axis. Identify A, B and C
(A) A = Lateral meristem, B = Intercalary meristem, C = Apical meristem
(B) A = Apical meristem, B = Lateral meristem, C = Intercalary meristem
(C) A = Apical meristem, B = Intercalary meristem, C = Lateral meristem
(D) A = Intercalary meristem, B = Lateral meristem, C = Apical meristem

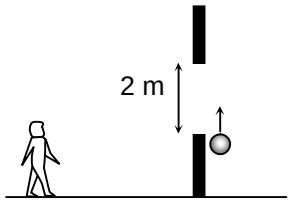


Space for Rough Work

Section-III Science & Mathematics (PCM)

Physics (Part – A)

43. A boy spots a ball that goes up past an open window. The ball, which passes very close to the window, is in view of the boy for 0.25 s while going up, and the top-to-bottom height of the window is 2.0 m. What is the ball's upward velocity at the bottom of the window? (Take g = 10 m/s^2)



(A) 8.00 m/s (B) 8.575 m/s
(C) 9.25 m/s (D) 18.5 m/s

44. A certain object floats in fluids of density
1. $0.9\rho_0$
2. ρ_0
3. $1.1\rho_0$
Rank these fluids according to the volume displaced by the object, least to greatest.
(A) 1, 2, 3 (B) 3, 2, 1
(C) 2, 3, 1 (D) 3, 1, 2

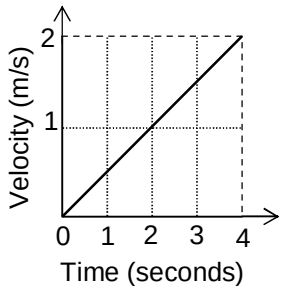
45. A particle moves along the x axis from x_i to x_f. For which of the following values of the initial and final coordinates, the displacement will have the largest magnitude?
(A) $x_i = 4m$, $x_f = 6m$ (B) $x_i = -4m$, $x_f = -8m$
(C) $x_i = -4m$, $x_f = 2m$ (D) $x_i = -4m$, $x_f = 4m$

46. In the shown figure, if F = 20 N, $m_1 = m_2 = 3$ kg and the acceleration is 0.5 m/s^2. If the friction forces on the two blocks are equal, what is the magnitude of frictional force on either block?

(A) 10 N (B) 17 N
(C) 8.5 N (D) 0

Space for Rough Work

47. The velocity-time graph of a particle of mass 50 g moving in a fixed direction is shown in figure. The force on the particle is



(A) 25 N
(B) 25×10^{-1} N
(C) 25×10^{2} N
(D) 25×10^{-3} N

48. An elevator starts from rest with a constant upward acceleration. It moves 2 m in the first 0.6 s. A passenger in the elevator is holding a 3 kg package by a vertical string. The tension in the string during acceleration is (Take g = 9.8 m/s^2)

(A) 60.7 N
(B) 61.7 N
(C) 62.7 N
(D) 63.0 N

Space for Rough Work

Chemistry (Part – B)

49. Which one of the following is a correct statement?
(P) Ice provides more cooling effect than water at 273 K
(Q) Evaporation of a liquid causes cooling
(R) Increase of Pressure decreases the separation between the particles of matter
(A) P and Q
(B) P and R
(C) Q and R
(D) P, Q and R

50. Pressure of a gas is due to
(A) Space between the gas molecules
(B) Molecular impact on the wall of the container
(C) Intermolecular collisions
(D) High kinetic energy of the gas molecule

51. The molecular weight of a compound whose atomicity is five is 160, then it is
(A) Ca_3P_2(At. Wt. of Ca=40, P=31)
(B) Fe_2O_3(At. Wt. of Fe=56, O=16)
(C) Al_2O_3(At. Wt. of Al=27, O=16)
(D) Mg_3N_2(At. Wt. of Mg=24, N=14)

52. The ratio of oxygen atoms present in one molecule of cupric nitrite and ferric sulphite is
(A) 4 : 9
(B) 2 : 3
(C) 1 : 2
(D) 1 : 3

53. P, Q, R, S are four gases, If the order of their critical temperature is as follows: S < Q < R < P, which of the following gas has the highest boiling point?
(A) P
(B) Q
(C) R
(D) S

54. Which among the following pairs are separated by using the principle of dissolution in suitable solvent?
(A) SO_2 and N_2O_5, KOH as solvent
(B) SO_2 and NO_2, KOH as solvent
(C) SO_2 and N_2O_3, KOH as solvent
(D) SO_2 and NO, KOH as solvent

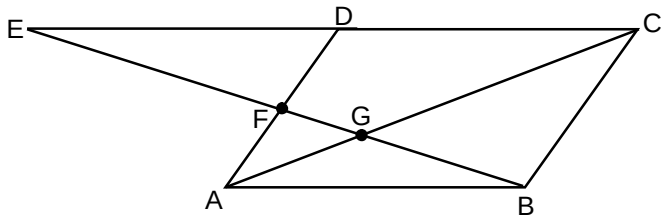
Space for Rough Work

Mathematics (Part – C)

55. Highest common factor of $21m + 4$ and $14m + 3$ (where $m \in N$) can be
(A) 2 (B) 5
(C) 9 (D) none of these

56. Certain divisor gives remainder 8, 9 and 4 when numbers 242, 698 and 940 respectively are divided by it. The value of divisor is
(A) 13 (B) 12
(C) 11 (D) 14

57. In the given figure, ABCD is a parallelogram and F is mid-point of AD. What is $\frac{EF}{FG}$?



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

58. $a^2 + b^2 = 7$ and $a^3 + b^3 = 10$, then greatest value of $a + b$ can be
(A) 4 (B) 5
(C) 6 (D) 9/2

59. $(2x + 3y)$ is divisible by 17, then for what value of k; $(9x + ky)$ is divisible by 17
(A) 3 (B) 5
(C) 7 (D) 9

60. Which of these cannot be equal to m^2? Where $m, n \in N$
(A) $n^5 - 4$ (B) n^3
(C) $n^2 + 5$ (D) $n^3 + 1$

Space for Rough Work

FIITJEE TALENT REWARD EXAM

(FTRE-2013)

CLASS IX

HINTS (SET-A)
PAPER-2

1. (C) Father-in-law

2. (C) RADHA = 9 + 26 + 23 + 19 + 26 = 103
i.e. sum of positional value of alphabets in reverse order.

3. (D) $2 \times 5 = 10$, $5 \times 10 = 150$, $10 \times 50 = 500$
$\therefore$ $50 \times 500 = 25000$

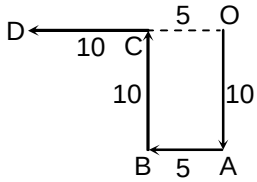
4. (A) 10^2, 12^2, 14^2, 16^2
$\therefore$ $18^2 = 324$

5. (B) $2 + 3 + 5 = 10$, $3 + 5 + 10 = 18$, $5 + 10 + 18 = 33$
$\therefore$ $10 + 18 + 33 = 61$

6. (D) Other three are perfect cube.

7. (C) Sum of other three letters is 27.

8. (B) $\therefore$ DO = 10 + 5 = 15 km

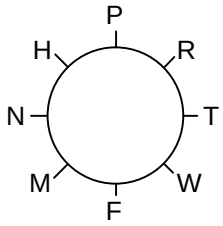


9. (C) Total value of word 'CONSEQUENCE' is 176.

10. (B) Total students = 7 + 26 – 1 = 32.

11. (B) The number of cows is 7.

Directions (Solution for Q. 12 to 17):



12. (A)

13. (D)

14. (C)

15. (D)

16. (C)

17. (A)

Directions (Solution for Q. 18 to 22):

Student	Class	Favourite Subject
A	VII	Marathi
B	VI	Geography
C	VI	Economics
D	VIII	Chemistry
E	VII	Biology
F	VI	Physics
G	VII	Mathematics
H	VIII	English

18. (A)

19. (D)

20. (A)

21. (D)

22. (C)

23. If position time graph is straight line, it will represent a constant velocity motion.

24. $S = ut + \frac{1}{2}at^2$

$\Rightarrow \quad 400 = 0 + \frac{1}{2}a \times 400$

$\Rightarrow \quad a = 2\ m/s^2$

25. $m = \frac{20}{8} = \frac{5}{2}kg$

$m' = \frac{20}{24} = \frac{5}{6}kg$

$$M = m + m' = \frac{20}{6}$$

$$a = \frac{20}{M} = 6 \text{ m/s}^2$$

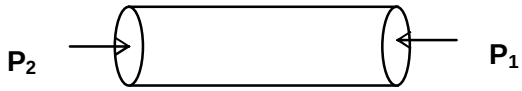
26. $T^2 \propto a^3$

$$\Rightarrow \left(\frac{T_1}{T_2}\right)^2 = \left(\frac{a_1}{a_2}\right)^3$$

$$\Rightarrow \left(\frac{T_1}{1}\right) = \left(\frac{4r}{r}\right)^3$$

$\Rightarrow$ $T_1 = 8$ years

27. The pressure in the compartment is lower in the front side



$P_2 > P_1$

28. Physical state of a substance doesn't depends upon the mass or volume of the substance.

29. Barium sulphate is insoluble in water. So the mixture can be separated by filtration followed by crystallization.

30. Valency of R is 3. Hence its hydroxide and sulphide respectively will be $R(OH)_3$ and R_2S_3.

31. Mass number of an element is a whole number.

32. Addition of impurities to solution or solvent decreases the freezing point / melting point of the system (solution/solvent).

33. $n = 11^2 \cdot 3$

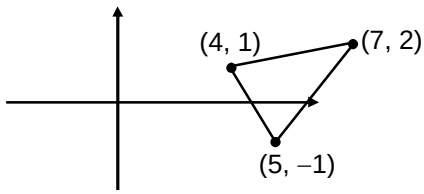
34. $(x^3 - 3)$

$= \left(x - \sqrt[3]{3}\right)\left(x^2 + \sqrt[3]{3^2} + x\sqrt[3]{3}\right)$

which has only one irrational root.

35. Hence $\alpha = 0$ or $\alpha = 4$.

36. 1st and 4th quadrant



37. ΔABC is equilateral

38. Operation flood, a project of (NDDB) National Dairy Development Board- made India the largest milk producer in the world.

39. Freon are used as safe refrigerant because of its non-toxic, non-corrosive, non-flammable and non-reactive. They are part of chemicals known as Chlorofluorocarbon (CFCs).

40. **Sphaerosomes** (oleosomes) are small membrane bound organelles which takes part in storage and synthesis of fats.
Peroxisomes: These contain oxidative enzymes and detoxify various toxic substances that enter the blood.
Elaioplasts are type of leucoplast i.e. specialised for the storage of lipids in plants.
Dictyosomes are golgi apparatus (stacks of cisternae) in plant cells.

41. Skeletal muscles attached to bones by bundles of collagen fibres known as tendons.

42. **Apical meristem** present at the tip of the root and stem commonly called root apex and shoot apex respectively.
Intercalary meristem : it occurs between permanent tissues, it is particularly common at the nodal regions.
Lateral meristem : It occurs laterally, parallel to the long axis of the plant body.

43. $S = ut + \frac{1}{2}at^2$

$\Rightarrow \quad 2 = u \times \frac{1}{4} - \frac{1}{2} \times 10 \times \frac{1}{16}$

$\Rightarrow$ u = 9.25 m/s

44. According to force of buoyancy

$V\rho g = mg \Rightarrow v = \frac{m}{\rho}$

So, 3, 2, 1

45. magnitude of displacement = $|x_f - x_i|$

46. $a = \frac{F = 2f_k}{m}$

$\Rightarrow \quad F - 2f_k = 6 \times 0.5$

$\Rightarrow \quad f_k = 8.5$ N

47. $a = \tan\theta = 2/4 = 1/2$ m/s^2

$F = ma = 50 \times 10^{-3} \times \frac{1}{2} = 25 \times 10^{-3}$ Newton

48. $S = ut + \frac{1}{2}at^2$

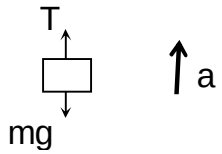
$\Rightarrow \quad 2 = 0 + \frac{1}{2} \times a \times 0.6 \times 0.6$

$a = \frac{4 \times 100}{6 \times 6} = \frac{100}{9}$ m/s^2

$T - mg = ma$

$T = m(g + a)$

$= 3 \times \left(9.8 + \frac{100}{9}\right) = 62.7$ N



49. All statements are correct.

50. Pressure is defined as the force exerted by particles per unit area. Hence, a gas exert pressure due to the impact (force) of the particles on the walls of the container.

51. At weight of Fe = 56 and O = 16. Therefore the molecular mass of Fe_2O_3 =(2×56) + (3×16) = 160

52. $Cu(NO_2)_2$ and $Fe_2(SO_3)_3$
$\therefore$ Ratio of O–atoms
= 4 : 9.

53. The gas P has the highest critical temperature, hence its boiling point will also be highest among all.

54. NO is neutral in nature where as SO_2 is acidic, so SO_2 will combine with basic solvent KOH.

55. $3 (4m + 3) - 2 (21m + 4) = 1$
Also, $14m + 3$ is not divisible by 2
and $21m + 4$ is not divisible by 3.
Hence H.C.F. is 1.

56. Let it be k,
$242 = nk + 8$, $698 = mk + 9$, $940 = lk + 4$.
Solve for k.

57. $\frac{AF}{BC} = \frac{GF}{BG} = \frac{1}{2}$
Also, EC = 2AB.

58. $a + b = x$ (say), then
$x^2 = a^2 + b^2 + 2ab$
$x^3 = a^3 + b^3 + 3ab (a + b)$
Eliminating ab, we get $x^3 - 21x + 20 = 0$
So, x = 1 or 4 or – 5.

59. $4 (2x + 3y) + (9x + 5y) = 17 (x + y)$
If $2x + 3y = 17n$, then $9x + 5y = 17 ((x + y) - 4n)$
Hence divisible by 17.

60. $8^2 = 4^3$, $3^2 = 2^2 + 5 = 2^3 + 1$
to prove (A) take $m = 11k + p$, $n = 11k + q$.