

FIITJEE PET – III (REG_2ND YEAR)

MAINS_SET-A

DATE: 23.06.2018

Time: 3 hours
INSTRUCTIONS:

Maximum Marks: 360

Instructions to the Candidates

1. This Test Booklet consists of **90 questions**.
Use **Blue/Black ball Point Pen only** for writing particulars and bubbling of OMR.
2. For each correct answer **4 Marks** will awarded and for each wrong answer **1 Mark** will be deducted.
3. Attempt all questions.
4. In case you have not darkened any bubble you will be awarded 0 mark for that question.
5. Use of calculator/logarithmic table is not permitted.

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.:

- The diameters of a circle are along $2x + y - 7 = 0$ and $x + 3y - 11 = 0$. Then, the equation of this circle, which also passes through $(5, 7)$ is
 (A) $x^2 + y^2 - 4x - 6y - 16 = 0$ (B) $x^2 + y^2 - 4x - 6y - 20 = 0$
 (C) $x^2 + y^2 - 4x - 6y - 12 = 0$ (D) $x^2 + y^2 + 4x + 6y - 12 = 0$
- The centroid of an equilateral triangle is $(0, 0)$ and the length of the altitude is 6. The equation of the circumcircle of the triangle is
 (A) $x^2 + y^2 = 6$ (B) $x^2 + y^2 = 16$ (C) $x^2 + y^2 = 9$ (D) $x^2 + y^2 = 36$
- For the circle $2x^2 + 2y^2 - 5x - 4y - 3 = 0$, the point $(4, 2)$
 (A) lies inside the circle (B) lies outside the circle
 (C) lies on the circle (D) is the centre of the circle
- The locus of a point which divides the join of $A(-1, 1)$ and a variable point P on the circle $x^2 + y^2 = 4$ in the ratio 3 : 2 is
 (A) $25(x^2 + y^2) + 20(x + y) + 28 = 0$ (B) $25(x^2 + y^2) - 20(x + y) + 28 = 0$
 (C) $25(x^2 + y^2) + 20(x - y) + 28 = 0$ (D) $25(x^2 + y^2) + 20(x - y) - 28 = 0$
- Equation $x^2 + 2ax - b^2 = 0$ has real roots α, β and equation $x^2 + 2px - q^2 = 0$ has real roots γ, δ . If circle C is drawn with the points $(\alpha, \gamma), (\beta, \delta)$ as extremities of a diameter, then the equation of C is
 (A) $x^2 + y^2 + 2ax + 2py - b^2 - q^2 = 0$ (B) $x^2 + y^2 + 2ax + 2py + b^2 + q^2 = 0$
 (C) $x^2 + y^2 - 2ax - 2py + b^2 + q^2 = 0$ (D) $x^2 + y^2 + 2ax - 2py + b^2 - q^2 = 0$
- If two distinct chords, drawn from the point (p, q) on the circle $x^2 + y^2 - px - qy = 0$ (where $pq \neq 0$) are bisected by the x -axis, then
 (A) $p^2 = q^2$ (B) $p^2 = 8q^2$ (C) $p^2 < 8q^2$ (D) $p^2 > 8q^2$
- The radius of the circle passing through the point $(6, 2)$ and two of whose diameters are $x + y = 6$ and $x + 2y = 4$ is
 (A) 10 (B) $2\sqrt{5}$ (C) 6 (D) 4
- A variable circle passes through the fixed point $A(p, q)$ and touches x -axis. The locus of the other end of the diameter through A is
 (A) $(x - p)^2 = 4qy$ (B) $(y - q)^2 = 4px$ (C) $(y - p)^2 = 4qx$ (D) $(x - q)^2 = 4py$
- If the circles described on the line joining the points $(0, 1)$ and (α, β) are diameter cuts the axis of x in points whose abscissae are the roots of the equation $x^2 - 5x + 3 = 0$, then $(\alpha, \beta) =$
 (A) $(5, 3)$ (B) $(3, 5)$ (C) $(-5, 3)$ (D) $(3, -5)$

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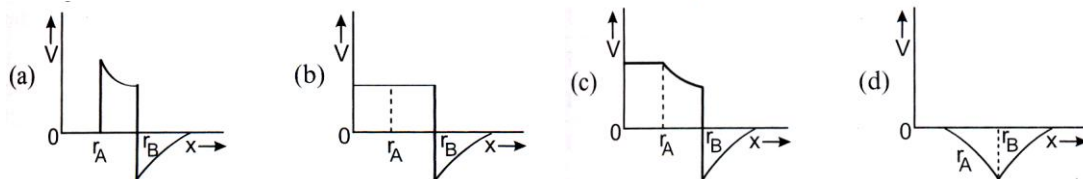
10. Consider the circle $x^2 + y^2 - 4x - 2y + c = 0$ whose centre is $A(2, 1)$. If the point $P(10, 7)$ is such that the line segment PA meets the circle in Q with $PQ = 5$, then $c =$
 (A) -15 (B) 20 (C) 30 (D) -20
11. The area of the circle $(x + 1)(x + 2) + (y - 1)(y + 3) = 0$ is
 (A) $\frac{17\pi}{4}$ (B) $\frac{17\pi}{2}$ (C) $\frac{2\pi}{17}$ (D) none of these
12. The area bounded by the circles $x^2 + y^2 = 1$ and $x^2 + y^2 = 2$, and the pair of lines $2x^2 - 3xy - 2y^2 = 0$ ($y > 0$), is
 (A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$ (C) $\frac{3\pi}{4}$ (D) π
13. The centre of the incircle of the triangle formed by the line $3x + 4y = 24$ with the axes is
 (A) $(3, 3)$ (B) $(2, 2)$ (C) $(-2, 2)$ (D) $(2, -2)$
14. Equation of the circle passing through $A(1, 2)$, $B(5, 2)$ so that the angle subtended by AB at points on the circle is $\frac{\pi}{4}$ is
 (A) $x^2 + y^2 - 6x - 8 = 0$ (B) $x^2 + y^2 - 6x - 8y + 17 = 0$
 (C) $x^2 + y^2 - 6x + 8 = 0$ (D) $x^2 + y^2 - 6x - 8y - 25 = 0$
15. $A = (\cos \theta, \sin \theta)$ and $B = (\sin \theta, -\cos \theta)$ are two points. The locus of the centroid of $\triangle OAB$ where O is the origin is
 (A) $x^2 + y^2 = 3$ (B) $9x^2 + 9y^2 = 2$ (C) $2x^2 + 2y^2 = 9$ (D) $3x^2 + 3y^2 = 2$
16. If $x^2 + y^2 + 2gx + 2fy + c = 0$ is concentric with $x^2 + y^2 - 2x + 6y - 3 = 0$ and whose radius is equal to the radius of the circle $x^2 + y^2 - 6x - 1 = 0$, then the value of " c " is
 (A) 0 (B) 1 (C) -1 (D) -2
17. A square is inscribed in the circle $x^2 + y^2 - 2x + 4y + 3 = 0$, whose sides are parallel to the coordinate axes. One vertex of the square is
 (A) $(1 + \sqrt{2}, -2)$ (B) $(1 - \sqrt{2}, -2)$ (C) $(1, -2 + \sqrt{2})$ (D) None of these
18. The equation of the circle which touches both the axes and whose radius is a , is
 (A) $x^2 + y^2 - 2ax - 2ay + a^2 = 0$ (B) $x^2 + y^2 + ax + ay - a^2 = 0$
 (C) $x^2 + y^2 + 2ax + 2ay - a^2 = 0$ (D) $x^2 + y^2 - ax - ay + a^2 = 0$

Space for rough work

19. If a circle passes through the points where the lines $3\lambda x - 2y - 1 = 0$ and $4x - 3y + 2 = 0$ meet the coordinate axes then $\lambda =$
 (A) -1 (B) $-1/2$ (C) $1/2$ (D) 1
20. The co-ordinates of the point on the circle $x^2 + y^2 - 12x - 4y + 30 = 0$ which is farthest from the origin are
 (A) (9, 3) (B) (8, 5) (C) (12, 4) (D) None of these
21. The equation of the circle passing through (2, 0) and (0, 4) and having the minimum radius is
 (A) $x^2 + y^2 + 2x + 4y = 0$ (B) $x^2 + y^2 - 2x + 4y = 0$
 (C) $x^2 + y^2 - 2x - 4y = 0$ (D) $x^2 + y^2 + 2x - 4y = 0$
22. Two rods of lengths a and b slide along the axes which are rectangular in such a manner that their ends are concyclic. The locus of the centre of the circle passing through these points is
 (A) $4(x^2 + y^2) = a^2 + b^2$ (B) $x^2 - y^2 = a^2 - b^2$ (C) $4(x^2 - y^2) = a^2 - b^2$ (D) $x^2 + y^2 = a^2 + b^2$
23. Circles are drawn through the point (2, 0) to cut intercepts of length 5 units on the x-axis. If their centres lie in the first quadrant, then their equation is (where $k > 0$)
 (A) $x^2 + y^2 - 9x + 2ky + 7/2 = 0$ (B) $3x^2 + 3y^2 + 27x - 2ky + 42 = 0$
 (C) $x^2 + y^2 - 9x - 2ky + 14 = 0$ (D) $x^2 + y^2 - 2kx - 9y + 7/2 = 0$
24. The equation of the circle passing through the origin and cutting intercepts of length 3 and 4 units from the positive axes, is
 (A) $x^2 + y^2 + 6x + 8y + 1 = 0$ (B) $x^2 + y^2 - 6x - 8y = 0$
 (C) $x^2 + y^2 + 3x + 4y = 0$ (D) $x^2 + y^2 - 3x - 4y = 0$
25. The equation of the circle with centre at (-3, 4) and touching y-axis is
 (A) $x^2 + y^2 - 4x - 6y + 4 = 0$ (B) $x^2 + y^2 + 6x - 8y + 16 = 0$
 (C) $x^2 + y^2 - 8x - 6y + 21 = 0$ (D) $x^2 + y^2 - 24x - 10y + 14 = 0$
26. If a chord of the circle $x^2 + y^2 = 8$ makes equal intercepts of length a on the coordinate axes, then
 (A) $|a| < 2$ (B) $|a| < \sqrt{2}$ (C) $|a| < 4$ (D) $|a| < \sqrt{8}$
27. The values of α for which the point $(2\alpha, \alpha+1)$ is in the interior of the larger segment of the circle $x^2 + y^2 - 2x - 2y - 8 = 0$ made by the chord $x - y + 1 = 0$ is
 (A) $\left(-\frac{9}{5}, 0\right)$ (B) $\left(0, \frac{9}{5}\right)$ (C) $(-1, 0)$ (D) $(0, 1)$

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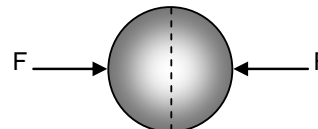
28. Circle $x^2 + y^2 - 4x - 8y - 5 = 0$ will intersect the line $3x - 4y = m$ in two distinct points, if
 (A) $-10 < m < 5$ (B) $9 < m < 20$ (C) $-35 < m < 15$ (D) None of these
29. The circle $x^2 + y^2 - 6x - 10y + k = 0$ does not touch or intersect the axes and the point (1, 4) is inside the circle. Then the condition is
 (A) $0 < k < 25$ (B) $k < 29$ (C) $25 < k < 29$ (D) $k > 25$
30. The number of integral (a point whose abscissa as well as ordinate are integers) lying inside the circle $x^2 + y^2 - 4x - 6y + 9 = 0$ is
 (A) 10 (B) 12 (C) 9 (D) 8
31. Two conducting spheres of radii 3 cm and 1 cm are separated by a distance of 10 cm in free space. If the spheres are charged to same potential of 10 V each, the force of repulsion between them, is
 (A) $\left(\frac{1}{3}\right) \times 10^{-9}$ N (B) $\left(\frac{2}{9}\right) \times 10^{-9}$ N (C) $\left(\frac{1}{9}\right) \times 10^{-9}$ N (D) $\left(\frac{4}{3}\right) \times 10^{-9}$ N
32. A dipole of electric dipole moment p is placed in a uniform electric field of strength E . If θ is the angle between positive direction of p and E , then the potential energy of the electric dipole is largest when θ is
 (A) $\frac{\pi}{3}$ (B) $\frac{\pi}{2}$ (C) π (D) zero
33. The electrostatic potential inside a uniformly charged spherical ball is given by $\phi = ar^2 + B$, where r is the distance from the centre, a, b are constants. Then, the charge density inside the ball is
 (A) $-24 a\epsilon_0 r$ (B) $-6 a\epsilon_0 r$ (C) $-24 a\epsilon_0$ (D) $-6 a\epsilon_0$
34. Two concentric conducting thin spherical shells A and B having radii r_A and r_B ($r_B > r_A$) are charged to Q_A and $-Q_B$ ($|Q_B| > |Q_A|$). The electrical potential along a line, (passing through the centre) is



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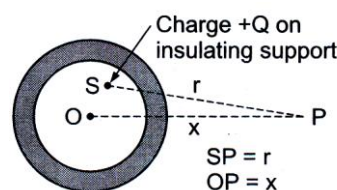
35. Consider the following statements about electric dipole and select the correct ones:
 S₁: Electric dipole moment vector \vec{p} is directed from the negative charge to positive charge.
 S₂: Electric field of a dipole at a point with position vector \vec{r} depends on $|\vec{r}|$ as well as angle between \vec{r} and \vec{p} .
 S₃: The electric dipole potential falls-off as $\frac{1}{r^2}$ and not as $\frac{1}{r}$.
 S₄: In a uniform electric field the electric dipole experiences no net force.
 (A) S₁, S₃, S₄ (B) S₁, S₂, S₄ (C) S₁, S₂, S₃ (D) all the four

36. A uniformly charged thin spherical shell of radius R carries uniform surface charge density of σ per unit area. It is made of two hemispherical shells, held together by pressing them with force F (see figure). F is proportional to



- (A) $\sigma^2 R^2$ (B) $\sigma^2 R$ (C) $\frac{\sigma^2}{R}$ (D) $\frac{\sigma^2}{R^2}$

37. The figure given below shows a charge + Q held on an insulating support S and enclosed by a hollow spherical conductor. O represents the centre of the spherical conductor and P is a point such that OP = x and SP = r. The electric field at point P will be



- (a) $\frac{Q}{4\pi\epsilon_0 x^2}$ (b) $\frac{Q}{4\pi\epsilon_0 r^2}$
 (c) 0 (d) none of these

38. Let $\rho(r) = \frac{Q}{\pi R^4} r$ be the charge density distribution for a solid sphere of radius R and total charge Q. For a point P inside the sphere at distance r_1 from the centre of the sphere, the magnitude of electric field is:

- (A) zero (B) $\frac{Q}{4\pi\epsilon_0 r_1^2}$ (C) $\frac{Qr_1^2}{4\pi\epsilon_0 R^4}$ (D) $\frac{Qr_1^2}{8\pi\epsilon_0 R^4}$

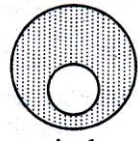
39. A solid sphere of radius R_1 and volume charge density $\rho = \frac{\rho_0}{r}$ is enclosed by a hollow sphere of radius R_2 with negative surface charge density σ , such that the total charge in the system is zero, ρ_0 is a positive constant and r is the distance from the centre of the sphere. the ratio $\frac{R_2}{R_1}$ is

- (A) $\frac{\sigma}{\rho_0}$ (B) $\sqrt{\frac{2\sigma}{\rho_0}}$ (C) $\sqrt{\frac{\rho_0}{2\sigma}}$ (D) $\frac{\rho_0}{\sigma}$

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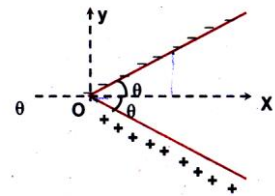
40. Three concentric metallic spherical shells of radii R , $2R$ and $3R$ are given charges Q_1 , Q_2 and Q_3 , respectively, It is found that the surface charge densities on the outer surfaces of the shells are equal. Then, the ratio of the charges given to the shells, $Q_1 : Q_2 : Q_3$ is
 (A) $1 : 2 : 3$ (B) $1 : 3 : 5$ (C) $1 : 4 : 9$ (D) $1 : 8 : 18$

41. A spherical portion has been removed from a solid sphere having a charge distributed uniformly in its volume as shown in the figure. The electric field inside the emptied space is
 (A) zero everywhere (B) non zero and uniform
 (C) non uniform (D) zero only at its centre

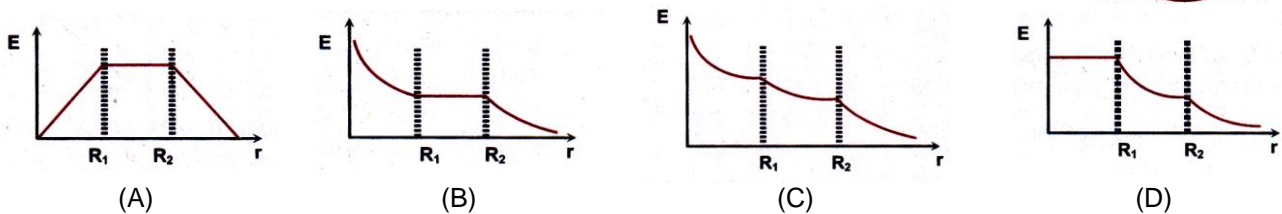
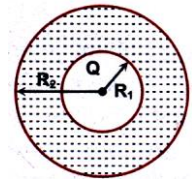


42. A positive point charge q is fixed at origin. A dipole with a dipole moment \vec{p} is placed along the x -axis far away from the origin with \vec{p} pointing along positive x -axis. The kinetic energy of the dipole when it reaches a distance d from the origin is
 (A) $\frac{kqp}{d^2}$ (B) $\frac{2kqp}{d^2}$ (C) $\frac{kqp}{2d^2}$ (D) zero

43. Two rods of length L are kept at angle 2θ to each other. The charge density on each rod varies as $\lambda(x) = \lambda_0 \left(1 - \frac{x}{L \cos \theta}\right)$. Find magnitude of dipole moment.
 (A) $\frac{\lambda L^2}{6} \cos \theta$ (B) $\frac{\lambda L^2}{3} \cos \theta$ (C) $\frac{\lambda L^2}{6} \sin \theta$ (D) $\frac{\lambda L^2}{3} \sin \theta$

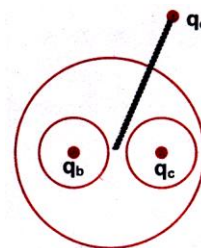


44. In a spherical distribution the charge density varies as $\rho(r) = \frac{Q}{2\pi R_1^2 r}$ for $R_1 < r < R_2$ as shown in the figure. A point charge Q lies at the centre of the sphere at $r = 0$. Choose the appropriate curve for variation of electric field E in the space as a function of r



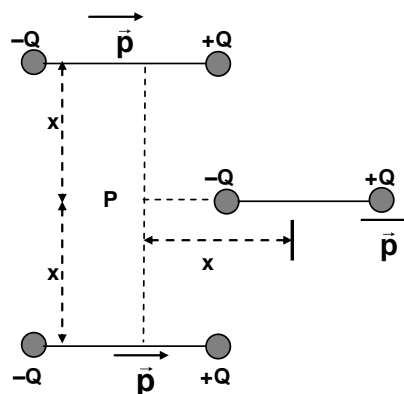
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45. A spherical conductor A contains two spherical cavities. The total charge on the conductor itself is zero. However, there is a point charge q_b at the centre of one cavity and q_c at the centre of the other. A considerable distance r away from the centre of the spherical conductor, there is another charge q_d . Force acting on q_b , q_c and q_d are F_1 , F_2 and F_3 respectively. [Assume all charges are positive]



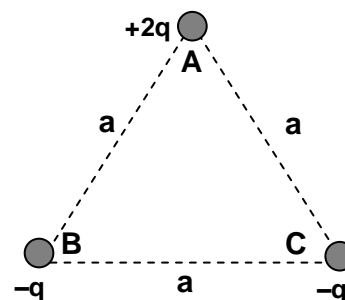
- (A) $F_1 < F_2 < F_3$ (B) $F_1 = F_2 < F_3$
 (C) $F_1 = F_2 > F_3$ (D) $F_1 > F_2 > F_3$

46. Three identical dipoles are arranged as shown in the figure. What will be the net electric field at P $\left(k = \frac{1}{4\pi\epsilon_0}\right)$?



- (A) $\frac{k \cdot p}{x^3}$ (B) $\frac{2kp}{x^3}$
 (C) Zero (D) $\frac{\sqrt{2}kp}{x^3}$

47. Three charges of $(+2q)(-q)$ and $(-q)$ are placed at the corners A, B and C of an equilateral triangle of side a as shown in the adjoining figure. Then the dipole moment of this combination is



- (A) qa (B) zero
 (C) $qa\sqrt{3}$ (D) $\frac{2}{\sqrt{3}}qa$

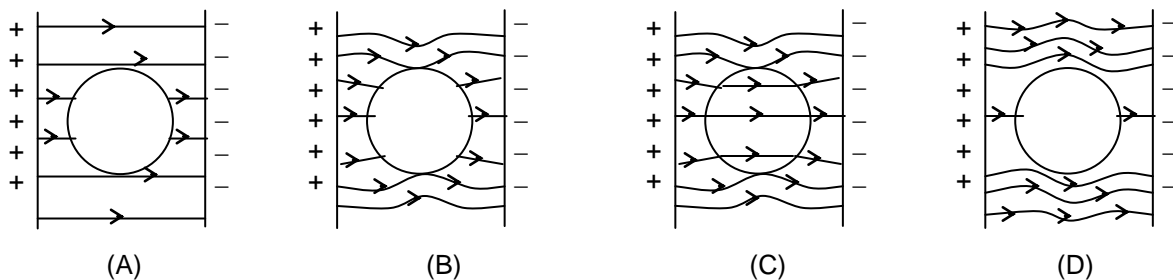
48. Total electric force on an electric dipole placed in an electric field of a point charge is
 (A) always zero
 (B) never zero
 (C) zero when mid-point of dipole coincides with the point charge
 (D) zero when dipole axis is along any electric line of force

Space for rough work

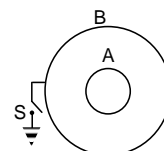
49. A solid conducting sphere having a charge Q is surrounded by an uncharged concentric conducting hollow spherical shell. Let the potential difference between the surface of the solid sphere and that of the outer surface of the hollow shell be V . If the shell is now given a charge of $-3Q$, the new potential difference between the same two surfaces is
 (A) V (B) $2V$ (C) $4V$ (D) $-2V$
50. Electric field intensity at an equatorial point of a dipole [dipole moment \vec{p}] is \vec{E} . The angle between \vec{p} and \vec{E} is
 (A) 90° (B) 0° (C) 180° (D) none of these
51. There are four concentric shells A, B, C and D of radii a , $2a$, $3a$ and $4a$ respectively. Shells B and D are given charges $+q$ and $-q$ respectively. Shell C is now earthed. The potential difference $V_A - V_C$ is
 (A) $\frac{Kq}{2a}$ (B) $\frac{Kq}{3a}$ (C) $\frac{Kq}{4a}$ (D) $\frac{Kq}{6a}$
52. Two conducting spheres of radii r_1 and r_2 have same electric fields near their surfaces. The ratio of their electric potential is
 (A) (r_1^2/r_2^2) (B) (r^2/r_1^2) (C) (r_1/r_2) (D) (r_2/r_1)
53. At distances of 5 cm and 10 cm from the surface of a sphere, the potentials are 600 V and 420 V. Find the potential at its surface
 (A) 650 V (B) 850 V (C) 1050 V (D) 1250 V
54. Two large horizontal plates charged with $+q$ and $-q$ charge are having an area $A \text{ m}^2$. A charged drop of oil is suspended in equilibrium position between the plates, then the charge on the oil drop will be
 (A) $\frac{mg\epsilon_0 A}{2q}$ (B) mg/A (C) $mg\epsilon_0 A/q$ (D) $mA\epsilon_0/q$
55. A charge Q is given to a large square plate of copper. The electric field at a point very close to the centre of the plate is 10V/m . If the copper plate is replaced by a plastic plate of the same geometrical dimensions and carrying the same charge Q uniformly distributed on one side of the plate, then the electric field at the point P will be
 (A) 5V/m (B) zero (C) 10V/m (D) 20V/m

Space for rough work

56. An uncharged metal sphere is placed between two equal and oppositely charged metal plates. The nature of line of force will be



57. Initially the spheres A and B are at potentials 15V and 10V. Find the potential of A when sphere B is earthed.

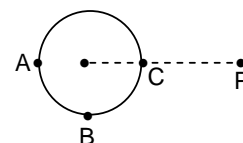


- (A) 10V (B) 5V (C) 15V (D) Zero

58. Two point dipoles $p\hat{k}$ and $\frac{p}{2}\hat{k}$ are located at $(0, 0, 0)$ & $(1m, 2m, 0m)$ respectively. The resultant electric field due to the two dipoles at the point $(1m, 0, 0)$ is

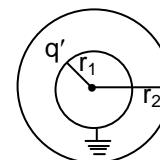
- (A) $\frac{9p}{32\pi\epsilon_0}\hat{k}$ (B) $\frac{-7p}{32\pi\epsilon_0}\hat{k}$ (C) $\frac{7p}{32\pi\epsilon_0}\hat{k}$ (D) none of these

59. A hollow conducting sphere is placed in an electric field produced by a point charge placed at P as shown in figure. Let V_A, V_B, V_C be the potentials at points A, B and C respectively. Then



- (A) $V_C > V_B$ (B) $V_B > V_C$ (C) $V_A > V_B$ (D) $V_A = V_C$

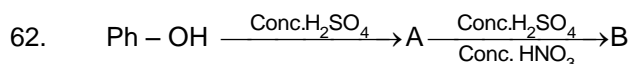
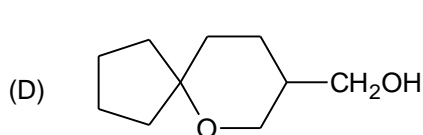
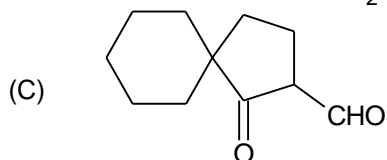
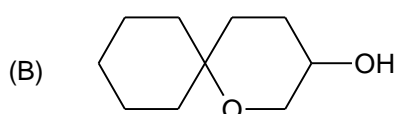
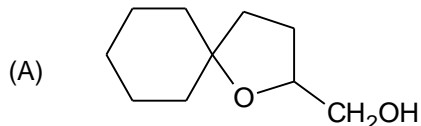
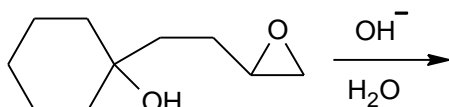
60. The concentric spheres are of radii r_1 and r_2 . The outer sphere is given a charge q . The charge q' on the inner sphere will be (inner sphere is grounded)



- (A) q (B) $-q$ (C) $-q \frac{r_1}{r_2}$ (D) zero

Space for rough work

61.



The number of $-\text{NO}_2$ groups substituted on benzene ring in the product.

- (A) 3 (B) 2 (C) 1 (D) 0

63. Which of the following cannot be used to distinguish between benzyl alcohol and phenol.
 (A) FeCl_3 (B) NaOH (aq) (C) Br_2/CCl_4 (D) $\text{NaHCO}_3 \text{ (aq)}$

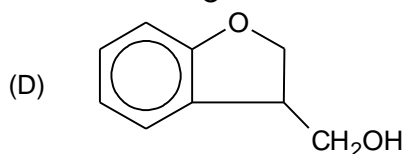
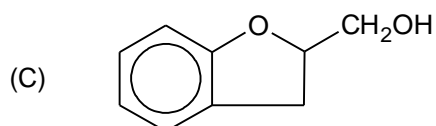
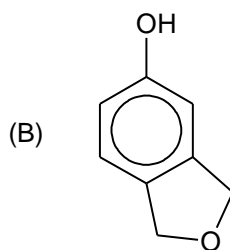
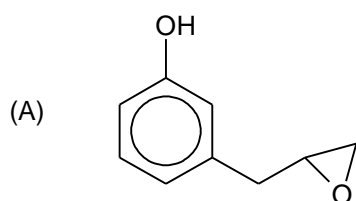
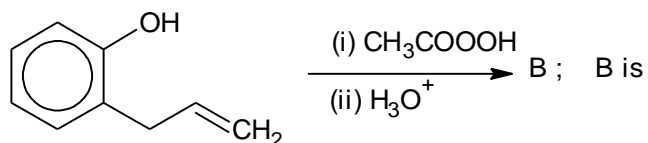
64. Which of the following statement is correct about phenol ?
 (A) Electron releasing groups increases acidic character
 (B) Phenol turns red litmus blue
 (C) Electron withdrawing groups decrease acidic character
 (D) Electron withdrawing substituents increase acidic character.

65. When phenol reacts with dilute neutral FeCl_3 solution, a violet colouration is produced. The violet colour species could be

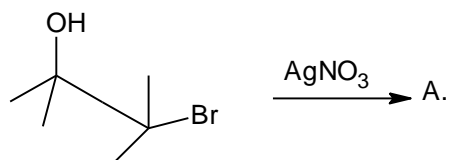
- (A) $[\text{Fe}(\text{COC}_6\text{H}_5)_6]^{-4}$ (B) $\text{Fe}(\text{C}_6\text{H}_5)_3$
 (C) $[\text{Fe}(\text{OC}_6\text{H}_5)_6]^{-3}$ (D) $\text{Fe}(\text{OC}_6\text{H}_5)_3$

Space for rough work

66.



67.



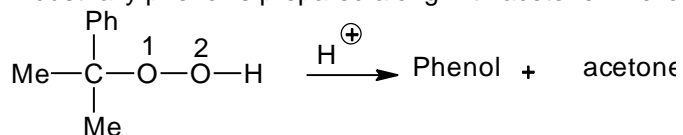
Degree of unsaturation of A is ?

- (A) 1 (B) 2 (C) 0 (D) 3

68. The Lucas test, which alcohol gives cloudiness immediately

- (A) C₂H₅OH (B) Isopropanol
(C) t-butanol (D) sec-butyl alcohol

69. Industrially phenol is prepared along with acetone in following way :

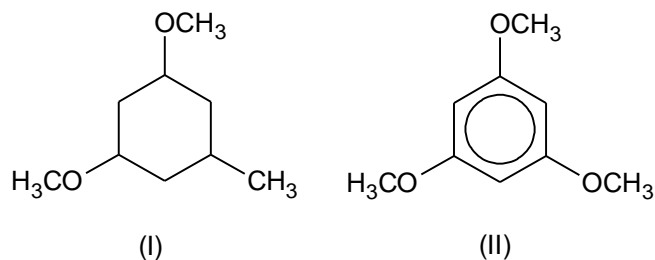


Which oxygen gets protonated in the above reaction ?

- (A) 2 (B) 1 (C) 1 or 2 (D) None

Space for rough work

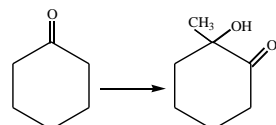
70.



The maximum number of moles of HI required for complete reaction of one mole of compound (I) and (II) are respectively.

- (A) 3 & 6 (B) 6 & 3 (C) 6 & 6 (D) 3 & 3

71.

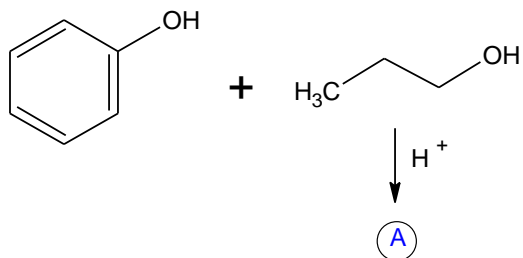


- (1) $\text{CH}_3\text{MgBr} / \text{H}^+$ (2) KMnO_4 (cold dil.) (3) CrO_3 (4) H^+ / Δ

For the above conversion the correct order of reagents used is:

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

72.

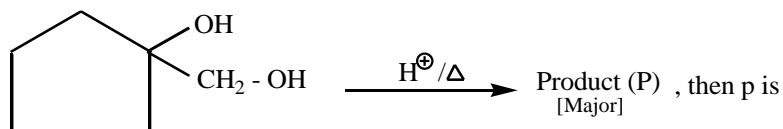


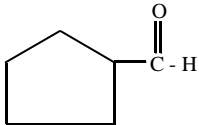
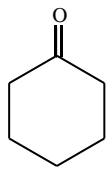
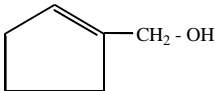
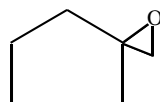
Then the product A is

- (A) CCCOc1ccccc1 (B) CCCOc1ccccc1
- (C) CC(C)c1ccccc1O (D) C=CCc1ccccc1O

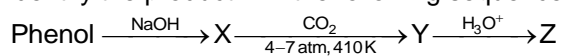
Space for rough work

73.



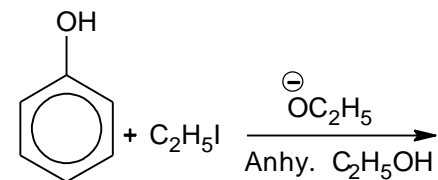
- (A)  (B) 
- (C)  (D) 

74. Identify the product Z in the following sequence of reactions



- (A) Aspirin (B) Salicylaldehyde (C) Benzoic acid (D) Salicylic acid

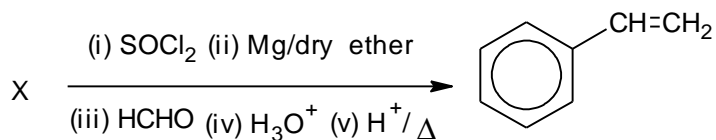
75.



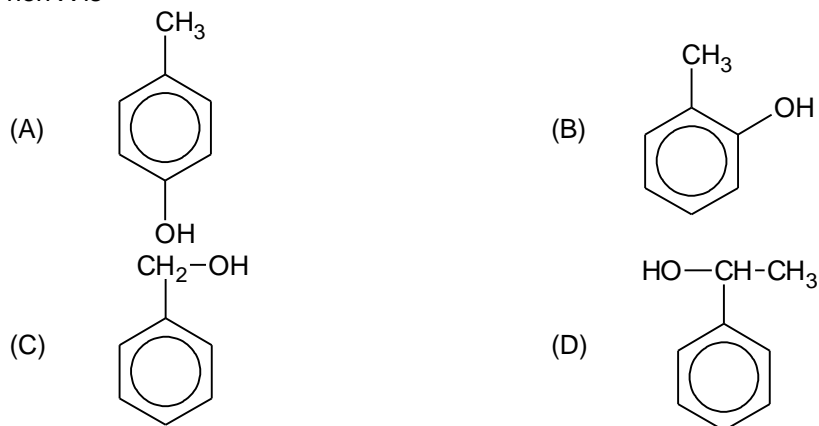
- (A) CCOCc1ccccc1 (B) CCOC(C)C (C) CCOC(c1ccccc1)c2ccccc2 (D) CC(I)C

Space for rough work

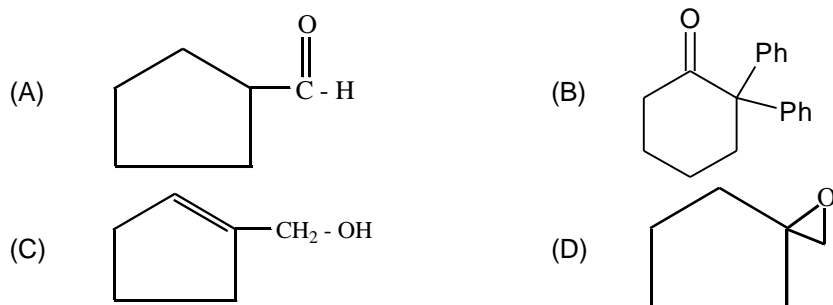
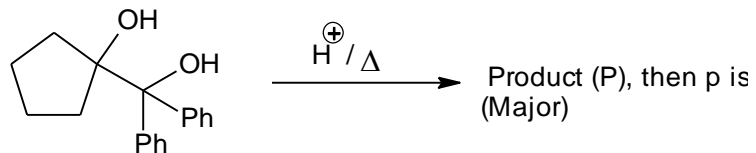
76.



Then X is

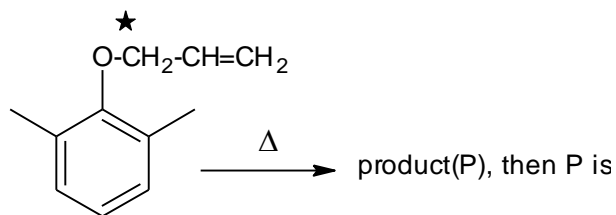


77.



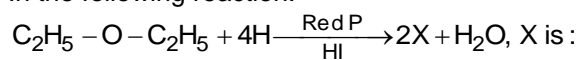
Space for rough work

78.



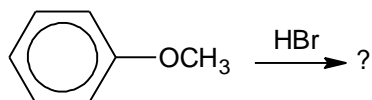
- (A) (B)
- (C) (D)

79. In the following reaction.



- (A) ethane (B) ethylene (C) butane (D) propane

80. In the reaction

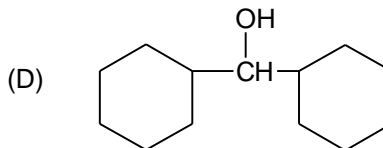
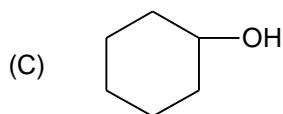
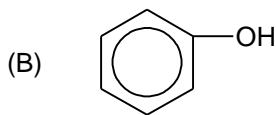
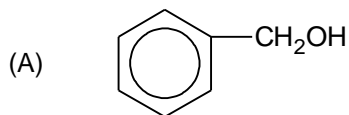


the products are :

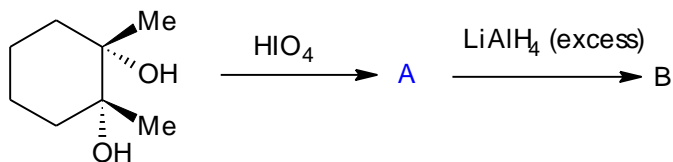
- (A) (B)
- (C) (D)

Space for rough work

81. Which of the following compounds has the most acidic nature ?



82.

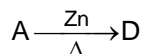
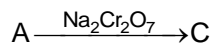
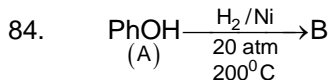


How many stereoisomers of B are possible

- (A) 2 (B) 0 (C) 4 (D) 3

83. Number of moles of NaOH required by one mole of acetone in Haloform reaction.

- (A) 5 (B) 4 (C) 6 (D) 3

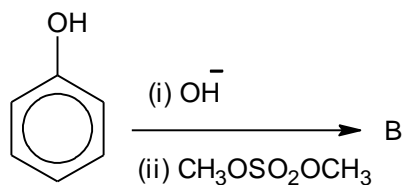


The compounds B, C, D respectively, are

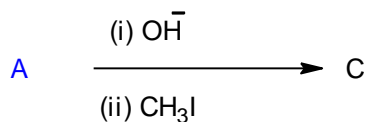
- (A) cyclohexanol, benzene and benzoquinone (B) benzene, cyclohexanol and benzoquinone
(C) benzo quinone, cyclohexanol and benzene (D) cyclohexanol, benzo quinone and benzene

Space for rough work

85.



(A)



The products B and C, respectively are

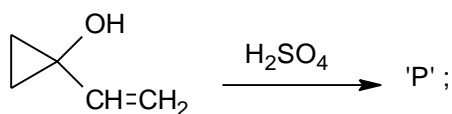
(A) Both B and C are PhOCH₃

(B) B is PhO₃-OCH₃

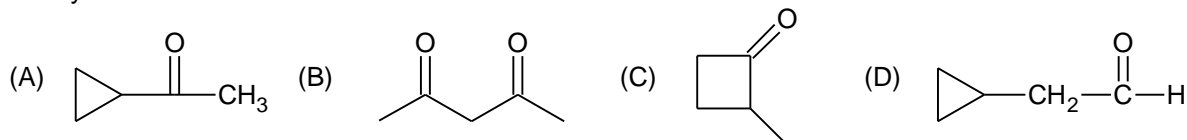
(C) B is PhSO₃-CH₃

(D) B is both B and C

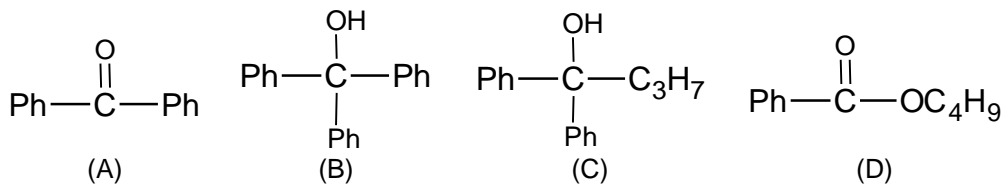
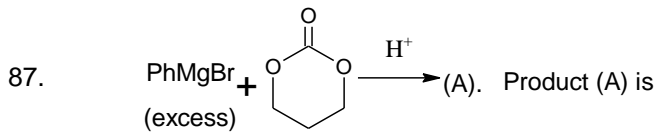
86.



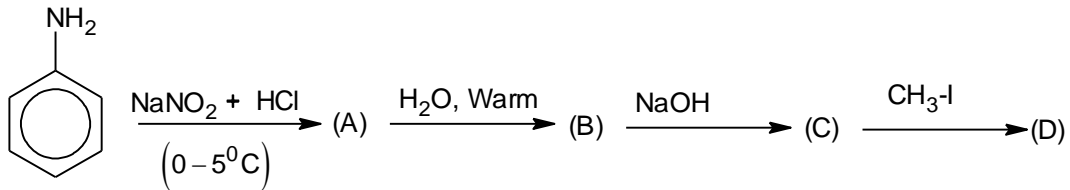
Identify 'P' in the reaction.



Space for rough work

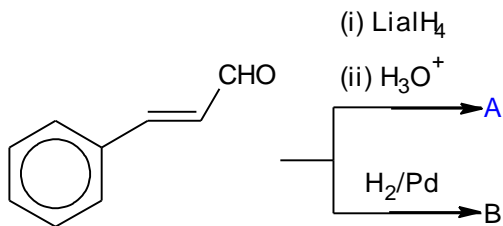


88.



- (A) The product (D) is an ether
 (B) The product (D) gives CO_2 gas on treatment with NaHCO_3
 (C) The product (B) is more acidic than H_2CO_3
 (D) The product (D) is an aryl halide

89.

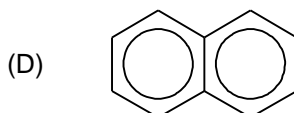
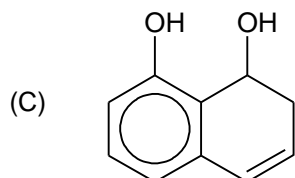
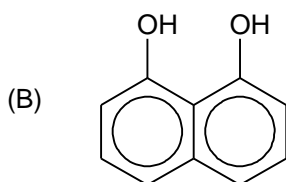
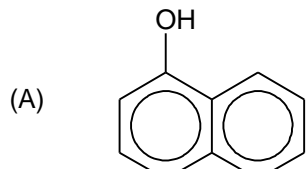
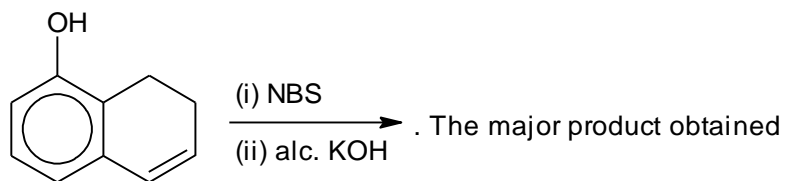


The sum of Pi bonds present in A and B is

- (A) 4 (B) 7 (C) 3 (D) 6

Space for rough work

90.



Space for rough work

FIITJEE PET – III (REG_2ND YEAR)

MAINS_SET-A_ANSWERS

DATE: 23.06.2018

MATHEMATICS

1. C	2. B	3. B	4. D
5. A	6. D	7. B	8. A
9. A	10. D	11. A	12. A
13. B	14. B	15. B	16. A
17. D	18. A	19. C	20. A
21. C	22. C	23. C	24. D
25. B	26. C	27. B	28. C
29. C	30. C		

PHYSICS

31. A	32. C	33. D	34. C
35. D	36. A	37. A	38. C
39. C	40. B	41. B	42. A
43. D	44. B	45. B	46. C
47. C	48. B	49. A	50. C
51. D	52. C	53. C	54. C
55. C	56. B	57. B	58. D
59. D	60. C		

CHEMISTRY

61. A	62. A	63. D	64. D
65. C	66. C	67. A	68. C
69. A	70. B	71. C	72. C
73. B	74. D	75. A or B	76. C
77. B	78. B	79. A	80. A
81. B	82. D	83. B	84. D
85. A	86. C	87. B	88. A
89. D	90. A		

FIITJEE PET – III (REG_2ND YEAR)

MAINS_SET-B

DATE: 23.06.2018

Time: 3 hours1

Maximum Marks: 360

INSTRUCTIONS:

Instructions to the Candidates

1. This Test Booklet consists of **90 questions**.
Use **Blue/Black ball Point Pen only** for writing particulars and bubbling of OMR.
2. For each correct answer **4 Marks** will awarded and for each wrong answer **1 Mark** will be deducted.
3. Attempt all questions.
4. In case you have not darkened any bubble you will be awarded 0 mark for that question.
5. Use of calculator/logarithmic table is not permitted.

**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.:

- The equation of the circle passing through (2, 0) and (0, 4) and having the minimum radius is
 (A) $x^2 + y^2 + 2x + 4y = 0$ (B) $x^2 + y^2 - 2x + 4y = 0$
 (C) $x^2 + y^2 - 2x - 4y = 0$ (D) $x^2 + y^2 + 2x - 4y = 0$
- Two rods of lengths a and b slide along the axes which are rectangular in such a manner that their ends are concyclic. The locus of the centre of the circle passing through these points is
 (A) $4(x^2 + y^2) = a^2 + b^2$ (B) $x^2 - y^2 = a^2 - b^2$ (C) $4(x^2 - y^2) = a^2 - b^2$ (D) $x^2 + y^2 = a^2 + b^2$
- Circles are drawn through the point (2, 0) to cut intercepts of length 5 units on the x-axis. If their centres lie in the first quadrant, then their equation is (where $k > 0$)
 (A) $x^2 + y^2 - 9x + 2ky + 7/2 = 0$ (B) $3x^2 + 3y^2 + 27x - 2ky + 42 = 0$
 (C) $x^2 + y^2 - 9x - 2ky + 14 = 0$ (D) $x^2 + y^2 - 2kx - 9y + 7/2 = 0$
- The equation of the circle passing through the origin and cutting intercepts of length 3 and 4 units from the positive axes, is
 (A) $x^2 + y^2 + 6x + 8y + 1 = 0$ (B) $x^2 + y^2 - 6x - 8y = 0$
 (C) $x^2 + y^2 + 3x + 4y = 0$ (D) $x^2 + y^2 - 3x - 4y = 0$
- The equation of the circle with centre at (-3, 4) and touching y-axis is
 (A) $x^2 + y^2 - 4x - 6y + 4 = 0$ (B) $x^2 + y^2 + 6x - 8y + 16 = 0$
 (C) $x^2 + y^2 - 8x - 6y + 21 = 0$ (D) $x^2 + y^2 - 24x - 10y + 14 = 0$
- If $x^2 + y^2 + 2gx + 2fy + c = 0$ is concentric with $x^2 + y^2 - 2x + 6y - 3 = 0$ and whose radius is equal to the radius of the circle $x^2 + y^2 - 6x - 1 = 0$, then the value of "c" is
 (A) 0 (B) 1 (C) -1 (D) -2
- A square is inscribed in the circle $x^2 + y^2 - 2x + 4y + 3 = 0$, whose sides are parallel to the coordinate axes. One vertex of the square is
 (A) $(1 + \sqrt{2}, -2)$ (B) $(1 - \sqrt{2}, -2)$ (C) $(1, -2 + \sqrt{2})$ (D) None of these
- The equation of the circle which touches both the axes and whose radius is a, is
 (A) $x^2 + y^2 - 2ax - 2ay + a^2 = 0$ (B) $x^2 + y^2 + ax + ay - a^2 = 0$
 (C) $x^2 + y^2 + 2ax + 2ay - a^2 = 0$ (D) $x^2 + y^2 - ax - ay + a^2 = 0$
- If a circle passes through the points where the lines $3\lambda x - 2y - 1 = 0$ and $4x - 3y + 2 = 0$ meet the coordinate axes then $\lambda =$
 (A) -1 (B) -1/2 (C) 1/2 (D) 1

Space for rough work

10. The co-ordinates of the point on the circle $x^2 + y^2 - 12x - 4y + 30 = 0$ which is farthest from the origin are
 (A) (9, 3) (B) (8, 5) (C) (12, 4) (D) None of these
11. The diameters of a circle are along $2x + y - 7 = 0$ and $x + 3y - 11 = 0$. Then, the equation of this circle, which also passes through (5, 7) is
 (A) $x^2 + y^2 - 4x - 6y - 16 = 0$ (B) $x^2 + y^2 - 4x - 6y - 20 = 0$
 (C) $x^2 + y^2 - 4x - 6y - 12 = 0$ (D) $x^2 + y^2 + 4x + 6y - 12 = 0$
12. The centroid of an equilateral triangle is (0, 0) and the length of the altitude is 6. The equation of the circumcircle of the triangle is
 (A) $x^2 + y^2 = 6$ (B) $x^2 + y^2 = 16$ (C) $x^2 + y^2 = 9$ (D) $x^2 + y^2 = 36$
13. For the circle $2x^2 + 2y^2 - 5x - 4y - 3 = 0$, the point (4, 2)
 (A) lies inside the circle (B) lies outside the circle
 (C) lies on the circle (D) is the centre of the circle
14. The locus of a point which divides the join of A(-1, 1) and a variable point P on the circle $x^2 + y^2 = 4$ in the ratio 3 : 2 is
 (A) $25(x^2 + y^2) + 20(x + y) + 28 = 0$ (B) $25(x^2 + y^2) - 20(x + y) + 28 = 0$
 (C) $25(x^2 + y^2) + 20(x - y) + 28 = 0$ (D) $25(x^2 + y^2) + 20(x - y) - 28 = 0$
15. Equation $x^2 + 2ax - b^2 = 0$ has real roots α, β and equation $x^2 + 2px - q^2 = 0$ has real roots γ, δ . If circle C is drawn with the points $(\alpha, \gamma), (\beta, \delta)$ as extremities of a diameter, then the equation of C is
 (A) $x^2 + y^2 + 2ax + 2py - b^2 - q^2 = 0$ (B) $x^2 + y^2 + 2ax + 2py + b^2 + q^2 = 0$
 (C) $x^2 + y^2 - 2ax - 2py + b^2 + q^2 = 0$ (D) $x^2 + y^2 + 2ax - 2py + b^2 - q^2 = 0$
16. If a chord of the circle $x^2 + y^2 = 8$ makes equal intercepts of length a on the coordinate axes, then
 (A) $|a| < 2$ (B) $|a| < \sqrt{2}$ (C) $|a| < 4$ (D) $|a| < \sqrt{8}$
17. The values of α for which the point $(2\alpha, \alpha+1)$ is in the interior of the larger segment of the circle $x^2 + y^2 - 2x - 2y - 8 = 0$ made by the chord $x - y + 1 = 0$ is
 (A) $\left(-\frac{9}{5}, 0\right)$ (B) $\left(0, \frac{9}{5}\right)$ (C) (-1, 0) (D) (0, 1)
18. Circle $x^2 + y^2 - 4x - 8y - 5 = 0$ will intersect the line $3x - 4y = m$ in two distinct points, if
 (A) $-10 < m < 5$ (B) $9 < m < 20$ (C) $-35 < m < 15$ (D) None of these

Space for rough work

19. The circle $x^2 + y^2 - 6x - 10y + k = 0$ does not touch or intersect the axes and the point (1, 4) is inside the circle. Then the condition is
 (A) $0 < k < 25$ (B) $k < 29$ (C) $25 < k < 29$ (D) $k > 25$
20. The number of integral (a point whose abscissa as well as ordinate are integers) lying inside the circle $x^2 + y^2 - 4x - 6y + 9 = 0$ is
 (A) 10 (B) 12 (C) 9 (D) 8
21. The area of the circle $(x + 1)(x + 2) + (y - 1)(y + 3) = 0$ is
 (A) $\frac{17\pi}{4}$ (B) $\frac{17\pi}{2}$ (C) $\frac{2\pi}{17}$ (D) none of these
22. The area bounded by the circles $x^2 + y^2 = 1$ and $x^2 + y^2 = 2$, and the pair of lines $2x^2 - 3xy - 2y^2 = 0$ ($y > 0$), is
 (A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$ (C) $\frac{3\pi}{4}$ (D) π
23. The centre of the incircle of the triangle formed by the line $3x + 4y = 24$ with the axes is
 (A) (3, 3) (B) (2, 2) (C) (-2, 2) (D) (2, -2)
24. Equation of the circle passing through A(1, 2), B(5, 2) so that the angle subtended by AB at points on the circle is $\frac{\pi}{4}$ is
 (A) $x^2 + y^2 - 6x - 8 = 0$ (B) $x^2 + y^2 - 6x - 8y + 17 = 0$
 (C) $x^2 + y^2 - 6x + 8 = 0$ (D) $x^2 + y^2 - 6x - 8y - 25 = 0$
25. A = (cos θ , sin θ) and B = (sin θ , -cos θ) are two points. The locus of the centroid of ΔOAB where O is the origin is
 (A) $x^2 + y^2 = 3$ (B) $9x^2 + 9y^2 = 2$ (C) $2x^2 + 2y^2 = 9$ (D) $3x^2 + 3y^2 = 2$
26. If two distinct chords, drawn from the point (p, q) on the circle $x^2 + y^2 - px - qy = 0$ (where $pq \neq 0$) are bisected by the x-axis, then
 (A) $p^2 = q^2$ (B) $p^2 = 8q^2$ (C) $p^2 < 8q^2$ (D) $p^2 > 8q^2$
27. The radius of the circle passing through the point (6, 2) and two of whose diameters are $x + y = 6$ and $x + 2y = 4$ is
 (A) 10 (B) $2\sqrt{5}$ (C) 6 (D) 4
28. A variable circle passes through the fixed point A(p, q) and touches x-axis. The locus of the other end of the diameter through A is
 (A) $(x - p)^2 = 4qy$ (B) $(y - q)^2 = 4px$ (C) $(y - p)^2 = 4qx$ (D) $(x - q)^2 = 4py$

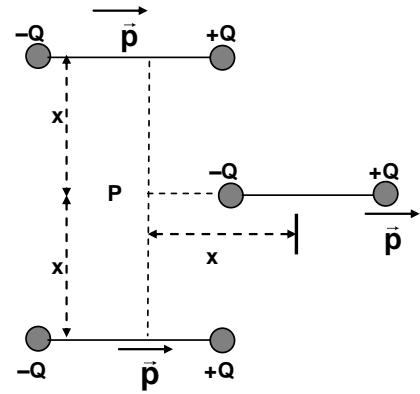
Space for rough work

29. If the circles described on the line joining the points (0, 1) and (α , β) are diameter cuts the axis of x in points whose abscissae are the roots of the equation $x^2 - 5x + 3 = 0$, then (α , β) =
 (A) (5, 3) (B) (3, 5) (C) (-5, 3) (D) (3, -5)
30. Consider the circle $x^2 + y^2 - 4x - 2y + c = 0$ whose centre is A(2, 1). If the point P(10, 7) is such that the line segment PA meets the circle in Q with PQ = 5, then c =
 (A) -15 (B) 20 (C) 30 (D) -20
31. There are four concentric shells A, B, C and D of radii a, 2a, 3a and 4a respectively. Shells B and D are given charges +q and -q respectively. Shell C is now earthed. The potential difference $V_A - V_C$ is
 (A) $\frac{Kq}{2a}$ (B) $\frac{Kq}{3a}$ (C) $\frac{Kq}{4a}$ (D) $\frac{Kq}{6a}$
32. Two conducting spheres of radii r_1 and r_2 have same electric fields near their surfaces. The ratio of their electric potential is
 (A) (r_1^2/r_2^2) (B) (r^2/r_1^2) (C) (r_1/r_2) (D) (r_2/r_1)
33. At distances of 5 cm and 10 cm from the surface of a sphere, the potentials are 600 V and 420 V. Find the potential at its surface
 (A) 650 V (B) 850 V (C) 1050 V (D) 1250 V
34. Two large horizontal plates charged with +q and -q charge are having an area $A \text{ m}^2$. A charged drop of oil is suspended in equilibrium position between the plates, then the charge on the oil drop will be
 (A) $\frac{mg\epsilon_0 A}{2q}$ (B) mg/A (C) $mg\epsilon_0 A/q$ (D) $mA\epsilon_0/q$
35. A charge Q is given to a large square plate of copper. The electric field at a point very close to the centre of the plate is 10V/m. If the copper plate is replaced by a plastic plate of the same geometrical dimensions and carrying the same charge Q uniformly distributed on one side of the plate, then the electric field at the point P will be
 (A) 5V/m (B) zero (C) 10V/m (D) 20V/m

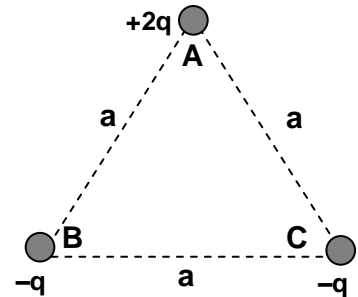
Space for rough work

36. Three identical dipoles are arranged as shown in the figure. What will be the net electric field at P $\left(k = \frac{1}{4\pi\epsilon_0}\right)$?

- (A) $\frac{k.p}{x^3}$ (B) $\frac{2kp}{x^3}$
 (C) Zero (D) $\frac{\sqrt{2}kp}{x^3}$



37. Three charges of $(+2q)(-q)$ and $(-q)$ are placed at the corners A, B and C of an equilateral triangle of side a as shown in the adjoining figure. Then the dipole moment of this combination is
 (A) qa (B) zero
 (C) $qa\sqrt{3}$ (D) $\frac{2}{\sqrt{3}}qa$



38. Total electric force on an electric dipole placed in an electric field of a point charge is
 (A) always zero
 (B) never zero
 (C) zero when mid-point of dipole coincides with the point charge
 (D) zero when dipole axis is along any electric line of force
39. A solid conducting sphere having a charge Q is surrounded by an uncharged concentric conducting hollow spherical shell. Let the potential difference between the surface of the solid sphere and that of the outer surface of the hollow shell be V . If the shell is now given a charge of $-3Q$, the new potential difference between the same two surfaces is
 (A) V (B) $2V$ (C) $4V$ (D) $-2V$

Space for rough work

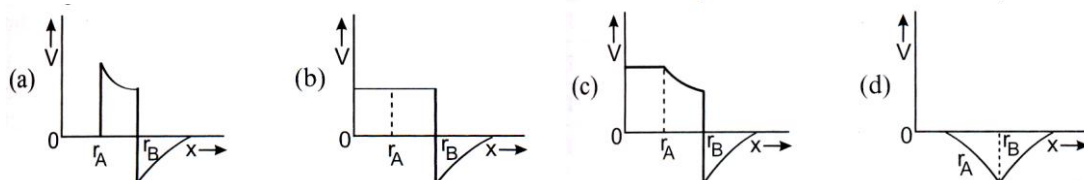
40. Electric field intensity at an equatorial point of a dipole [dipole moment \vec{p}] is \vec{E} . The angle between \vec{p} and \vec{E} is
 (A) 90° (B) 0° (C) 180° (D) none of these

41. Two conducting spheres of radii 3 cm and 1 cm are separated by a distance of 10 cm in free space. If the spheres are charged to same potential of 10 V each, the force of repulsion between them, is
 (A) $\left(\frac{1}{3}\right) \times 10^{-9}$ N (B) $\left(\frac{2}{9}\right) \times 10^{-9}$ N (C) $\left(\frac{1}{9}\right) \times 10^{-9}$ N (D) $\left(\frac{4}{3}\right) \times 10^{-9}$ N

42. A dipole of electric dipole moment p is placed in a uniform electric field of strength E . If θ is the angle between positive direction of p and E , then the potential energy of the electric dipole is largest when θ is
 (A) $\frac{\pi}{3}$ (B) $\frac{\pi}{2}$ (C) π (D) zero

43. The electrostatic potential inside a uniformly charged spherical ball is given by $\phi = ar^2 + B$, where r is the distance from the centre, a, b are constants. Then, the charge density inside the ball is
 (A) $-24 a\epsilon_0 r$ (B) $-6 a\epsilon_0 r$ (C) $-24 a\epsilon_0$ (D) $-6 a\epsilon_0$

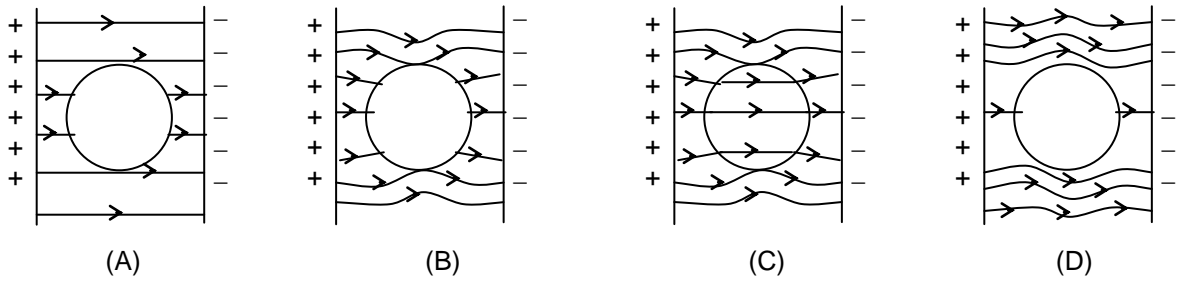
44. Two concentric conducting thin spherical shells A and B having radii r_A and r_B ($r_B > r_A$) are charged to Q_A and $-Q_B$ ($|Q_B| > |Q_A|$). The electrical potential along a line, (passing through the centre) is



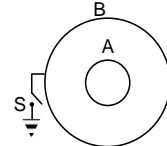
45. Consider the following statements about electric dipole and select the correct ones:
 S₁: Electric dipole moment vector \vec{p} is directed from the negative charge to positive charge.
 S₂: Electric field of a dipole at a point with position vector \vec{r} depends on $|\vec{r}|$ as well as angle between \vec{r} and \vec{p} .
 S₃: The electric dipole potential falls off as $\frac{1}{r^2}$ and not as $\frac{1}{r}$.
 S₄: In a uniform electric field the electric dipole experiences no net force.
 (A) S₁, S₃, S₄ (B) S₁, S₂, S₄ (C) S₁, S₂, S₃ (D) all the four

Space for rough work

46. An uncharged metal sphere is placed between two equal and oppositely charged metal plates. The nature of line of force will be



47. Initially the spheres A and B are at potentials 15V and 10V. Find the potential of A when sphere B is earthed.

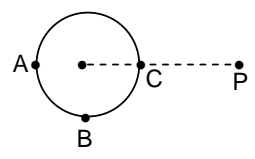


- (A) 10V (B) 5V (C) 15V (D) Zero

48. Two point dipoles $p\hat{k}$ and $\frac{p}{2}\hat{k}$ are located at $(0, 0, 0)$ & $(1m, 2m, 0m)$ respectively. The resultant electric field due to the two dipoles at the point $(1m, 0, 0)$ is

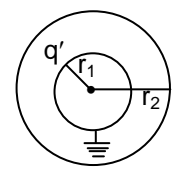
- (A) $\frac{9p}{32\pi\epsilon_0}\hat{k}$ (B) $\frac{-7p}{32\pi\epsilon_0}\hat{k}$ (C) $\frac{7p}{32\pi\epsilon_0}\hat{k}$ (D) none of these

49. A hollow conducting sphere is placed in an electric field produced by a point charge placed at P as shown in figure. Let V_A , V_B , V_C be the potentials at points A, B and C respectively. Then



- (A) $V_C > V_B$ (B) $V_B > V_C$ (C) $V_A > V_B$ (D) $V_A = V_C$

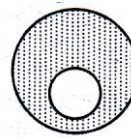
50. The concentric spheres are of radii r_1 and r_2 . The outer sphere is given a charge q . The charge q' on the inner sphere will be (inner sphere is grounded)



- (A) q (B) $-q$ (C) $-q \frac{r_1}{r_2}$ (D) zero

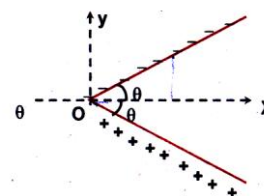
Space for rough work

51. A spherical portion has been removed from a solid sphere having a charge distributed uniformly in its volume as shown in the figure. The electric field inside the emptied space is
 (A) zero everywhere (B) non zero and uniform
 (C) non uniform (D) zero only at its centre



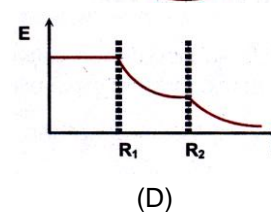
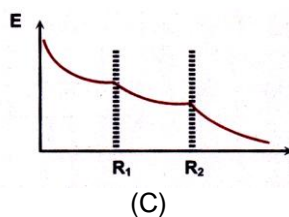
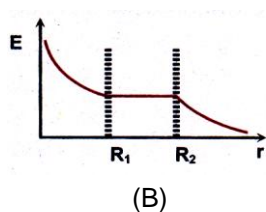
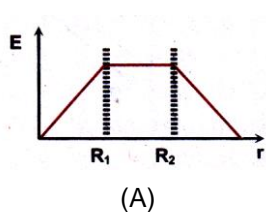
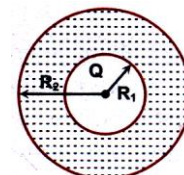
52. A positive point charge q is fixed at origin. A dipole with a dipole moment \vec{p} is placed along the x -axis far away from the origin with \vec{p} pointing along positive x -axis. The kinetic energy of the dipole when it reaches a distance d from the origin is
 (A) $\frac{kqp}{d^2}$ (B) $\frac{2kqp}{d^2}$ (C) $\frac{kqp}{2d^2}$ (D) zero

53. Two rods of length L are kept at angle 2θ to each other. The charge density on each rod varies as $\lambda(x) = \lambda_0 \left(1 - \frac{x}{L \cos \theta}\right)$. Find magnitude of dipole moment.



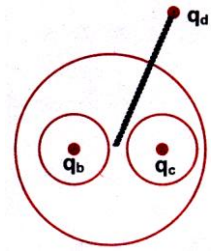
- (A) $\frac{\lambda L^2}{6} \cos \theta$ (B) $\frac{\lambda L^2}{3} \cos \theta$ (C) $\frac{\lambda L^2}{6} \sin \theta$ (D) $\frac{\lambda L^2}{3} \sin \theta$

54. In a spherical distribution the charge density varies as $\rho(r) = \frac{Q}{2\pi R_1^2 r}$ for $R_1 < r < R_2$ as shown in the figure. A point charge Q lies at the centre of the sphere at $r = 0$. Choose the appropriate curve for variation of electric field E in the space as a function of r



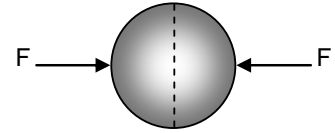
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55. A spherical conductor A contains two spherical cavities. The total charge on the conductor itself is zero. However, there is a point charge q_b at the centre of one cavity and q_c at the centre of the other. A considerable distance r away from the centre of the spherical conductor, there is another charge q_d . Force acting on q_b , q_c and q_d are F_1 , F_2 and F_3 respectively. [Assume all charges are positive]



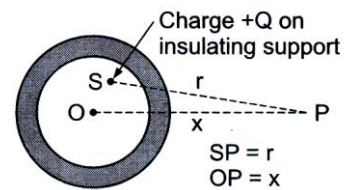
- (A) $F_1 < F_2 < F_3$ (B) $F_1 = F_2 < F_3$
 (C) $F_1 = F_2 > F_3$ (D) $F_1 > F_2 > F_3$

56. A uniformly charged thin spherical shell of radius R carries uniform surface charge density of σ per unit area. It is made of two hemispherical shells, held together by pressing them with force F (see figure). F is proportional to



- (A) $\sigma^2 R^2$ (B) $\sigma^2 R$ (C) $\frac{\sigma^2}{R}$ (D) $\frac{\sigma^2}{R^2}$

57. The figure given below shows a charge $+Q$ held on an insulating support S and enclosed by a hollow spherical conductor. O represents the centre of the spherical conductor and P is a point such that $OP = x$ and $SP = r$. The electric field at point P will be



- (a) $\frac{Q}{4\pi\epsilon_0 x^2}$ (b) $\frac{Q}{4\pi\epsilon_0 r^2}$
 (c) 0 (d) none of these

58. Let $\rho(r) = \frac{Q}{\pi R^4} r$ be the charge density distribution for a solid sphere of radius R and total charge Q . For a point P inside the sphere at distance r_1 from the centre of the sphere, the magnitude of electric field is:

- (A) zero (B) $\frac{Q}{4\pi\epsilon_0 r_1^2}$ (C) $\frac{Qr_1^2}{4\pi\epsilon_0 R^4}$ (D) $\frac{Qr_1^2}{8\pi\epsilon_0 R^4}$

Space for rough work

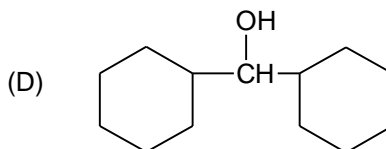
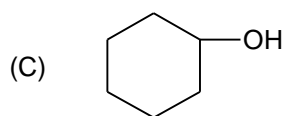
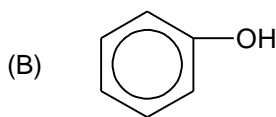
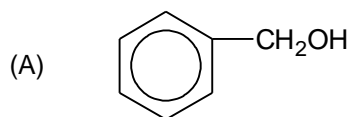
59. A solid sphere of radius R_1 and volume charge density $\rho = \frac{\rho_0}{r}$ is enclosed by a hollow sphere of radius R_2 with negative surface charge density σ , such that the total charge in the system is zero, ρ_0 is a positive constant and r is the distance from the centre of the sphere. the ratio $\frac{R_2}{R_1}$ is

- (A) $\frac{\sigma}{\rho_0}$ (B) $\sqrt{\frac{2\sigma}{\rho_0}}$ (C) $\sqrt{\frac{\rho_0}{2\sigma}}$ (D) $\frac{\rho_0}{\sigma}$

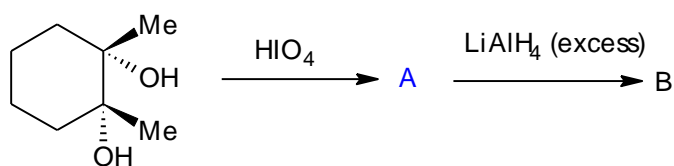
60. Three concentric metallic spherical shells of radii R , $2R$ and $3R$ are given charges Q_1 , Q_2 and Q_3 , respectively, It is found that the surface charge densities on the outer surfaces of the shells are equal. Then, the ratio of the charges given to the shells, $Q_1 : Q_2 : Q_3$ is

- (A) 1 : 2 : 3 (B) 1 : 3 : 5 (C) 1 : 4 : 9 (D) 1 : 8 : 18

61. Which of the following compounds has the most acidic nature ?



62.



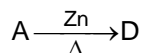
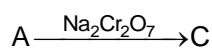
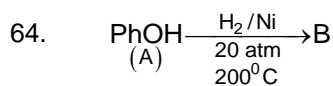
How many stereoisomers of B are possible

- (A) 2 (B) 0 (C) 4 (D) 3

63. Number of moles of NaOH required by one mole of acetone in Haloform reaction.

- (A) 5 (B) 4 (C) 6 (D) 3

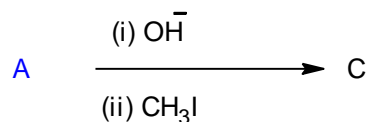
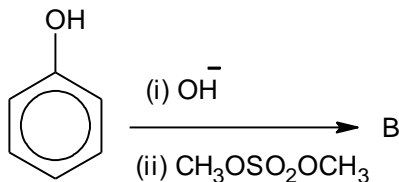
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The compounds B, C, D respectively, are

- (A) cyclohexanol, benzene and benzoquinone (B) benzene, cyclohexanol and benzoquinone
 (C) benzo quinone, cyclohexanol and benzene (D) cyclohexanol, benzo quinone and benzene

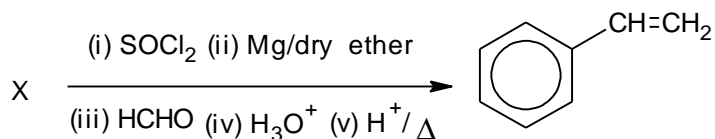
65.



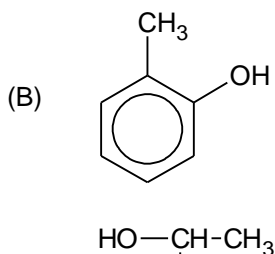
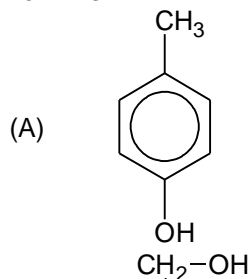
The products B and C, respectively are

- (A) Both B and C are PhOCH_3 (B) B is $\text{PhO}_3\text{-OCH}_3$
 (C) B is $\text{PhSO}_3\text{-CH}_3$ (D) B is both B and C

66.

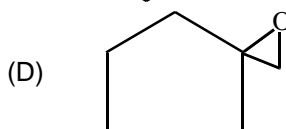
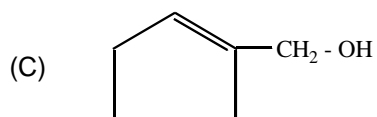
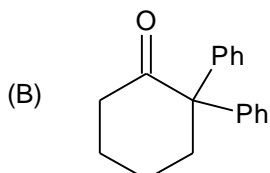
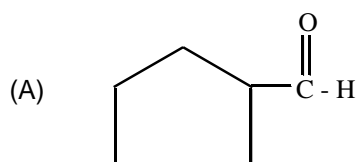
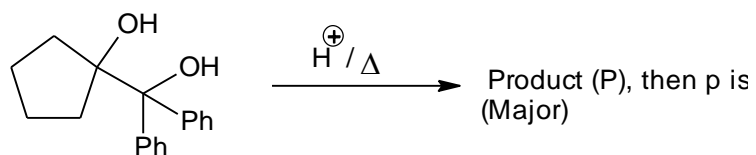


Then X is

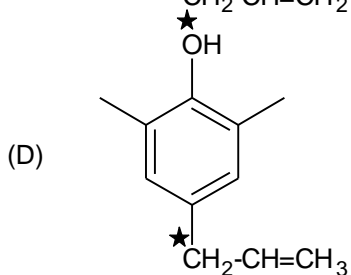
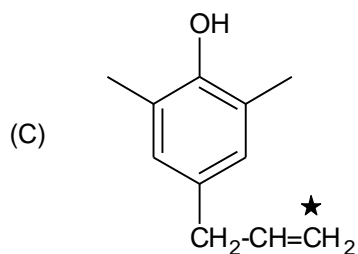
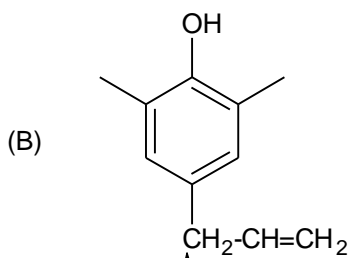
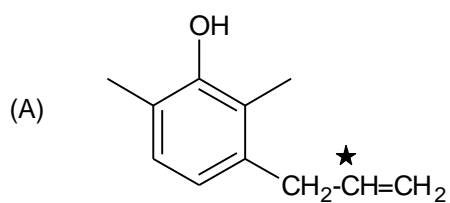
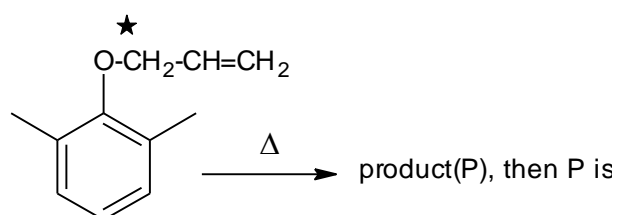


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67.

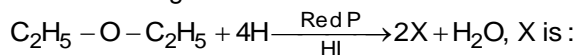


68.



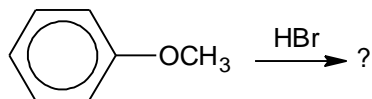
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69. In the following reaction.



- (A) ethane (B) ethylene (C) butane (D) propane

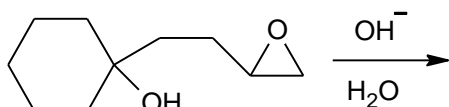
70. In the reaction



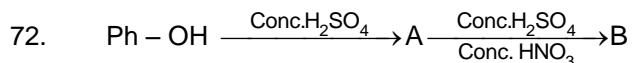
the products are :

- (A) and CH_3Br (B) and CH_3Br
 (C) and CH_3OH (D) and H_2

71.



- (A) (B)
 (C) (D)

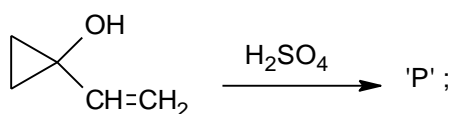


The number of $-\text{NO}_2$ groups substituted on benzene ring in the product.

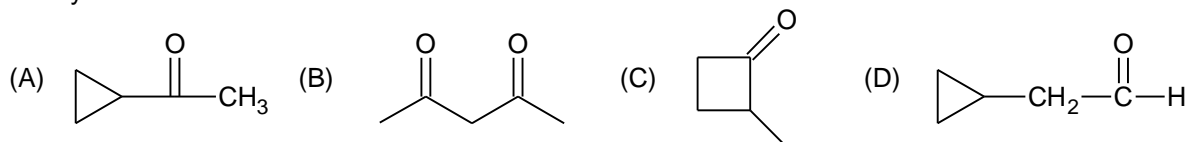
- (A) 3 (B) 2 (C) 1 (D) 0

Space for rough work

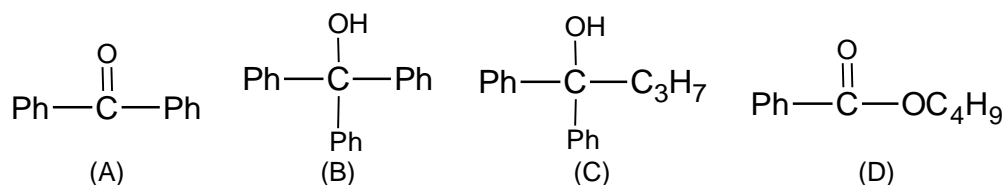
73. Which of the following cannot be used to distinguish between benzyl alcohol and phenol.
 (A) FeCl₃ (B) NaOH (aq) (C) Br₂/CCl₄ (D) NaHCO₃ (aq)
74. Which of the following statement is correct about phenol ?
 (A) Electron releasing groups increases acidic character
 (B) Phenol turns red litmus blue
 (C) Electron withdrawing groups decrease acidic character
 (D) Electron withdrawing substituents increase acidic character.
75. When phenol reacts with dilute neutral FeCl₃ solution, a violet colouration is produced. The violet colour species could be
 (A) [Fe(COC₆H₅)₆]⁻⁴ (B) Fe(C₆H₅)₃
 (C) [Fe(OC₆H₅)₆]⁻³ (D) Fe(OC₆H₅)₃
- 76.



Identify 'P' in the reaction.

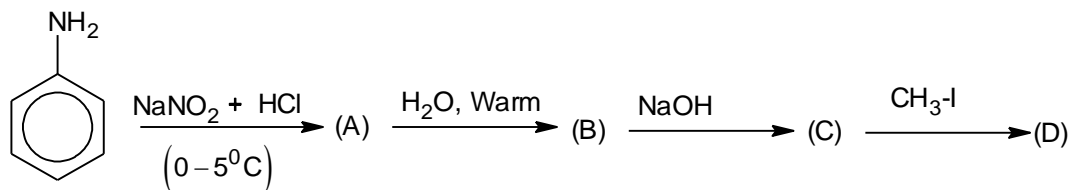


77. PhMgBr + O=C1OCCOC1 + H+ (excess) → (A). Product (A) is



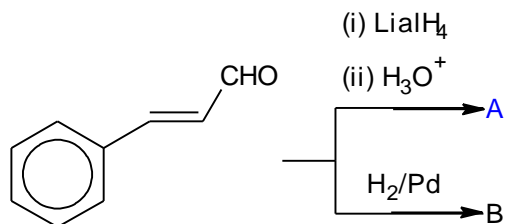
Space for rough work

78.



- (A) The product (D) is an ether
 (B) The product (D) gives CO₂ gas on treatment with NaHCO₃
 (C) The product (B) is more acidic than H₂CO₃
 (D) The product(D) is an aryl halide

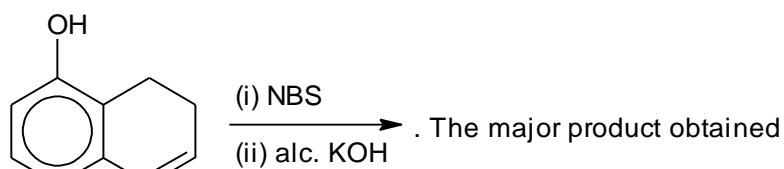
79.

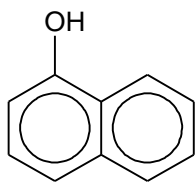
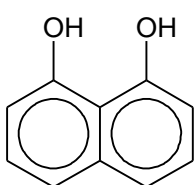
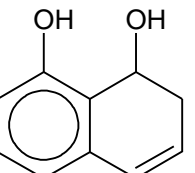
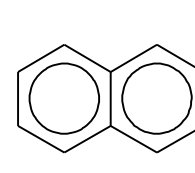


The sum of Pi bonds present in A and B is

- (A) 4 (B) 7 (C) 3 (D) 6

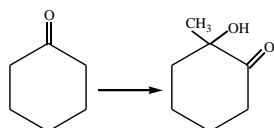
80.



- (A)  (B) 
- (C)  (D) 

Space for rough work

81.



$\text{CH}_3\text{MgBr} / \text{H}^+$
(1)

KMnO_4 (cold dil.)
(2)

CrO_3
(3)

H^+ / Δ
(4)

For the above conversion the correct order of reagents used is:

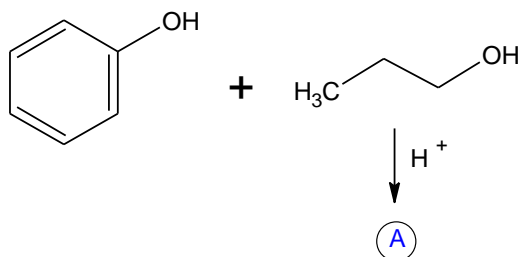
(A) 1 → 2 → 3 → 4

(B) 1 → 4 → 3 → 2

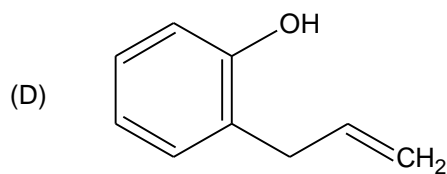
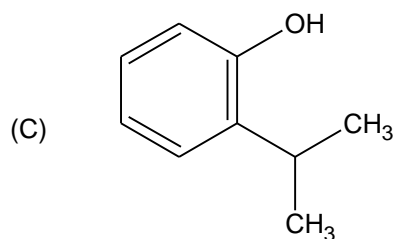
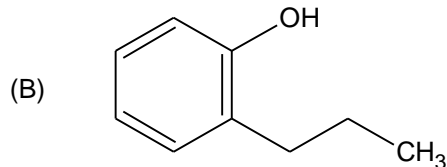
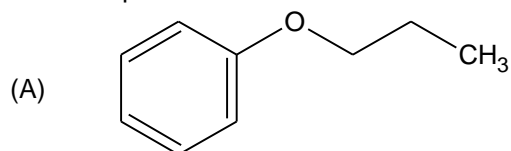
(C) 1 → 4 → 2 → 3

(D) 2 → 3 → 4 → 1

82.

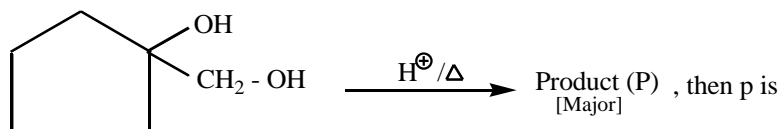


Then the product A is



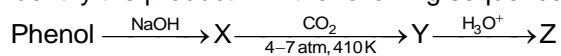
Space for rough work

83.



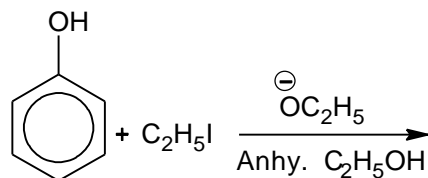
- (A) C1CCCC1C=O (B) C1CCCCC1=O
- (C) C1=CCCC1CO (D) C12OC1CC2

84. Identify the product Z in the following sequence of reactions



- (A) Aspirin (B) Salicylaldehyde (C) Benzoic acid (D) Salicylic acid

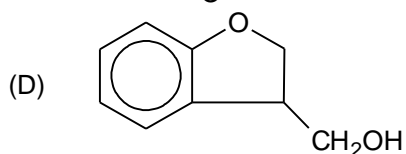
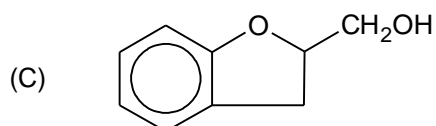
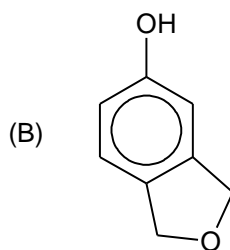
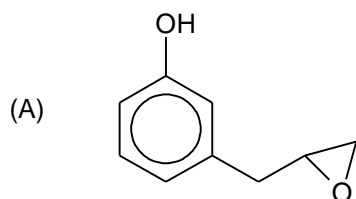
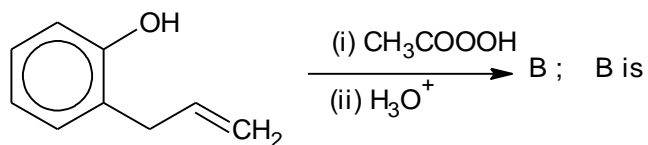
85.



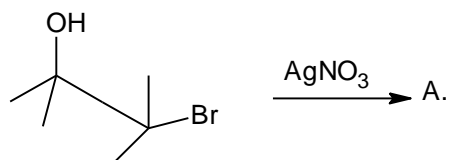
- (A) CCOCc1ccccc1 (B) CCOC(C)C (C) CCOC(c1ccccc1)c2ccccc2 (D) CC(I)C

Space for rough work

86.



87.



Degree of unsaturation of A is ?

(A) 1

(B) 2

(C) 0

(D) 3

88.

The Lucas test, which alcohol gives cloudiness immediately

(A) C₂H₅OH

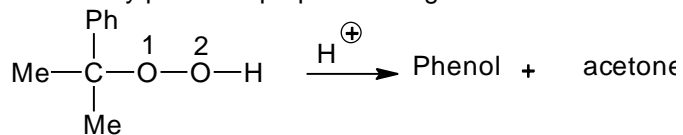
(B) Isopropanol

(C) t-butanol

(D) sec-butyl alcohol

Space for rough work

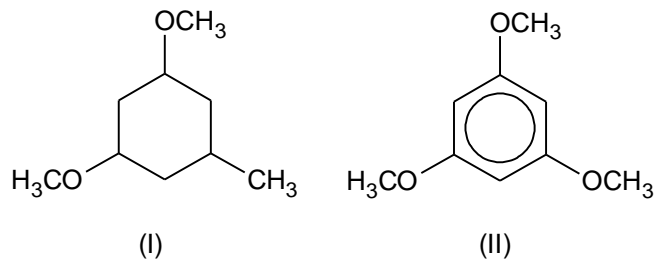
89. Industrially phenol is prepared along with acetone in following way :



Which oxygen gets protonated in the above reaction ?

- (A) 2 (B) 1 (C) 1 or 2 (D) None

90.



The maximum number of moles of HI required for complete reaction of one mole of compound (I) and (II) are respectively.

- (A) 3 & 6 (B) 6 & 3 (C) 6 & 6 (D) 3 & 3

Space for rough work

FIITJEE PET – III (REG_2ND YEAR)

MAINS_SET-B_ANSWERS

DATE: 23.06.2018

MATHEMATICS

1. C	2. C	3. C	4. D
5. B	6. A	7. D	8. A
9. C	10. A	11. C	12. B
13. B	14. D	15. A	16. C
17. B	18. C	19. C	20. C
21. A	22. A	23. B	24. B
25. B	26. D	27. B	28. A
29. A	30. D		

PHYSICS

31. D	32. C	33. C	34. C
35. C	36. C	37. C	38. B
39. A	40. C	41. A	42. C
43. D	44. C	45. D	46. B
47. B	48. D	49. D	50. C
51. B	52. A	53. D	54. B
55. B	56. A	57. A	58. C
59. C	60. B		

CHEMISTRY

61. B	62. D	63. B	64. D
65. A	66. C	67. B	68. B
69. A	70. A	71. A	72. A
73. D	74. D	75. C	76. C
77. B	78. A	79. D	80. A
81. C	82. C	83. B	84. D
85. A or B	86. C	87. A	88. C
89. A	90. B		