FIITJEE

ALL INDIA TEST SERIES

JEE (Advanced)-2025

PART TEST – II

PAPER –2

TEST DATE: 08-12-2024

Time Allotted: 3 Hours **Maximum Marks: 180**

General Instructions:

- The test consists of total 51 questions.
- Each subject (PCM) has 17 questions.
- This question paper contains **Three Parts.**
- **Part-I** is Physics, **Part-II** is Chemistry and **Part-III** is Mathematics.
- Each **Part** is further divided into **Three Sections**: **Section-A, Section-B & Section-C**.
  Section – A *(01 – 04, 18 – 21, 35 – 38):* This section contains **TWELVE (12)** questions. Each question has **FOUR** options. **ONLY ONE** of these four options is the correct answer.
  Section – A *(05 –07, 22 – 24, 39 – 41):* This section contains **NINE (09)** questions. Each question has **FOUR** options. **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).
  Section – B *(08 – 13, 25 – 30, 42 – 47):* This section contains **EIGHTEEN (18)** numerical based questions. The answer to each question is a **NON-NEGATIVE INTEGER VALUE**.
  Section – C *(14 –17, 31 – 34, 48 – 51):* This section contains **SIX (06) paragraphs.** Based on each paragraph, there are **TWO (02)** questions of numerical answer type. The answer to each question is a **NUMERICAL VALUE (XXXXX.XX).** If the numerical value has more than two decimal places, truncate/round-off the value to **TWO** decimal places.

MARKING SCHEME

Section – A (Single Correct): Answer to each question will be evaluated according to the following marking scheme:

Full Marks	:	+3	If ONLY the correct option is chosen.
Zero Marks	:	0	If none of the options is chosen (i.e. the question is unanswered);
Negative Marks	:	–1	In all other cases.

Section – A (One or More than One Correct): Answer to each question will be evaluated according to the following marking scheme:

Full Marks	:	+4	If only (all) the correct option(s) is (are) chosen;
Partial Marks	:	+3	If all the four options are correct but ONLY three options are chosen;
Partial marks	:	+2	If three or more options are correct but ONLY two options are chosen and both of which are correct;
Partial Marks	:	+1	If two or more options are correct but ONLY one option is chosen and it is a correct option;
Zero Marks	:	0	If none of the options is chosen (i.e. the question is unanswered);
Negative Marks	:	–2	In all other cases.

Section – B: Answer to each question will be evaluated according to the following marking scheme:

Full Marks	:	+4	If ONLY the correct integer is entered;
Zero Marks	:	0	Question is unanswered;
Negative Marks	:	0	In all other cases.

Section – C: Answer to each question will be evaluated according to the following marking scheme:

Full Marks	:	+3	If ONLY the correct integer is entered;
Zero Marks	:	0	Question is unanswered;
Negative Marks	:	0	In all other cases.

Physics

PART – I

SECTION – A
(One Options Correct Type)

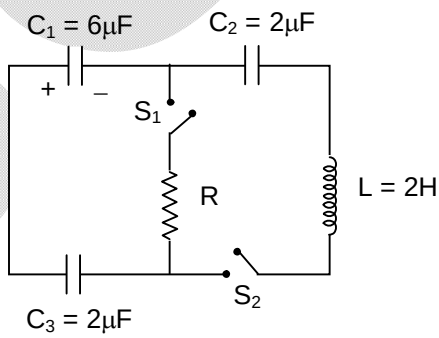
*This section contains **FOUR (04)** questions. Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.*

1. In LCR series A.C. circuit, an A.C. voltage $V = 200\sin\left(50t + \frac{\pi}{3}\right)$ is applied across a branch containing inductor (L), resistance (R) and a capacitor (C). When L, C and R are chosen such that voltage across resistance is maximum, the rms current in the circuit is $\frac{5}{\sqrt{2}}$ A. The current in the circuit when L and C are such that X_L = 40 Ω and X_C = 80 Ω by keeping the resistance unchanged is

(A) $\left(\frac{5}{\sqrt{2}}A\right)\sin\left(50t + \frac{\pi}{12}\right)$ (B) $\left(\frac{5}{\sqrt{2}}A\right)\sin\left(50t + \frac{7\pi}{12}\right)$

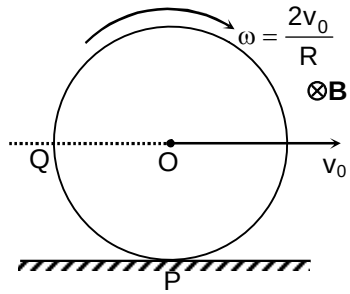
(C) $\left(5\sqrt{2}A\right)\sin\left(50t + \frac{\pi}{12}\right)$ (D) $\left(5\sqrt{2}A\right)\sin\left(50t + \frac{7\pi}{12}\right)$

2. The capacitor C_1 = 6 μF is charged to 22 μC with polarity as shown at t = 0. Switch S_1 is closed while S_2 is kept open. When the charge on C_1 becomes 20 μC, switch S_1 is opened and S_2 is closed. The maximum current in inductor after S_2 is closed is $\left(\sqrt{\frac{a}{b}}\right)$ mA. Find the minimum value of (a +b), where a and b are integers.



(A) 4 (B) 6
(C) 8 (D) 10

3. A conducting disc of radius R is rolling on a horizontal surface as shown in the figure. A uniform magnetic field $\vec{B}$ exists in region having direction of $\vec{B}$ into the plane of motion. Potential difference between the points P and Q of disc at this instant is (a×b) volts where a and b are positive integers. Find (a+b). (Given B = 1T, v_0 = 1 m/s and R = 1m)



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

4. For an ideal gas, relationship between its pressure and volume is given as PV^k = constant. This process is called polytropic process and k is called polytropic constant. For a monoatomic ideal gas, when k = 1.5, temperature of 2 moles gas is increased by 20°C . Then, which of the following statement is correct.
(A) Q = 10R, heat will be absorbed by the gas
(B) Q = 20R, heat will be released by the gas
(C) Q = 15R, heat will be absorbed by the gas
(D) Q = 10R, heat will be released by the gas

SECTION – A
(One or More than one correct type)

*This section contains **THREE (03)** questions. Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).*

5. Two point charges +q and –q and masses m and 2m respectively are attached to the ends of a massless rigid rod of length ℓ. The system is placed in a uniform electric field E in the position of dipole moment making an angle θ with the electric field and released. There are three points O, A and C on the rod
O $\rightarrow$ mid point of the rod
A $\rightarrow$ Any general point on the rod
C $\rightarrow$ centre of mass of the system
τ_0, τ_A, τ_C are torque of electric forces on system about point O, A and C respectively. I_0, I_A and I_C are moment of inertia of system about axis through point O, A and C respectively and normal to plane of motion of system. Then after release which of the following is/are wrong? (α is angular acceleration of the system at time t)

(A) $\tau_0 = \tau_C \neq \tau_A$

(B) $\alpha = \dfrac{\tau_0}{I_0}$

(C) $\alpha = \dfrac{\tau_C}{I_C}$

(D) for small θ, period of oscillation, $T = 2\pi\sqrt{\dfrac{I_0}{qE\ell}}$

6. A metallic cylinder is rotating about its axis with a constant angular velocity ω. A uniform magnetic field B exists in the region parallel to the axis of cylinder. Then choose the correct option(s).

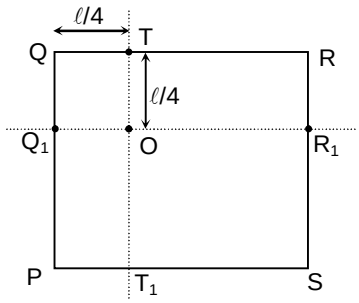
(A) If angular velocity of the cylinder is $\dfrac{eB}{m}$, then charge density in the interior of the cylinder must be zero.

(B) If ω and B are oppositely directed the charge density in the interior of the cylinder is positive

(C) If ω and B are directed in the same direction, then charge density in the interior of the cylinder may be positive

(D) Data is insufficient to determine the nature of charge density.

7. PQRS is a square of side ℓ. A long wire carrying current I is passing through point O and is normal to the plane of the square. Then choose the correct option(s).



(A) $\int\limits_{QRR_1} \vec{B}\cdot\vec{d\ell} = \dfrac{3\mu_0 i}{8}$, if current in the wire is coming out of page

(B) $\int\limits_{QPT_1} \vec{B}\cdot\vec{d\ell} = \int\limits_{QRR_1} \vec{B}\cdot\vec{d\ell}$, for any direction of current in the wire

(C) $\int\limits_{Q_1PS} \vec{B}\cdot\vec{d\ell} = \dfrac{3\mu_0 i}{8}$, if current in the wire is coming out of page

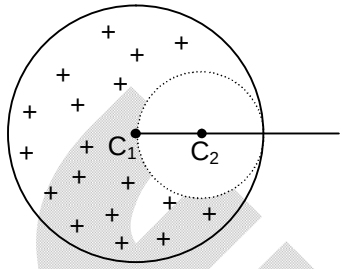
(D) $\int\limits_{QRR_1} \vec{B}\cdot\vec{d\ell} = \int\limits_{TRS} \vec{B}\cdot\vec{d\ell}$, for any direction of current in the wire

SECTION – B

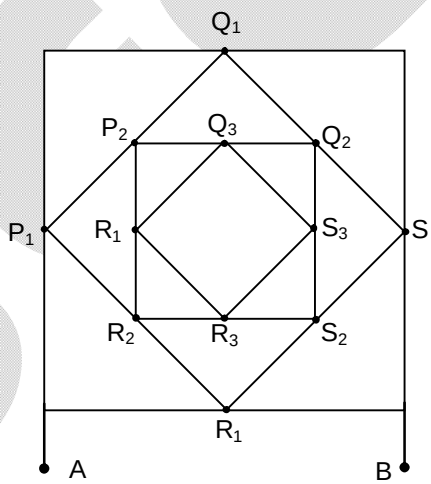
(Numerical Answer Type)

*This section contains **SIX (06)** Numerical based questions. The answer to each question is a **NON-NEGATIVE INTEGER VALUE**.*

8. A non-conducting solid sphere of radius R has charge density ρ. A spherical portion of radius $\frac{R}{2}$ is removed as shown. If C_1 and C_2 are the centres of the sphere and the spherical cavity respectively. If work done required in slowly bringing a point charge q from infinity to the centre C_1 is $\left(\frac{a\rho R^2 q}{b\varepsilon_0}\right)$, where a and b are positive integers. Find the least value of (a + b).

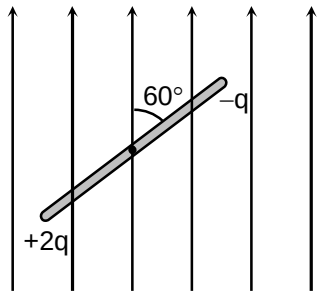


9. A long wire is bent in the form of infinite squares of reducing sides. The edge of the outermost square is of length 2m and its resistance per unit lengths λ = 2 Ω/m. An ideal battery of emf ε is connected across A and B. The potential difference between points Q_1 and R_1 is……..volt.



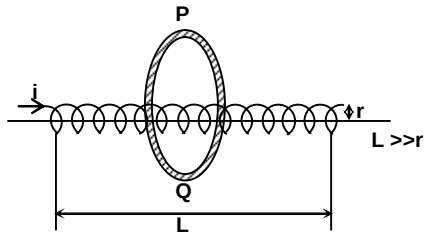
10. A calorimeter contains 100 gm mixture of water and ice at 0°C. Water equivalent of the calorimeter is 50 gm. Steam at 100°C is passed through it and the final temperature of the calorimeter contents become 30°C. If final amount of the calorimeter contents become 110 gm, then amount of the ice in the mixture is ……gm. (given latent heat fusion of ice = 80 cal/gm, Specific heat of water is 1 cal/gm-°C, Latent heat of vaporization of water = 540 cal/gm)

11. Two charges +2q and –q, each of mass m are attached to two ends of a rigid massless rod of length L. It is placed in a uniform electric field E. The rod is released when it makes an angle 60° with the field as shown. The maximum angular velocity of rod is ω_0. Find ω_0 in rad/s. (Given q = 2mC, m = 1 gm, E= 2N/C and L = 4m)



12. Uniform electric and magnetic fields, $\vec{E} = 8\hat{j}$ N/C and $\vec{B} = \pi\hat{j}$ T exists in the region x > 0. A particle having charge q = –2μC and mass m enters at origin with a velocity $(2\hat{i} + 4\hat{j})$ m/s. Speed of the particle when it leaves the field is $n\sqrt{5}$ m/s. What is n?

13. Current I is flowing in a long and tightly wound solenoid having n turns per unit length as shown in the figure. A ring of radius R and co-axial with the solenoid is made of two material: material-1 and material-2 having electrical conductivity σ_1 and σ_2 respectively ($\sigma_1 = 2\sigma_2$) and $\frac{\text{Arc length of material 1}}{\text{Arc length of material 2}} = \frac{3}{1}$. Each material has same area of cross section. If electric field intensity in material 1 and material 2 is E_1 and E_2 respectively, the value of $\frac{E_2}{E_1}$ is……..(current in solenoid is increasing at the rate of 2 A/sec)



SECTION – C
(Numerical Answer Type)

*This section contains **TWO (02) paragraphs.** Based on each paragraph, there are **TWO (02)** questions of numerical answer type. The answer to each question is a **NUMERICAL VALUE (XXXXX.XX).** If the numerical value has more than two decimal places, truncate/round-off the value to **TWO** decimal places.*

Paragraph for Question Nos. 14 and 15

A ball of mass 0.1 gm carries a charge of 100 μC. It is released under gravity from some height H, from ground. There exists a uniform horizontal magnetic field B = 1T in space. Let h be the vertical displacement of the ball (h < H). (Take g = 10 m/s^2)

14. Find the maximum value of h in meters.

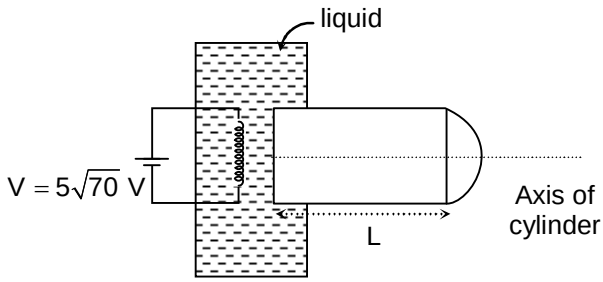
Paragraph-I

A ball of mass 0.1 gm carries a charge of 100 μC. It is released under gravity from some height H, from ground. There exists a uniform horizontal magnetic field B = 1T in space. Let h be the vertical displacement of the ball (h < H). (Take g = 10 m/s^2)

15. Find the speed (in m/s) of the ball at vertical displacement, h = 10 m.

Paragraph for Question Nos. 16 and 17

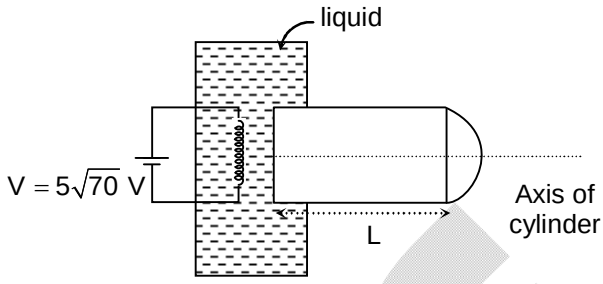
A heat conducting cylinder of length L and radius R has one of its end in the liquid having boiling point 500°C while at its other end there is hemispherical heat radiating surface of radius R = $\sqrt{\frac{1}{5.6\pi}}$ m and emissivity e = 1. An electric circuit has resistance of 5Ω inside the liquid. The liquid heats up due to the heat from the resistance. Assume there is no emission of heat except through hemispherical portion at end of the conducting cylinder. The temperature of environment is 27°C. (Stefan-Boltzmann constant of the spherical surface $\sigma = 5.6\times10^{-8}\ \text{Wm}^{-2}\text{k}^{-4}$, freezing temperature of water is 273 K)



16. The temperature of the hemispherical surface at steady state is ……..°C.

Paragraph-II

A heat conducting cylinder of length L and radius R has one of its end in the liquid having boiling point 500°C while at its other end there is hemispherical heat radiating surface of radius R = $\sqrt{\frac{1}{5.6\pi}}$ m and emissivity e = 1. An electric circuit has resistance of 5Ω inside the liquid. The liquid heats up due to the heat from the resistance. Assume there is no emission of heat except through hemispherical portion at end of the conducting cylinder. The temperature of environment is 27°C. (Stefan-Boltzmann constant of the spherical surface $\sigma = 5.6 \times 10^{-8}\ Wm^{-2}k^{-4}$, freezing temperature of water is 273 K)



17. The temperature of the liquid at steady state is ……..°C. Given L= 1 m and thermal conductivity of cylindrical material is 100 W/m-K.

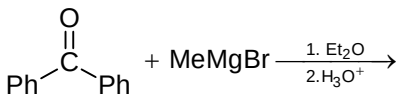
Chemistry

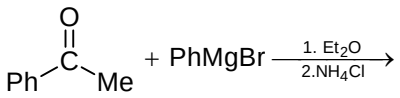
PART – II

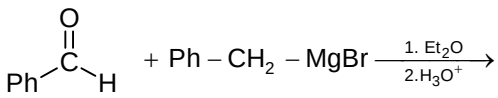
SECTION – A
(One Options Correct Type)

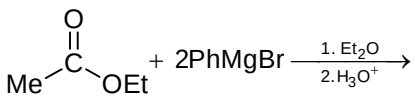
*This section contains **FOUR (04)** questions. Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.*

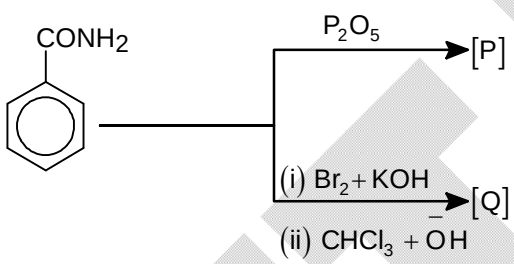
18. Which of the following reaction will NOT provide a synthesis of 1,1-diphenylethanol as a major product?

(A) 

(B) 

(C) 

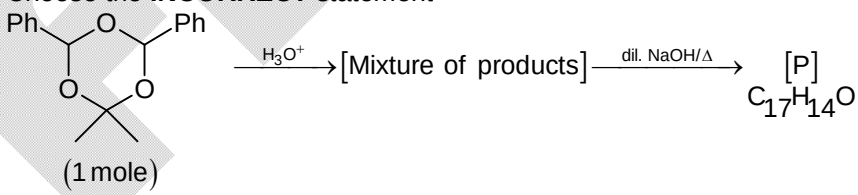
(D) 

19. 

Which statement is INCORRECT?

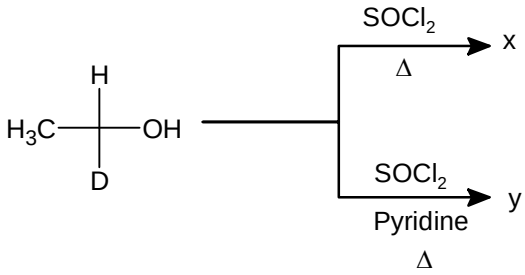
(A) Reduced product of P and Q will be metamers to each other. (Consider $LiAlH_4$ as a reducing agent)
(B) By dry distillation of hydrolysed product of P with $Ca(OH)_2$ gives benzophenone.
(C) One of the hydrolysis product of Q reacts with $NaNO_2$ + HCl followed by reaction with phenol in mild basic medium gives orange red dye.
(D) Electrophile involved in the formation of Q is dichlorocarbene.

20. Choose the **INCORRECT** statement



(A) In mixture, one of the product shows positive iodoform test.
(B) In mixture, one of the product shows positive Tollen's test and negative Fehling's test.
(C) [P] on reaction with hydroxyl amine gives oxime that can have 4 stereoisomers.
(D) Number of double bonds in [P] is 10.

21.

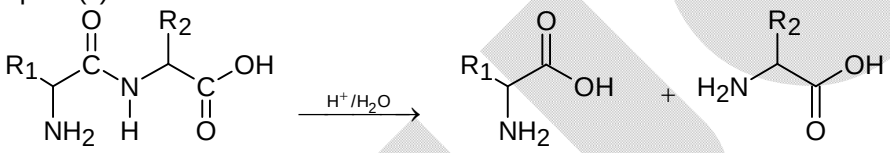


Which statement is correct?
(A) x and y are superimposable mirror images
(B) x and y are non-superimposable mirror images
(C) x and y are neither mirror images nor super imposable
(D) x and y are structural isomers

SECTION – A
(One or More than one correct type)

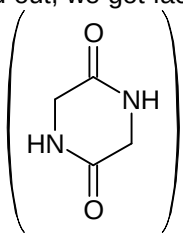
*This section contains **THREE (03)** questions. Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).*

22. Analyse the following data of the following hydrolyzed products and choose the **INCORRECT** option(s):



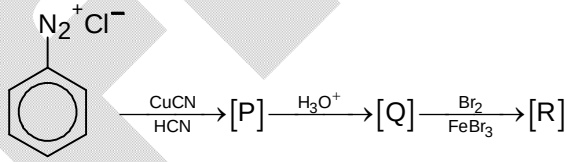
Dipeptide [x] [y]

If the dipeptide is first treated with HNO_2 and then hydrolysis is carried out, we got lactic acid and [y]. Two mole of [y] on heating gives one mole of 2,5-diketopiperazine



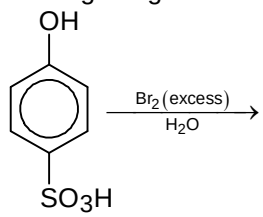
(A) $R_1 = H$ and $R_2 = CH_3$
(B) $R_1 = CH_3$ and $R_2 = CH_3$
(C) $R_1 = CH_3$ and $R_2 = H$
(D) $R_1 = H$ and $R_2 = H$

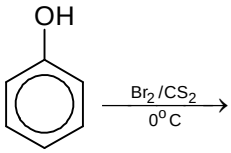
23. In the following reaction sequence:

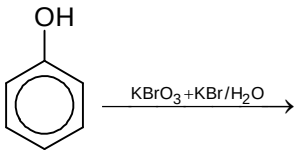


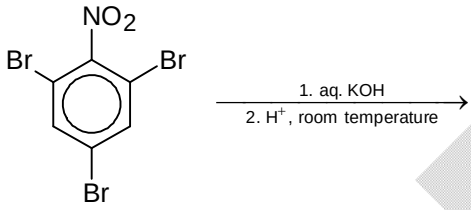
Choose the **'TRUE'** statement(s):
(A) [R] is more acidic than [Q].
(B) [R] is less reactive towards electrophilic aromatic substitution than [Q].
(C) [Q] is more reactive towards electrophilic substitution than benzene.
(D) [R] on reaction with sodalime form a compound which can undergo phenol formation with aq. NaOH treatment under the normal condition of pressure and temperature.

24. Which among the given reactions will **NOT** yield the 2, 4,6-tribromo phenol as a major product?

(A) 

(B) 

(C) 

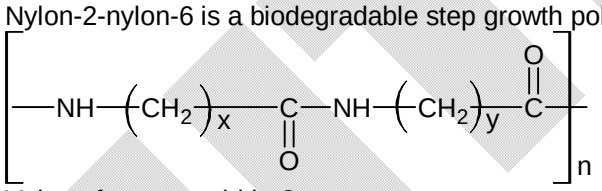
(D) 

SECTION – B

(Numerical Answer Type)

*This section contains **SIX (06)** Numerical based questions. The answer to each question is a **NON-NEGATIVE INTEGER VALUE**.*

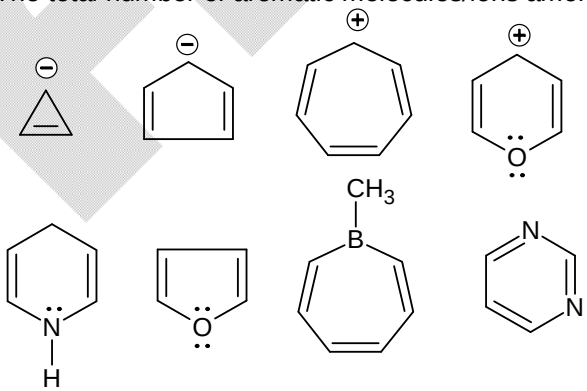
25. Nylon-2-nylon-6 is a biodegradable step growth polymer. It can be expressed as



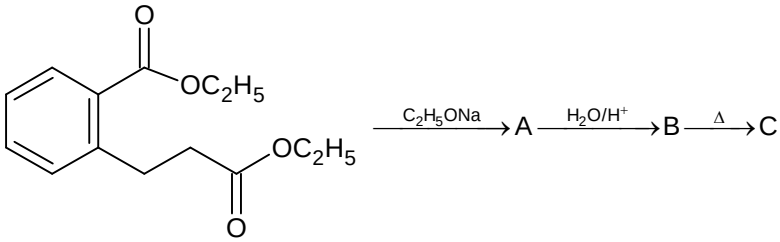
Value of y – x would be?

26. When formaldehyde is treated with ammonia a crystalline compound urotropine is formed. If the number of carbon atoms and nitrogen atoms in the compound are x and y respectively then the value of (x + y) is

27. The total number of aromatic molecules/ions among the following is



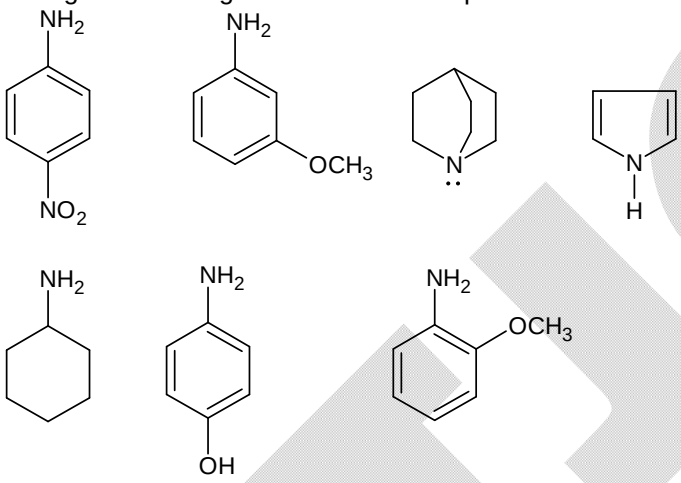
28. In the following sequence of reactions



Total number of $\pi-$bond(s) in the product (C) is/are

29. The number of moles of formaldehyde formed by the oxidative cleavage of one mole of D-Glucose by excess of HIO_4 is

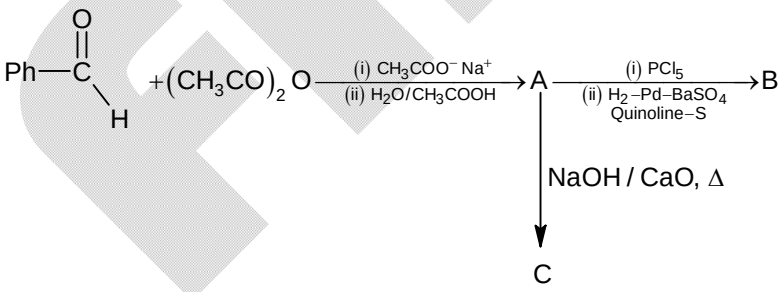
30. Among the following the number of compounds which are less basic than aniline is



SECTION – C
(Numerical Answer Type)

*This section contains **TWO (02) paragraphs.** Based on each paragraph, there are **TWO (02)** questions of numerical answer type. The answer to each question is a **NUMERICAL VALUE (XXXXX.XX).** If the numerical value has more than two decimal places, truncate/round-off the value to **TWO** decimal places.*

Paragraph for Question Nos. 31 and 32



31. If molar mass of C = M then M / 2 is _____

32. If 0.2 mole of PhCHO is taken then mass of B formed (with 100 efficiency of the reaction)

Paragraph for Question Nos. 33 and 34

0.5 gm of an organic compound was Kjeldahlised and the ammonia evolved was absorbed in to 60 ml of 0.1 N sulphuric acid solution. The residual acid solution was diluted with distilled water and the volume was made up to 150 ml. 50 ml of this solution required 20 ml of N/20 NaOH solution for complete neutralization.
[Atomic mass of N = 14, H = 1]

33. Calculate the mass percentage of nitrogen in the compound.

34. If we use Duma's process then the volume of N_2 at STP will be V lit. Calculate 50 V.

Mathematics

PART – III

SECTION – A
(One Options Correct Type)

*This section contains **FOUR (04)** questions. Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.*

35. If α, β, γ are acute angle and $\sin\beta = \sin\alpha\cdot\cos\theta$; $\sin\gamma = \sin\alpha\cdot\cos\phi$ and $\cos(\theta - \phi) = \sin\beta\sin\gamma$, then the value of $\frac{\tan^2\beta - \tan^2\alpha}{\tan^2\gamma}$, is/are

(A) –1 (B) 0
(C) 1 (D) 3

36. The hypotenuse BC = 'a' of a right-angle triangle ABC is divided into (2m – 1) equal segments, where $m \in N$. The segment containing mid-point of BC subtends are angle θ at A. Also, h is the altitude of triangle through A, then $\tan\theta$ is

(A) $\frac{4(2m-1)h}{am(m-1)}$ (B) $\frac{(2m-1)a}{4hm(m-1)}$
(C) $\frac{4(2m-1)h}{am(m+1)}$ (D) $\frac{(2m-1)h}{a(m)(m-1)}$

37. Let AB be a variable chord to the curve $xy = c^2$, such that the length of chord AB is constant 'a' units. Then the locus of centroid of the triangle OAB is

(A) $(x^2 + y^2)(axy - c^2) = 9xy$ (B) $(x^2 + y^2)(9xy - 4c^2) = a^2xy$
(C) $xy(9xy - 4c^2) = a^2(x^2 + y^2)$ (D) $xy(axy - c^2) = 9(x^2 + y^2)$

38. Let α and $f(\alpha)$ be the eccentricity of the ellipse $\frac{x^2}{4b^2-3a^2} + \frac{y^2}{3b^2-2a^2} = 1$ and $\frac{x^2}{3b^2-2a^2} + \frac{y^2}{b^2} = 1$ respectively where $b^2 > a^2 > 0$, then

(A) $\underbrace{f(f(f.....f(\alpha)))}_{\text{n times}} = \frac{2^{\frac{n}{2}}\alpha}{\sqrt{(1+\alpha^2) - 2^n\alpha^2}}$ (B) $\underbrace{f(f(f.....f(\alpha)))}_{\text{n times}} = \left(\frac{2^n\alpha}{\sqrt{1-2^n\alpha^2}}\right)$

(C) $\underbrace{f(f(f.....f(\alpha)))}_{\text{n times}} = \frac{2^{\frac{n}{2}}\alpha}{\sqrt{1-(2n-1)\alpha}}$ (D) $f(f(f.....f(\alpha))) = \frac{2^n\alpha}{\sqrt{1-(2n-1)\alpha^2}}$

SECTION – A
(One or More than one correct type)

*This section contains **THREE (03)** questions. Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).*

39. If $x^2 - 6x + 14 - \frac{5}{\sqrt{2}}\sin\left(\frac{\pi x}{12}\right) - \frac{5}{\sqrt{2}}\cos\left(\frac{\pi x}{12}\right) + \sin^2 y = 0$ has real solutions, then (x, y) can be

(A) $(3, 3\pi)$ (B) $(-3, -3\pi)$
(C) $(3, 30\pi)$ (D) $(3, 100\pi)$

40. Let PQR be an equilateral triangle, where point P is (1, 3) and Q is $(3, \lambda)$, $\lambda \in R$, then the locus of point R is

(A) $\sqrt{3}y - x = 3(\sqrt{3} - 1)$ (B) $\sqrt{3}y + x = 3(\sqrt{3} + 1)$
(C) $\sqrt{3}y - x = 3(\sqrt{3} + 1)$ (D) $\sqrt{3}y + x = 3(\sqrt{3} - 1)$

41. Let a point P lies inside a circle C : $x^2 + y^2 + 2gx + 2fy + c = 0$, such that distance of P from center of circle is $\sqrt{33}$. If a chord AB to the circle C passes through P such that AP = 2 and BP = 8, then
(A) angle subtend by AB at center of circle C is obtuse angle
(B) angle subtended by AB at center of circle C is acute angle
(C) radius of circle C is 8 units
(D) radius of circle C is 7 units

SECTION – B

(Numerical Answer Type)

*This section contains **SIX (06)** Numerical based questions. The answer to each question is a **NON-NEGATIVE INTEGER VALUE**.*

42. If t® = $\sin^r\theta + \cos^r\theta$, then find maximum value of $24\left|\frac{t(25)-t(23)}{t(21)}\right|$ is _____?

43. The diameter of the circumcircle of triangle ABC from A, B, C intersect BC, AC and AB at L, M, N respectively, then the value of $R\left(\frac{1}{AL}+\frac{1}{BM}+\frac{1}{CN}\right)$ is _____? (Where R is radius of circumcircle of triangle ABC)

44. Let (–3, 4) and (2, 1) be two foci of an ellipse E. If ellipse E touches x-axis at point P(α, 0), then $|\alpha|$ is

45. Let the foci of hyperbola $\frac{x^2}{A^2}-\frac{y^2}{B^2}=1$, are the vertices of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and foci of ellipse are vertices of hyperbola. Let e and $\sqrt{\frac{2}{3}}$ be the eccentricity of hyperbola and ellipse respectively. If (α, β) be the point of intersection of hyperbola and ellipse, then $\left[\left|\frac{\alpha}{\beta}\right|\right]$ is _____
(Where [.] represents greatest integer function)

46. The hyperbolas $C_1 : xy = c^2$ and $C_2 : x^2 - y^2 = c^2$ intersects each other at points A and B. If the distance between the tangents at A and B to the hyperbola C_2 is $\left(\frac{c}{a}\right)$, then the value of $16a^4 + 3$ is

47. The tangent at a point R on the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$, passes through the point (0, –b) and normal at the point R passes through the point $\left(2\sqrt{2}a, 0\right)$. If 'e' is eccentricity of the hyperbola, then $2e^2 + 1$ is

SECTION – C
(Numerical Answer Type)

*This section contains **TWO (02) paragraphs.** Based on each paragraph, there are **TWO (02)** questions of numerical answer type. The answer to each question is a **NUMERICAL VALUE (XXXXX.XX).** If the numerical value has more than two decimal places, truncate/round-off the value to **TWO** decimal places.*

Paragraph for Question Nos. 48 and 49

Let P is any point inside the triangle OAB whose vertices are A(3, 0), B(0, 4), O(0, 0). Let P_1, P_2, P_3 be the perpendicular distance of point P from the sides OA, OB and AB respectively, then

48. For some $\alpha, \beta, \gamma \in R$, if $\frac{P_1}{\alpha}+\frac{P_2}{\beta}+\frac{P_3}{\gamma}=1$, then $\alpha + \beta + \gamma$ is equal to

49. The maximum value of $3P_1P_2P_3$ is/are

Paragraph for Question Nos. 50 and 51

Let $C_1 : (x – y)^2 – 8(x + y – 2) = 0$ and $C_2 : 4x^2 + 9y^2 = 36$ be two curve on xy-plane. If A, B be two distinct points on curve C_1 from where pair of perpendicular tangents are drawn to the curve C_2, then

50. If coordinates of point $A(\alpha_1, \beta_1)$ and $B(\alpha_2, \beta_2)$, then $\left(\frac{\alpha_1+2\alpha_2+\beta_1+2\beta_2}{\alpha_1\beta_2+\alpha_2\beta_1}\right)$ is

51. Maximum area of the triangle PAB, where P is any point on curve C_2 is $2\sqrt{a}+b$, a, b $\in$ N, then $\frac{a+b}{2}$ is