FIITJEE INTERNAL TEST

SECOND YEAR 2018-20

JEE MAINS

REVISION-2 PART TEST - 2

Time: 3 hours **Maximum Marks: 300**

INSTRUCTIONS: **26th April 2020**

Instructions to the Candidates

A. General

1. This booklet is your Question Paper containing 75 questions.
2. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers and electronic gadgets in any form are not allowed to be carried inside the examination hall.
3. Fill in the boxes provided for Name and Enrolment No.
4. The answer sheet, a machine-readable Objective Response (ORS), is provided separately.
5. DO NOT TAMPER WITH / MULTILATE THE ORS OR THE BOOKLET.

B. Filling in the OMR:

6. The instructions for the OMR sheet are given on the OMR itself.

C. Question paper format:

7. The question paper consists of **3 parts (Mathematics, Physics and Chemistry)**. Each part consists of **two sections**.
8. **Section I** contains **20 Multiple Choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONE** is correct.
9. **Section II** contains **5 questions**. Each question is numerical value. For each question, enter the correct numerical value (in decimal notation, truncated/rounded-off to second decimal place.

   (e.g. 6.25, 7.00, - 0.33, - .30, 30.27, - 127.30)
10. **Q.No. 21-25, 46-50, 71-75** are Numerical based questions with answer is of the type xxxx.xx. Suppose your answer is 25.3 (example-1) you need to write answer as 0025.30, if your answer is only 1 (example-2) then you have bubble like 0001.00 and bubble accordingly including zero's and dot.

D. Marking Scheme

11. For each question in **Section I**, you will be awarded **4 marks** if you darken ALL the bubble(s) corresponding to the correct answer(s) **ONLY**. In all other cases **zero (0) marks** will be awarded. **–1 negative marks** will be awarded for incorrect answers in this section.
12. For each question in **Section II**, you will be awarded **4 marks** if you darken the bubble corresponding to the correct answer **ONLY.** In all other cases **zero (0) marks** will be awarded. **No negative marks** will be awarded for incorrect answers in this section.

Don't write / mark your answers in this question booklet.

If you mark the answers in question booklet, you will not be allowed to continue the exam.

NAME: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ENROLLMENT NO.: ☐☐☐☐☐☐☐☐☐☐

MATHEMATICS

Single Correct Answer Type

1. Let D, E, F be the midpoints of the sides BC, CA, and AB respectively of ΔABC. Then $\overrightarrow{AD}+\overrightarrow{BE}+\overrightarrow{CF}$ equals
(A) $\vec{0}$ (B) 0 (C) 2 (D) none of these

2. If the points $P\left(\vec{a}+2\vec{b}+\vec{c}\right)$, $Q\left(2\vec{a}+3\vec{b}\right)$, $R\left(\vec{b}+t\vec{c}\right)$ are collinear, where $\vec{a}$, $\vec{b}$, $\vec{c}$ are three non-coplanar vectors, the value of t is
(A) -2 (B) $-\frac{1}{2}$ (C) $\frac{1}{2}$ (D) 2

3. ABCD is a parallelogram with AC and BD as diagonals. Then $\overrightarrow{AC}-\overrightarrow{BD}=$
(A) $4\overrightarrow{AB}$ (B) $3\overrightarrow{AB}$ (C) $2\overrightarrow{AB}$ (D) $\overrightarrow{AB}$

4. If $\vec{a}$, $\vec{b}$ are unit vectors such that $\left|\vec{a}+\vec{b}\right|=1$, then $\left|2\vec{a}-3\vec{b}\right|=$
(A) 19 (B) $\sqrt{19}$ (C) $\sqrt{13}$ (D) 4

5. A non-zero vector $\vec{a}$ is parallel to the line of intersection of the plane determined by the vectors $\hat{i}$, $\hat{i}+\vec{j}$ and the plane determined by the vectors $\hat{i}-\vec{j}$, $\hat{i}+\hat{k}$. The angle between $\vec{a}$ and $\hat{i}-2\hat{j}+2\hat{k}$ is
(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{3}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{2}$

6. A straight line which makes an angle of 60° with each of y and z axes, inclines with x-axis at an angle
(A) 30° (B) 60° (C) 75° (D) 45°

7. If the foot of the perpendicular from $O(0,0,0)$ to a plane is $P(1,2,2)$. Then the equation of the plane is
(A) $-x+2y+8z-9=0$ (B) $x+2y+2z-9=0$
(C) $x+y+z-5=0$ (D) $x+2y-3z+1=0$

8. If A and B are square matrices such that $B=-A^{-1}BA$, then $(A+B)^2=$
(A) 0 (B) A^2+B^2 (C) $A^2+2AB+B^2$ (D) $A+B$

9. If A is a square matrix such that $AA^T=I$ and $|A|=1$, then $|A-I|=$
(A) 0 (B) 1 (C) – 1 (D) none of these

10. The greatest value of n for which the determinant $\Delta=\begin{vmatrix} 1 & 1 & 1 \\ {}^{n}c_1 & {}^{n+3}c_1 & {}^{n+6}c_1 \\ {}^{n}c_2 & {}^{n+3}c_2 & {}^{n+6}c_2 \end{vmatrix}$ is divisible by 3^x is
(A) 7 (B) 5 (C) 3 (D) 1

11. If x^2+x+1 is a factor of $ax^3+bx^2+cx+d=0$ is
(A) $\frac{d}{a}$ (B) $-\frac{d}{a}$ (C) $-\frac{b}{a}$ (D) $-\frac{c}{a}$

12. If the roots of the equation $(x-b)(x-c)+(x-c)(x-a)+(x-a)(x-b)=0$ are equal, then
(A) $a+b+c=0$ (B) $a+bw+cw^2=0$ (C) $a-b+c=0$ (D) none of these

13. If x^3+3x^2-9x+c is of the form $(x-\alpha)^2(x-\beta)$, then $c=$
(A) –5 (B) 27 (C) –27 (D) 0

14. The number of real solutions of the equation $\left(\frac{9}{10}\right)^x=-3+x-x^2$ is
(A) 0 (B) 1 (C) 2 (D) none of these

15. For any two complex numbers z_1, z_2 $\frac{1}{2}\left|(z_1+z_2)+\sqrt{z_1z_2}\right|+\left|\frac{1}{2}(z_1+z_2)-\sqrt{z_1z_2}\right|$ is equal to
(A) $|z_1+z_2|$ (B) $|z_1-z_2|$ (C) $|z_1|+|z_2|$ (D) $|z_1|-|z_2|$

16. The amplitude of $\sin\frac{\pi}{5}+i\left(1-\cos\frac{\pi}{5}\right)$ is
(A) $\frac{2\pi}{5}$ (B) $\frac{\pi}{15}$ (C) $\frac{\pi}{10}$ (D) $\frac{\pi}{5}$

17. The area of the triangle on the Argand plane formed by the complex numbers z, iz, and $z+iz$ is
(A) $|z|^2$ (B) $\frac{1}{2}|z|^2$ (C) $\frac{1}{4}|z|^2$ (D) $\frac{\sqrt{3}}{4}|z|^2$

18. If $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+...\text{upto}\ \infty=\frac{\pi^2}{6}$, then the value of $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+...\text{upto}\ \infty=$
(A) $\frac{\pi^2}{4}$ (B) $\frac{\pi^2}{6}$ (C) $\frac{\pi^2}{8}$ (D) $\frac{\pi^2}{12}$

19. If in a triangle $\sin A:\sin C=\sin(A-B):\sin(B-C)$, then $a^2:b^2:c^2$ are in
(A) A.P. (B) G.P. (C) H.P. (D) none

20. The third term of a G.P. is 4. The product of the first five terms is
(A) 4^3 (B) 4^5 (C) 4^4 (D) none

Numerical Based

21. If S denotes the sum to infinity and S_n the sum of n terms of the series $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+...$, such that $S-S_n<\frac{1}{1000}$, then the least value of n is

22. If the value of x satisfying the equation $\left|\left|x^2-x+4\right|-2\right|-3=x^2+x-12$ is α, then 18α is

23. The number of solutions of $z^3=\bar{z}$ is

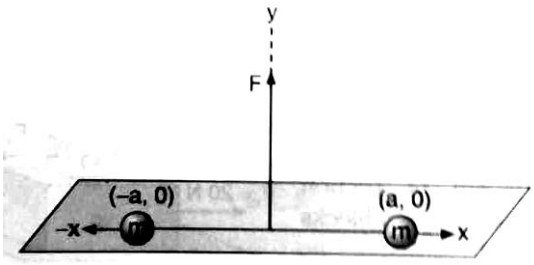
24. If A is an idempotent nonzero matrix and I is an identity matrix of same order such that $(I+A)^n=I+127A$, then the value of n is (here $n\in N$)

25. Let $\vec{a}=2\hat{i}+3\hat{j}-\hat{k}$ and $\vec{b}=\hat{i}-2\hat{j}+3\hat{k}$. Then the value of λ for which the vector $\vec{c}=\lambda\hat{i}+\hat{j}+(2\lambda-1)\hat{k}$ is parallel to the plane containing $\vec{a}$ and $\vec{b}$ is

PHYSICS

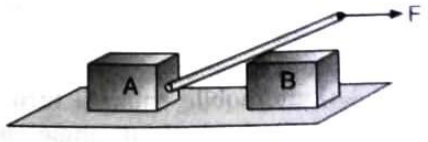
Single Correct Answer Type

26. Two masses each equal to m are lying on x-axis at $(-a,0)$ and $(+a,0)$, respectively, as shown in figure. They are connected by a light string. A force F is applied at the origin along vertical direction. As a result the masses move towards each other without losing contact with ground. The acceleration of each mass at the instant when the masses are at $(-x,0)$ and $(x,0)$ respectively is



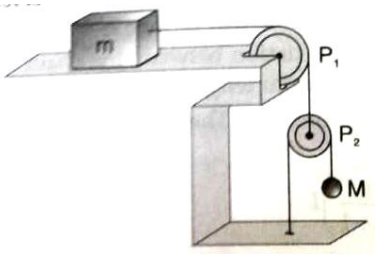
(A) $\frac{2F}{m}\frac{\sqrt{a^2-x^2}}{x}$ (B) $\frac{2F}{m}\frac{x}{\sqrt{a^2-x^2}}$ (C) $\frac{F}{2m}\frac{x}{\sqrt{a^2-x^2}}$ (D) $\frac{F}{m}\frac{x}{\sqrt{a^2-x^2}}$

27. A horizontal force F is applied on a very light rod inserted between the two identical blocks A and B placed over a rough surface as shown in figure. If the force F is gradually increased, which of the blocks will move first?



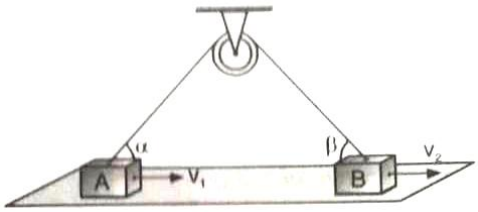
(A) A (B) B (C) both move simultaneously
(D) This depends on the friction coefficient between the blocks and the ground

28. In the pulley arrangement shown, the pulley P_2 is movable. Assuming coefficient of friction between m and surface to be μ, the minimum value of M for which m is at rest is



(A) $M=\frac{\mu m}{2}$ (B) $m=\frac{\mu M}{2}$
(C) $M=\frac{m}{2\mu}$ (D) $m=\frac{M}{2\mu}$

29. In the arrangement shown, blocks A and B connected with an inextensible string move with velocities v_1 and v_2 along horizontal direction. The ratio of $\frac{v_2}{v_1}$ is

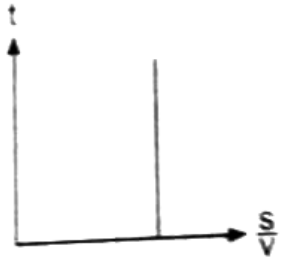


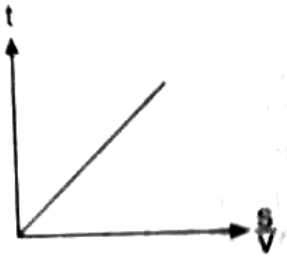
(A) $\frac{\sin\alpha}{\sin\beta}$ (B) $\frac{\sin\beta}{\sin\alpha}$ (C) $\frac{\cos\beta}{\cos\alpha}$ (D) $\frac{\cos\alpha}{\cos\beta}$

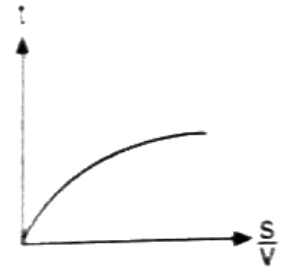
30. A chain of length ℓ and mass m lies on the surface of a smooth sphere of radius $R(R>\ell)$ with one end tied on the top of the sphere. Then the gravitational potential energy of the chain with reference level at the centre of sphere is given by

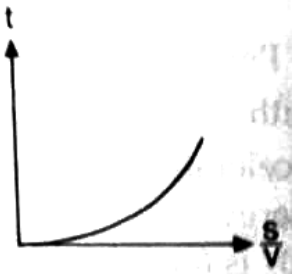
(A) $\frac{mR^2g}{\ell}\sin\left(\frac{\ell}{R}\right)$ (B) $\frac{mR^2g}{\ell}\cos\left(\frac{\ell}{R}\right)$ (C) $\frac{mR^2g}{\ell}\cot\left(\frac{R}{\ell}\right)$ (D) $\frac{mR^2g}{\ell}\tan\left(\frac{R}{\ell}\right)$

31. A body is moved from rest along a straight line by a machine delivering constant power. The ratio of displacement and velocity, $\left(\frac{s}{v}\right)$ varies with time t as

(A) 

(B) 

(C) 

(D) 

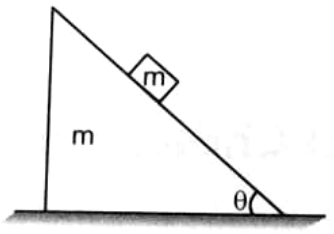
32. A block of mass 1 kg is attached to one end of a spring of force constant $k = 20\,Nm^{-1}$. The other end of a the spring is attached to a fixed rigid support. This spring block system is made to oscillate on a rough horizontal surface having $\mu = 0.04$. The initial displacement of the block from the equilibrium position is $a = 30\,cm$. The number of times the block passes from the mean position before coming to rest is $\left(g = 10\,ms^{-2}\right)$

(A) 15 (B) 11 (C) 7 (D) 6

33. A smooth sphere of radius R is made to translate in a straight line with a constant acceleration whose magnitude is equal to the value of acceleration due to gravity. A particle kept on the top of the sphere to released from there with zero velocity with respect to the sphere. The speed of particle with respect to the sphere as a function of angle θ with the vertical, as it sides down is

(A) $\frac{\sqrt{Rg(\sin\theta+\cos\theta)}}{2}$ (B) $\sqrt{Rg(\sin\theta+\cos\theta)}$ (C) $\sqrt{4Rg\sin\theta}$ (D) $\sqrt{2Rg(1+\sin\theta-\cos\theta)}$

34. A block of mass m slides down an inclined wedge of same mass m shown in figure. Friction is absent everywhere. Acceleration of centre of mass of the block and wedge is



(A) Zero (B) $\frac{g\cos^2\theta}{(1+\sin^2\theta)}$

(C) $\frac{g\sin^2\theta}{(1+\sin^2\theta)}$ (D) $\frac{g\sin\theta}{(1+\cos\theta)}$

35. Two billiard balls of the same size and mass are in contact on a billiard table. A third ball of the same size and mass strikes them symmetrically and comes to rest after the impact. The coefficient of restitution between the balls is

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$

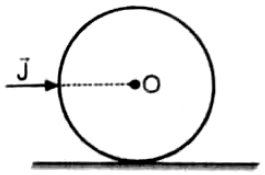
36. A ball A, moving with a speed u, collides directly with another similar ball B moving with a speed v in the opposite direction. A comes to rest after the collision. If the coefficient of restitution is e then $\frac{u}{v}$ is

(A) $\frac{1+e}{1-e}$ (B) $\frac{1-e}{1+e}$ (C) $\frac{e}{1-e}$ (D) $\frac{e}{1+e}$

37. A particle of mass m is made to move with uniform speed v along the perimeter of a regular polygon of 2n sides. The magnitude of impulse applied at each corner of the polygon is

(A) $mv\sin\left(\frac{\pi}{2n}\right)$ (B) $mv\cos\left(\frac{\pi}{2n}\right)$ (C) $2mv\cos\left(\frac{\pi}{2n}\right)$ (D) $2mv\sin\left(\frac{\pi}{2n}\right)$

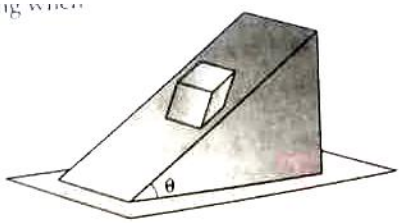
38. An impulse J is applied on a ring of mass m along a line passing through its centre O. The ring is placed on a rough horizontal surface. The linear velocity of centre of ring once it starts rolling without slipping is



(A) $\frac{J}{m}$ (B) $\frac{J}{2m}$

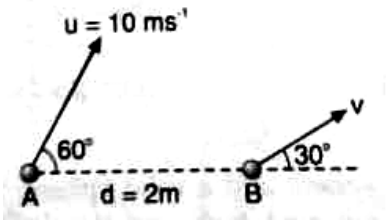
(C) $\frac{J}{4m}$ (D) $\frac{J}{3m}$

39. A cube is placed on a rough inclined plane of inclination θ as shown in figure. The coefficient of friction between the cube and the plane is μ. If the angle θ is gradually increased, the cube slides before toppling when



(A) $\mu < 1$ (B) $\mu < \frac{1}{2}$ (C) $\mu > 1$ (D) $\mu > \frac{1}{2}$

40. Two particles A and B situated at a distance $d = 2m$ apart are launched in a gravity free space. The particle A is launched with a velocity of $10\,ms^{-1}$ at an angle of $60°$ and particle B is launched with a velocity v at an angle $30°$ as shown in figure such that the distance d between A and B remains constant. The angular velocity of B with respect to A is

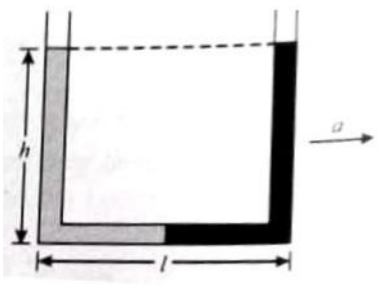


(A) $10\sqrt{3}\,rads^{-1}$ (B) $\frac{10}{\sqrt{3}}rads^{-1}$ (C) $5\sqrt{3}\,rads^{-1}$ (D) $\frac{5}{\sqrt{3}}rads^{-1}$

41. A uniform rod AB of mass m and length ℓ is at rest on a smooth horizontal surface. An impulse J is applied to the end B perpendicular to the rod in horizontal direction. The speed of particle P at a distance $\frac{\ell}{6}$ from the centre towards A of the rod after time $t = \frac{\pi m\ell}{12J}$ is

(A) $\frac{J}{m}$ (B) $\frac{2J}{m}$ (C) $\frac{J\sqrt{2}}{m}$ (D) $\frac{J}{\sqrt{2}m}$

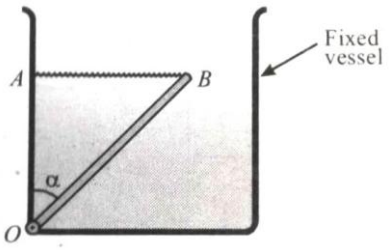
42. A U-tube of base length "ℓ" filled with same volume of two liquids of densities ρ and 2ρ is moving with an acceleration "a" on the horizontal plane. If the height difference between the two surfaces (open to atmosphere) becomes zero, then the height h is given by



(A) $\frac{a}{2g}\ell$ (B) $\frac{3a}{2g}\ell$

(C) $\frac{a}{g}\ell$ (D) $\frac{2a}{3g}\ell$

43. A uniform rod OB of length 1m, cross-sectional area 0.012 m^2 and relative density 2.0 is free to rotate about O in vertical plane. The rod is held with a horizontal string AB which can with stand a maximum tension of 45N. The rod and string system is kept in water as shown in figure. The maximum value of angle α which the rod can make with vertical without breaking the string is : (Take $g = 10 ms^{-2}$)



(A) 45° (B) 37° (C) 53° (D) 60°

44. There is a small hole in the bottom of a fixed container containing a liquid upto height 'h'. The top of the liquid as well as the hole at the bottom are exposed to atmosphere. As the liquid comes out of the hole. (Area of the hole is 'a' and that of the top surface is 'A')

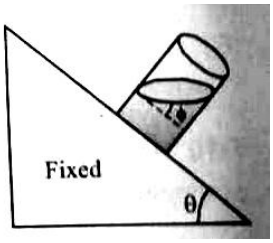
(A) The top surface of the liquid accelerates with acceleration $= g$

(B) The top surface of the liquid accelerates with acceleration $= g\frac{a^2}{A^2}$

(C) The top surface of the liquid retards with retardation $= g\frac{a}{A}$

(D) The top surface of the liquid retards with retardation $= \frac{ga^2}{A^2}$

45. A cylindrical vessel filled with water is released on a fixed inclined surface of angle θ as shown in figure. The friction coefficient of surface with vessel is $\mu(< \tan\theta)$. Then the constant angle made by the surface of water with the incline will be: (Neglect the viscosity of liquid)

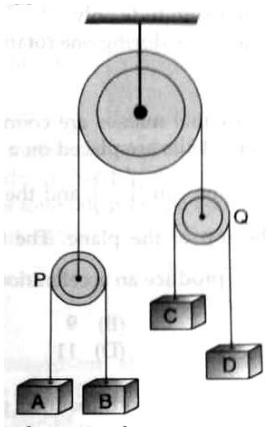


(A) $\tan^{-1}\mu$ (B) $\theta - \tan^{-1}\mu$

(C) $\theta + \tan^{-1}\mu$ (D) $\cot^{-1}\mu$

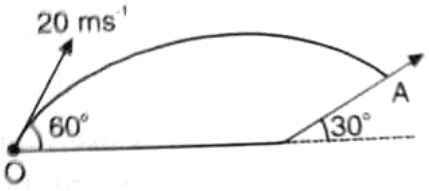
Numerical Based

46. In the arrangement shown, acceleration of A is $1 ms^{-2}$ upwards, acceleration of B is $7 ms^{-2}$ upwards and acceleration of C is $2 ms^{-2}$ upwards. Then acceleration of D has to be.....(ms^{-2})

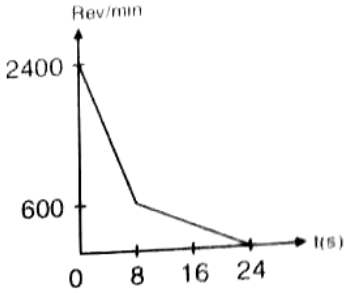


47. A horizontal force in the positive direction of x-axis is applied to a 1.5 kg block initially at rest on a horizontal frictionless surface. The force is given by $\vec{F} = (4 - x^2)\hat{i}$ N, where x is in metre and the initial position of the block is $x = 0$. The maximum kinetic energy of the block between $x = 0$ and $x = 2$ m is .....(J)

48. A ball is projected from the point O with velocity $20\ ms^{-1}$ at an angle of $60°$ with horizontal as shown in figure. At highest point of its trajectory it strikes a smooth plane of inclination $30°$ at point A. The collision is perfectly inelastic. The maximum height from the ground attained by the ball is (Take $g = 10 ms^{-2}$) in metres is .....



49. A table fan, rotating at a speed of 2400 rpm is switched off and the resulting variation of the rpm with time is shown in the figure. The total number of revolutions of the fan before it comes to rest is



50. A circular cylinder of height $h_0 = 10 cm$ and radius $r_0 = 2 cm$ is opened at the top and filled with liquid. It is rotated about its vertical axis. Determine the speed of rotation so that half the area of the bottom gets exposed. ($g = 10 m/sec^2$) in rad/s.....

CHEMISTRY

Single Correct Answer Type:

51. Water filled in two glasses A and B have BOD values of 10 and 20 respectively. The correct statement regarding them is
(A) B is more polluted than A (B) A is suitable for drinking, whereas B is not
(C) both A and B are suitable for drinking (D) A is more polluted than B

52. The total number of isomers for a square planar complex $\left[M(F)(Cl)(SCN)(NO_2)\right]$ is
(A) 16 (B) 8 (C) 4 (D) 12

53. The pair in which both species have same magnetic moment (spin only value) is
(A) $\left[Cr(H_2O)_6\right]^{2+}$, $[CoCl_4]^{2-}$ (B) $\left[Cr(H_2O)_6\right]^{2+}$, $\left[Fe(H_2O)_6\right]^{2+}$
(C) $\left[Mn(H_2O)_6\right]^{2+}$, $\left[Cr(H_2O)_6\right]^{2+}$ (D) $[CoCl_4]^{2-}$, $\left[Fe(H_2O)_6\right]^{2+}$

54. 0.5 moles of gas A and x moles of gas B exert a pressure of 200 Pa in a contain volume $10\ m^3$ at 1000 K. Given R is the gas constant in $JK^{-1}mol^{-1}$, x is
(A) $\frac{2R}{4+R}$ (B) $\frac{2R}{4-R}$ (C) $\frac{4+R}{2R}$ (D) $\frac{4-R}{2R}$

55. The van der Waal's parameters a and b for two gases are given as,

Gas A	Gas B
$a = 6.5\ dm^6\ bar/mole^2$	$a = 18.0\ dm^6\ bar/mole^2$
$b = 0.056\ dm^3\ mole^{-1}$	$b = 0.011\ dm^3\ mole^{-1}$

Which of the following options are incorrect?
(A) $(V_c)_A > (V_c)_B$ (B) $(P_c)_A > (P_c)_B$ (C) $(T_c)_A > (T_c)_B$ (D) $(P_c)_A = (P_c)_B$

56. The correct match between Item-I and Item-II is

Item – I (drug)	**Item – II (test)**
(a) Chloroxylenol	(p) Carbylamine test
(b) Norethindrone	(q) Sodium hydrogen carbonate test
(c) Sulpha pyridine	(r) Ferric chloride test
(d) Penicillin	(s) Bayer's test

(A) $a \to r, b \to p, c \to s, d \to q$ (B) $a \to q, b \to s, c \to p, d \to r$

(C) $a \to r, b \to s, c \to p, d \to q$ (D) $a \to q, b \to p, c \to s, d \to r$

57. A water sample has ppm level concentration of the following metals:
Fe = 0.2, Mn = 5.0, Cu = 3.0, Zn = 5.0. The metal that makes the water sample unsuitable for drinking is
(A) Cu (B) Mn (C) Fe (D) Zn

58. Which of the following reactions will give both gases (X) and (Y)?

$$Na_2C_2O_4 + H_2SO_4 \longrightarrow (A) + Na_2SO_4$$

$$(A) \xrightarrow{\Delta} H_2O + (X) + (Y)$$

(X): Burns with Yellow flame

(Y): Turns lime water milky

(A) $H_2C_2O_4 \xrightarrow{\Delta}$ (B) $FeC_2O_4 \xrightarrow{\Delta}$ (C) $HCOONa \xrightarrow{\Delta}$ (D) $HCOOAg \xrightarrow{\Delta}$

59. A flask of 1 L having $NH_{3(g)}$ at 2.0 atm and 200 K is connected with another flask of volume 800 mL having $HCl_{(g)}$ at 8 atm and 200 K through a narrow tube of negligible volume. The two gases react to form $NH_4Cl_{(5)}$ with evolution of $43\ KJ\ mol^{-1}$ of heat. If heat capacity of $HCl_{(g)}$ at constant volume is $20\ J\ K^{-1}\ mol^{-1}$ and neglecting heat capacity of flask, and volume of solid NH_4Cl formed, then final temperature in flask is
(Assume $R = 0.08\ L\ atm\ K^{-1} mol^{-1}$)
(A) 977.27 K (B) 1177.27 K (C) 1077.27 K (D) 1277.27 K

60. n_1 and n_2 moles of two ideal gases having molecular weights M_1 and M_2 respectively at temperature T_1 K and T_2 K are mixed. Assuming no loss of energy, the temperature of mixture will become

(A) $n_1T_1 + n_2T_2$ (B) $\frac{n_1T_1 + n_2T_2}{T_1 + T_2}$ (C) $\frac{n_1T_1 + n_2T_2}{n_1 + n_2}$ (D) $\frac{T_1 \times T_2}{n_1 \times n_2}$

61. The specific rate constant of a first order reaction depends on the:
(A) concentration of the reactant (B) concentration of the product
(C) time (D) temperature

62. A catalyst is a substance which:
(A) increases the equilibrium concentration of the product
(B) changes the equilibrium constant of the reaction
(C) shortens the time to reach equilibrium
(D) supplies energy to the reaction

63. Consider a reaction *a*G + *b*H → products. When concentration of both the reactants G and H is doubled, the rate increases by eight times. However, when concentration of G is doubled keeping the concentration of H fixed, the rate is doubled. The overall order of the reaction is:
(A) 0 (B) 1 (C) 2 (D) 3

64. When MnO_2 is fused with KOH, a coloured compound is formed, the product and its colour is:
(A) K_2MnO_4, purple colour (B) $KMnO_4$, purple
(C) Mn_2O_3, brown (D) Mn_3O_4, black

65. The compound having tetrahedral geometry is:
(A) $[Ni(CN)_4]^{2-}$ (B) $[Pd(CN_4)]^{2-}$ (C) $[PdCl_4]^{2-}$ (D) $[NiCl_4]^{2-}$

66. A metal nitrate reacts with KI to give a black precipitate which on addition of excess of KI convert into orange colour solution. The cation of metal nitrate is:
(A) Hg^{2+} (B) Bi^{3+} (C) Pb^{2+} (D) Cu^{+}

67. A solution when diluted with H_2O and boiled, it gives a white precipitate. On addition of excess NH_4Cl/NH_4OH, the volume of precipitate decreases leaving behind a white gelatinous precipitate. Identify the precipitate which dissolves in NH_4OH/NH_4Cl.
(A) $Zn(OH)_2$ (B) $Al(OH)_3$ (C) $Mg(OH)_2$ (D) $Ca(OH)_2$

68. A mixture of $C_2H_4(g)$ and $C_3H_8(g)$ was kept in a 0.820 L vessel at atom and 300 K. The weight of the gas mixture in the vessel is 0.613 g. Calculate the ratio of the numbers of moles of $C_3H_8(g)$ and $C_2H_4(g)$
(A) 1.54 (B) 1.68 (C) 1.44 (D) 1.60

69. A metal X on heating in nitrogen gas gives Y.Y. on treatment with H_2O gives a colourless gas which when passed through $CuSO_4$ solution gives a blue colour Y is
(A) $Mg(NO_3)_2$ (B) Mg_3N_2 (C) NH_3 (D) MgO

70. A salt on treatment with dil. HCl gives a pungent smelling gas and a yellow precipitate. The slat gives green flame when tested. Then solution given a yellow precipitate with potassium chromate. The slat is
(A) $NiSO_4$ (B) BaS_2O_3 (C) PbS_2O_3 (D) $CuSO_4$

Numerical Based:

71. Among the complex ions,
$\left[Co(NH_2CH_2CH_2NH_2)_2Cl_2\right]^+$, $\left[CrCl_2(C_2O_4)_2\right]^{3-}$, $\left[Fe(H_2O)_4(OH)_2\right]^+$, $\left[Fe(NH_3)_2(CN)_4\right]^-$,
$\left[Co(NH_2CH_2CH_2NH_2)_2(NH_3)Cl\right]^{2+}$ and $\left[Co(NH_3)_4(H_2O)Cl\right]^{2+}$, the number of complex ions that shows cis-trans isomerism is _____

72. Iron sulphide is heated in air to form A, an oxide of sulphur. A is dissolved in water to give an acid. The basicity of this acid is ____

73. The gaseous reaction $A_{(g)} \longrightarrow 2B_{(g)} + C_{(g)}$ is found to be first order. If the reaction is started with $p_A = 90$ mm Hg, the total pressure after 10 minutes is found to be 180 mm Hg. The rate constant of the reaction is $x \times 10^{-3} s^{-1}$. The value of x is ____

74. A metal complex having composition $\left[Cr(NH_3)_4Cl_2Br\right]$ has been isolated in two forms (A) and (B). The form (A) reacts with $AgNO_3$ to give a white precipitate which is readily soluble in dilute aqueous ammonia, whereas (B) gives a pale yellow precipitate which is soluble in concentrated ammonia. Magnetic moments (spin-only value) of

75. The highest value of the calculated spin-only magnetic moment (in BM) among a transition metal complexes is