FIITJEE PET – III (CHAMPIONS_2ND YEAR)

MAINS

DATE: 30.06.2018

Time: 3 hours **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.: ☐☐☐☐☐☐☐☐☐☐☐☐

1. The equation of the parabola having focus (5, 2) and vertex (3, –2) is
(A) $4x^2 - 4xy + y^2 - 72x - 64y + 24 = 0$ (B) $x^2 + 6xy + 9y^2 + 106x - 82y + 9 = 0$
(C) $y^2 - 12x - 6y - 15 = 0$ (D) $y^2 - x + 2y + 3 = 0$

2. The equation of the parabola whose axis is parallel to x-axis and passing through (2, –1), (6, 1), (3, –2) is
(A) $y^2 - x + 2y + 3 = 0$ (B) $y^2 - 2x - 3y + 4 = 0$
(C) $y^2 - 4x - 4y = 0$ (D) $x^2 - 4x - 2y + 10 = 0$

3. The equation of parabola whose latus rectum is the line segment joining the points (–3, 1), (1, 1) is
(A) $(x + 1)^2 = 4y$ (B) $(x - 1)^2 = 4y$ (C) $(x + 1)^2 = 2y$ (D) $(x - 1)^2 = 2y$

4. The vertex of the parabola $x^2 + 8x + 12y + 4 = 0$ is
(A) (–4, 1) (B) (4, –1) (C) (–4, –1) (D) (4, 1)

5. The ends of the latus rectum of the parabola $(x - 2)^2 = -6(y + 1)$ are
(A) (2, 7), (3, –7) (B) (0, 5), (0, –5) (C) (0, 7), (0, –5) (D) $\left(5,-\frac{5}{2}\right),\left(-1,-\frac{5}{2}\right)$

6. Let M be the foot of the perpendicular from a point P on the parabola $y^2 = 8(x - 3)$ onto its directrix and let S be the focus of the parabola. If ΔSPM is an equilateral triangle, then P =
(A) $\left(4\sqrt{3},8\right)$ (B) $\left(8,4\sqrt{3}\right)$ (C) $\left(9,4\sqrt{3}\right)$ (D) $\left(4\sqrt{3},9\right)$

7. The ratio in which the line segment joining the points (4, –6) and (3, 1) is divided by the parabola $y^2 = 4x$ is
(A) $\frac{-20 \pm \sqrt{155}}{11} : 1$ (B) $\frac{-2 \pm 2\sqrt{155}}{11} : 1$ (C) $-20 \pm 2\sqrt{155} : 11$ (D) $-20 \pm \sqrt{155} : 11$

8. The equation of the tangent to the parabola $y^2 = 8x$ inclined at 30° to the x-axis is
(A) $3x - \sqrt{3}\, y + 4 = 0$ (B) $2x - 3y + 14 = 0$ (C) $2x - \sqrt{2}\, y + 7 = 0$ (D) $x - \sqrt{3}\, y + 6 = 0$

9. The line $4x + 6y + 9 = 0$ touches the parabola $y^2 = 4x$ at the point
(A) $\left(-3,\frac{9}{4}\right)$ (B) $\left(3,-\frac{9}{4}\right)$ (C) $\left(\frac{9}{4},-3\right)$ (D) $\left(-\frac{9}{4},-3\right)$

10. The equation of the common tangent to $x^2 + y^2 = 2a^2$ and $y^2 = 8ax$ is
(A) $y = \pm(x + a)$ (B) $y = \pm(x + 2a)$ (C) $y = \pm(x + 3a)$ (D) $y = \pm(x + 4a)$

Space for rough work

11. The slope of the line touching both the parabola $y^2 = 4x$ and $x^2 = -32y$ is
(A) $\frac{1}{8}$ (B) $\frac{2}{3}$ (C) $\frac{1}{2}$ (D) $\frac{3}{2}$

12. The locus of the point of intersection of two tangents to the parabola $y^2 = 4ax$ which make an angle α with one another is
(A) $y^2 - 4ax = (x + a)^2 \tan^2\alpha$ (B) $y^2 - 4ax = (x + a)^2 \cot^2\alpha$
(C) $y^2 - 4ax = (x + a)^2$ (D) $y^2 - 4ax = (x + a)^2 \sin^2\alpha$

13. The locus of the point of intersection of tangents to $y^2 = 4ax$ which intercept a constant length d on the directrix is
(A) $(y^2 - 4ax)(x + a)^2 = d^2x^2$ (B) $(y^2 - 4ax)^2 (x - a)^2 = d^2x^2$
(C) $y^2 - 4ax = d^2 x^2 (x + a)^2$ (D) none of these

14. If M is the foot of the perpendicular from point P on a parabola to its directrix and SPM is an equilateral triangle, where S is the focus, then SP =
(A) a (B) 2a (C) 3a (D) 4a

15. The length of the perpendicular from the focus S of the parabola $y^2 = 4ax$ on the tangent at P is
(A) $\sqrt{OS \cdot SP}$ (B) OS . SP (C) OS + OP (D) none of these

16. Let O be the origin and A be a point on the curve $y^2 = 4x$. Then the locus of the midpoint of OA is
(A) $x^2 = 4y$ (B) $x^2 = 2y$ (C) $y^2 = 16x$ (D) $y^2 = 2x$

17. A variable tangent to the parabola $y^2 = 4ax$ meets the parabola $y^2 + 4ax = 0$ at the points P, Q. The locus of the middle point of PQ is
(A) $y^2 + 4ax = 0$ (B) $y^2 + 2ax = 0$ (C) $y^2 + ax = 0$ (D) $3y^2 + 4ax = 0$

18. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose vertex is at the vertex of the parabola. The length of its side is
(A) $2\sqrt{3}a$ (B) $4\sqrt{3}a$ (C) $8\sqrt{3}a$ (D) $16\sqrt{3}a$

19. The length of the focal chord of the parabola $y^2 = 4ax$ which makes an angle θ with its axis is
(A) $4a \sin^2\theta$ (B) $4a \cos^2\theta$ (C) $4a \operatorname{cosec}^2\theta$ (D) $4a \sec^2\theta$

20. A circle of radius 4, drawn on a chord of the parabola $y^2 = 8x$ as diameter, touches the axis of the parabola. Then, the slope of the chord is
(A) $\frac{1}{2}$ (B) $\frac{3}{4}$ (C) 1 (D) 2

Space for rough work

21. The portion of the tangent intercepted between the point of contact and the directrix of the parabola $y^2 = 4ax$ subtends at the focus at an angle of
(A) 30° (B) 45° (C) 60° (D) 90°

22. The circumcircle of the triangle formed by any three tangents to a parabola passes through
(A) vertex (B) focus (C) foot of the directrix (D) none of these

23. If the normals at the points t_1 and t_2 on $y^2 = 4ax$ intersect at the point t_3 on the parabola, then $t_1t_2 =$
(A) 1 (B) 2 (C) t_3 (D) $2t_3$

24. The number of normals drawn to the parabola $y^2 = 4x$ from the point (1, 0) is
(A) 0 (B) 1 (C) 2 (D) 3

25. If α is the inclination of a tangent to the parabola $y^2 = 4ax$, then the distance between the tangent and a parallel normal is
(A) a cosec α sec α (B) a cosec α $\sec^2\alpha$ (C) a $\operatorname{cosec}^2\alpha$ $\sec^2\alpha$ (D) None of these

26. If a circle cuts the parabola $y^2 = 4ax$ in four points, then the algebraic sum of ordinates of the four points is
(A) 0 (B) 1 (C) –1 (D) none of these

27. An arch is in the shape of a parabola whose axis is vertically downwords and measures 80 mt across its bottom on the ground. Its height point is 24mt. The measure of the horizontal beam across the section at a height of 18mt is
(A) 50 mt (B) 40 mt (C) 45 mt (D) 55 mt

28. A line bisecting the ordinate PN of a point $P(at^2, 2at)$, $t > 0$, on the parabola $y^2 = 4ax$ is drawn parallel to the axis to meet the curve at Q. If NQ meets the tangent at the vertex at the point T, then the coordinates of T are
(A) $\left(0, \frac{4at}{3}\right)$ (B) (0, 2at) (C) $\left(\frac{at^2}{4}, at\right)$ (D) (0, at)

29. The tangents at three points A, B, C on the parabola $y^2 = 4x$, taken in pairs intersect at the points P, Q and R. If Δ, Δ' be the areas of the triangles ABC and PQR respectively, then
(A) $\Delta = 2\Delta'$ (B) $\Delta' = 2\Delta$ (C) $\Delta = \Delta'$ (D) none of these

30. If the tangents and normals at the extremities of a focal chord of the parabola $y^2 = 4ax$ intersect at (x_1, y_1) and (x_2, y_2) respectively, then
(A) $x_1 = x_2$ (B) $x_1 = y_2$ (C) $y_1 = y_2$ (D) $x_2 = y_1$

Space for rough work

31. A cell of e.m.f. E and internal resistance r is connected in series with an external resistance nr then the ratio of the terminal potential difference to E.M.F. is

(A) 1/n (B) $\frac{1}{n+1}$ (C) $\frac{n}{n+1}$ (D) $\frac{n+1}{n}$

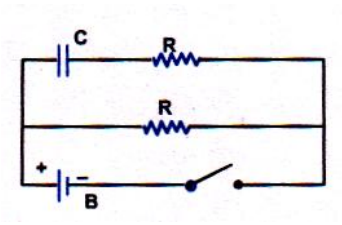
32. A wire of resistance R is cut into n equal parts. These parts are then connected in parallel. The equivalent resistance of the resultant combination is

(A) nR (B) R/n (C) n/R (D) R/n^2

33. In the circuit shown, when the switch is closed, the capacitor charges with a time constant

(A) RC (B) 2RC

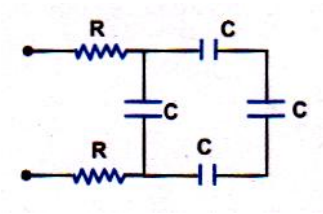
(C) $\frac{1}{2}$RC (D) RC In 2



34. The time constant of the circuit shown in the figure is

(A) $\frac{RC}{3}$ (B) $\frac{4RC}{3}$

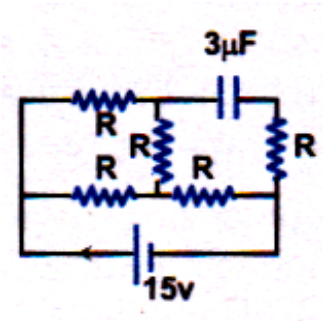
(C) $\frac{2RC}{3}$ (D) $\frac{8RC}{3}$



35. In the circuit shown, the cell is ideal with emf = 15 V and each resistance is of 3Ω. The potential difference across the capacitor in the steady state is

(A) zero (B) 9 V

(C) 12 V (D) 15 V

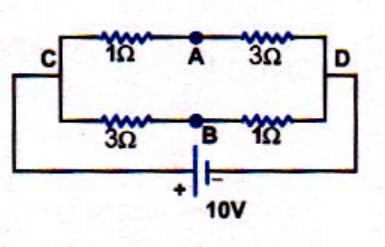


Space for rough work

36. In the previous problem, if $R = 5\Omega$, then the rate of charging at t = 0 is

(A) 1.5 μC/s (B) 2.5 μC/s (C) 3.5 μC/s (D) None of the above

37. A battery of emf 10 V is connected to the network of resistance as shown in the figure. The potential difference between A and B $(V_A - V_B)$ is



(A) - 2V (B) 2 V

(C) 5 V (D) $\left(\frac{20}{11}\right)$V

38. The resistivity of a potentiometer wire is 40×10^{-8} ohm$-$m and its area of cross – section is $8\times10^{-6}m^2$. If 0.2 amp current is flowing through the wire, then the potential gradient will be

(A) 10^{-2} Vm^{-1} (B) 10^{-1} Vm^{-1} (C) 3.2×10^{-2} Vm^{-1} (D) $1\,Vm^{-1}$

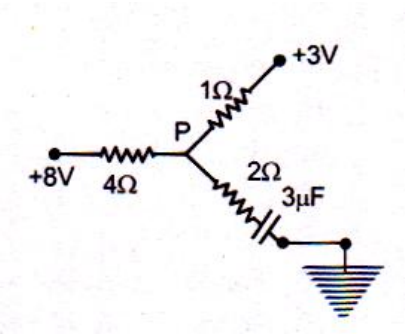
39. For a cell of emf 2 V, a balance point is obtained for 50 cm of the potentiometer wire. If the cell is shunted in parallel by a 2Ω resistor and the balance is obtained across 40 cm of the wire, then internal resistance of the cell is

(A) 0.25Ω (B) 0.50Ω (C) $0.80\,\Omega$ (D) 1.00Ω

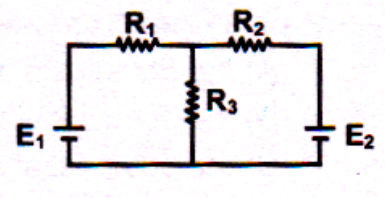
40. The energy stored in the capacitor in the steady state is

(A) 6μJ (B) 24 μJ

(C) 96 μJ (D) None of these



41. In the circuit shown, $E_1 = 7V$, $E_2 = 7V$, $R_1 = R_2 = 1\Omega$ and $R_3 = 3\Omega$ respectively. The current through the resistance R_3 is

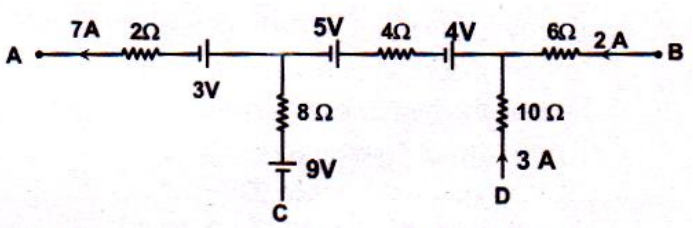


(A) 2 A (B) 3.5 A

(C) 1.75 A (D) None of these

Space for rough work

42. In a portion of some large electrical network, currents in certain branches are known. The values of $(V_A - V_B)$ and $(V_C - V_D)$ are X and Y, respectively, where X and Y are



(A) $X = 29\,V, Y = 26\,V$

(B) $X = 58\,V, Y = -52\,V$

(C) $X = -58\,V, Y = -52\,V$

(D) $X = -29\,V, Y = -26\,V$

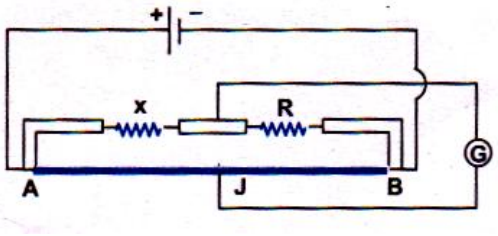
43. The potential difference across the terminals of a battery is 8.5 V when there is a current of 3 A in the battery from the negative to the positive terminal. When the current is 2 A in the reverse direction, the potential difference becomes 11 V. The internal resistance of the battery is

(A) 2.5Ω (B) 5.5Ω (C) 2.83Ω (D) 0.5Ω

44. A charge Q flowing through resistance R varies with time t as $Q = at - bt^2$. The total heat produced in R is (up to the instant when instantaneous current is zero)

(A) $\frac{a^3R}{6b}$ (B) $\frac{a^3R}{3b}$ (C) $\frac{a^3R}{2b}$ (D) $\frac{a^3R}{b}$

45. The figure, shows a metre bridge circuit, with AB = 100cm, x = $12\,\Omega$ and $R = 18\Omega$ and the jockey J in the position of the balance. If R is now made 8Ω, through what distance will J have to be moved to obtain balance ?

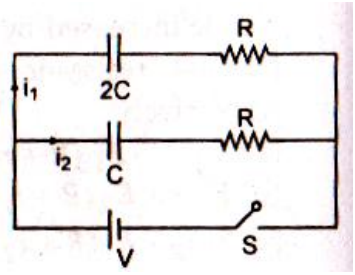


(A) 10 cm (B) 20 cm

(C) 30 cm (D) 40 cm

Space for rough work

46. In the circuit shown in figure switch S is closed at time t= 0. Let i_1 and i_2 be the currents at any finite time t then the ratio $\frac{i_1}{i_2}$

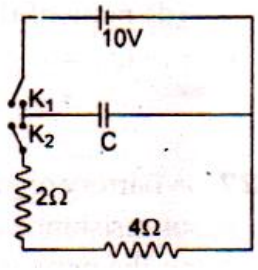


(A) is constant
(B) increase with time
(C) decreases with time
(D) first increase and then decreases

47. A galvanometer of resistance R_G is to be converted into an ammeter, with the help of a shunt of resistance R. If the ratio of the heat dissipated through galvanometer and shunt is 3:4, then

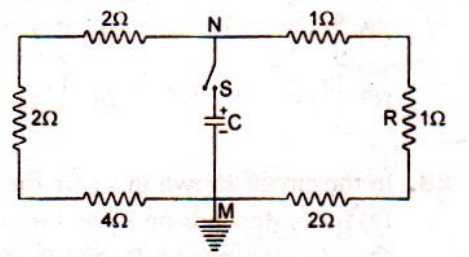
(A) $R = \frac{3}{4}R_G$ (B) $\frac{4}{3}R_G = R$ (C) $\frac{9R}{16} = R_G$ (D) $\frac{16R}{9} = R_G$

48. A capacitor of capacitance 3μF is first charged by connecting it across a 10 V battery by closing key K_1. Then it is allowed to get discharged through 2Ω and 4Ω resistors by closing the key K_2. The total energy dissipated in the 4Ω resistor is equal to



(A) 0.5 mJ (B) 0.05 mJ
(C) 0.1 mJ (C) None of these

49. A capacitor of capacity of 6μF and initial charge 160 μC is connected with a key S and resistance as shown in figure. Point M is earthed. If key is closed at t=0; then the current through resistance $R(=1\Omega)$ at t = 16μs is



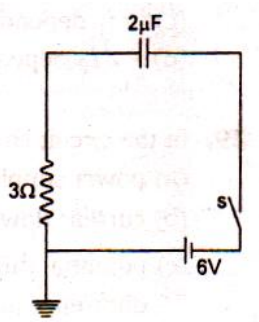
(A) $\frac{10}{3e}$A (B) $\frac{10}{e}$A
(C) $\frac{20}{3e}$A (D) None of these

Space for rough work

50. In the given circuit the quantity of charge that flows to ground long time after the switch is closed is

(A) 12μC (B) 9μC

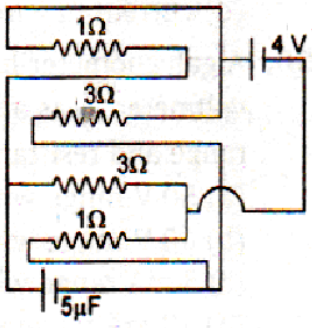
(C) 13μC (D) zero



51. Calculate the charge on the capacitor long time after the assembling of the circuit.

(A) 5μC (B) 10μC

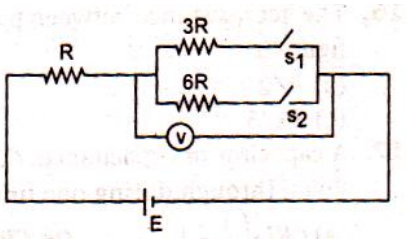
(C) 15μC (D) zero



52. In the circuit shown in figure reading of voltmeter is V_1 when only S_1 is closed, reading of voltmeter is V_2 when only S_2 is closed, reading of voltmeter is V_3 when both S_1 and S_2 are closed. Then

(A) $V_3 > V_2 > V_1$ (B) $V_2 > V_1 > V_3$

(C) $V_3 > V_1 > V_2$ (D) $V_1 > V_2 > V_3$



Space for rough work

53. A resistance R carries a current i. The power lost to the surroundings is $\lambda(\theta-\theta_0)$ .Here λ is a constant , θ is temperature of the resistance and θ_0 is the temperature of the atmosphere. If the coefficient of linear expansion is α. The strain in the resistance is

(A) $\frac{\alpha}{\lambda}i^2R$

(B) $\alpha\lambda iR$

(C) $\frac{ci^2R}{2\lambda}$

(D) proportional to the length of the resistance wire

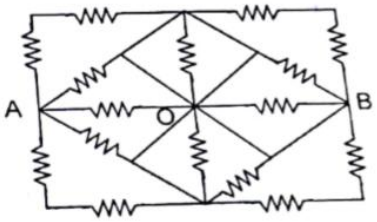
54. n identical cells are joined in series with two cells A and B with reversed polarities. EMF of each cell is E and internal resistance is r. Potential difference across Cell A or B is (n>4)

(A) $\frac{2E}{n}$ (B) $2E\left(1-\frac{1}{n}\right)$ (C) $\frac{4E}{n}$ (D) $2E\left(1-\frac{2}{n}\right)$

55. Value of resistance in each branch is 18Ω. The equivalent resistance between the points A and B is

(A) 3Ω (B) 6Ω

(C) 9Ω (D) 4.5 Ω



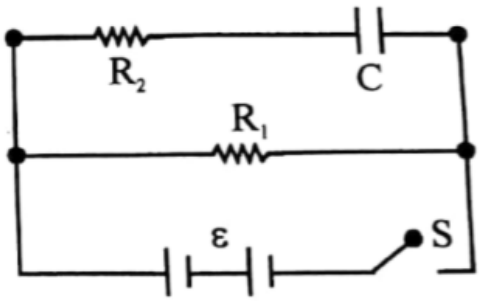
56. In the figure, switch S is open and capacitor is uncharged. At t = 0, S is closed. Choose the incorrect alternative after closing the switch.

(A) current through R_1 remains constant

(B) current through switch S decreases with time

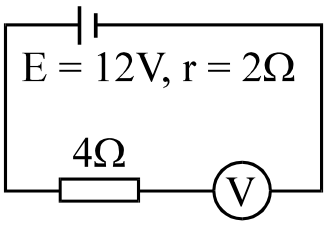
(C) current through R_2 remains constant

(D) Potential difference across capacitor increases with time



Space for rough work

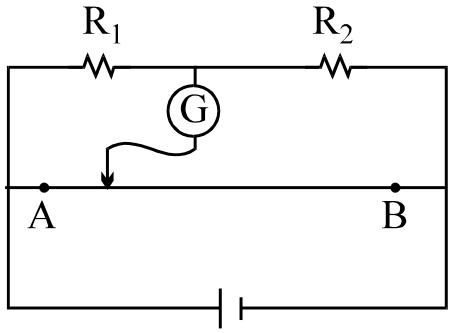
57. By error, a student places moving-coil voltmeter V (nearly ideal) in series with the resistance in a circuit in order to read the current, as shown. The voltmeter reading will be



(A) 0 (B) 4V
(C) 6V (D) 12V

58. In a balanced wheat stone bridge, current in the galvanometer is zero. It remains zero when:
[1] battery emf is increased
[2] all resistances are increased by 10 ohms
[3] all resistances are made five times
[4] the battery and the galvanometer are interchanged
(A) only [1] is correct (B) [1], [2] and [3] are correct
(C) [1], [3] and [4] are correct (D) [1] and [3] are correct

59. In the figure shown for the given values of R_1 and R_2 the balance point for Jockey is at 40 cm from A. When R_2 is shunted by a resistance of 10 Ω, balance shifts to 50 cm. R_1 and R_2 are (AB = 1 m):
(A) 10/3 Ω, 5 Ω
(B) 20 Ω, 30 Ω
(C) 10 Ω, 15 Ω
(D) 5 Ω, 15/2 Ω

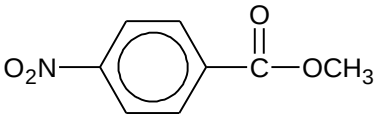


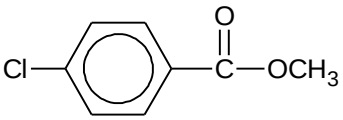
60. A brass disc and a carbon disc of same radius are assembled alternatively to make a cylindrical conductor. The resistance of the cylinder is independent of the temperature. The ratio of thickness of the brass disc to that of the carbon disc is [α is temperature coefficient of resistance & Neglect linear expansion]

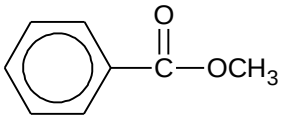
(A) $\left|\frac{\alpha_C\rho_C}{\alpha_B\rho_B}\right|$ (B) $\left|\frac{\alpha_C\rho_B}{\alpha_B\rho_C}\right|$ (C) $\left|\frac{\alpha_B\rho_C}{\alpha_C\rho_B}\right|$ (D) $\left|\frac{\alpha_B\rho_B}{\alpha_C\rho_C}\right|$

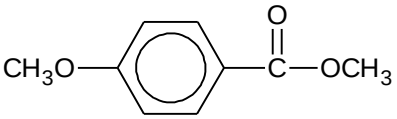
Space for rough work

61. The ease of alkaline hydrolysis is the greatest for

(A) 

(B) 

(C) 

(D) 

62. Which of the following will not undergo Hell-Volhard Zellinsky (HVZ) reaction?

(A) HCOOH (B) CH_3COOH

(C) CH_3CH_2COOH (D) $CH_3CHBrCOOH$

63. Which of the following alcohols will be esterified least readily by acetic acid in presence of a trace of con. H_2SO_4?

(A) $CH_3CH_2CH_2CH_2OH$ (B) $(CH_3)_2 CHCH_2OH$

(C) $CH_3CHOHCH_2CH_3$ (D) $(CH_3)_3 COH$

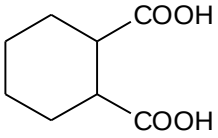
64. What is Z in the following sequence of reactions?

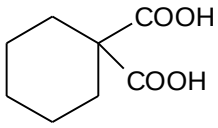
Phenol $\xrightarrow[\text{dust}]{Zn} X \xrightarrow[\text{anhyd. } AlCl_3]{CH_3Cl} Y \xrightarrow[KMnO_4]{\text{Alkaline}} Z$

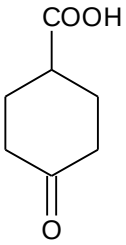
(A) benzene (B) Toluene

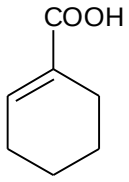
(C) Benzaldehyde (D) Benzoic acid

65. Which of the following compound undergo decarboxylation on heating ?

(A) 

(B) 

(C) 

(D) 

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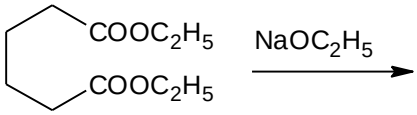
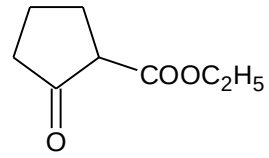
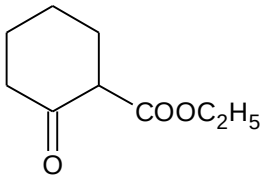
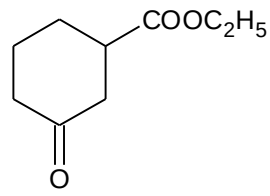
66.

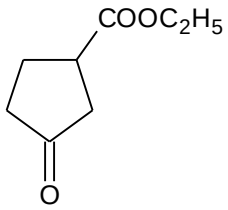


'A' is :

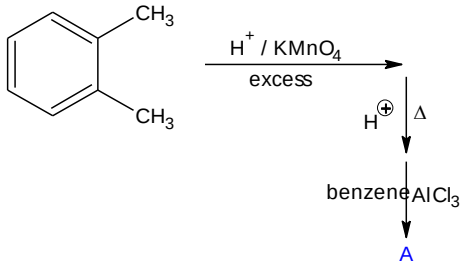
(A) 

(B) 

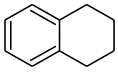
(C) 

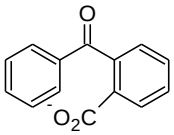
(D) 

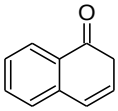
67.

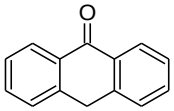


The structure of the compound (A) in the above reaction is

(A) 

(B) 

(C) 

(D) 

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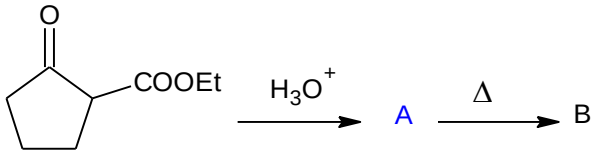
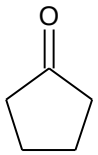
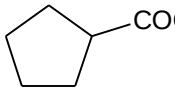
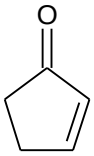
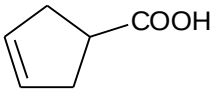
68. 

The compound B is

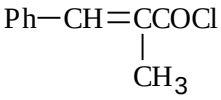
(A) 

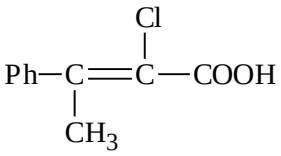
(B) 

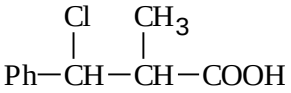
(C) 

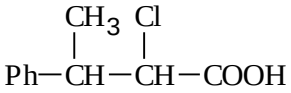
(D) 

69. $PhCHO+(CH_3CH_2CO)_2O \xrightarrow[(ii)\ H_2O]{(i)\ CH_3CH_2COONa} A \xrightarrow{HCl} B$. The product 'B' in the given reaction is

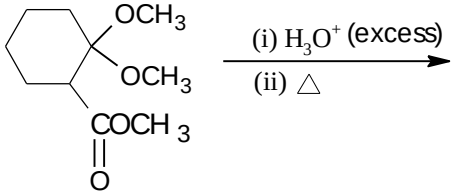
(A) 

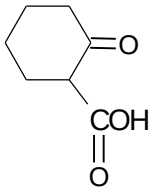
(B) 

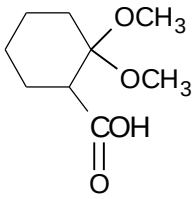
(C) 

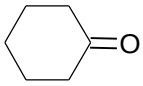
(D) 

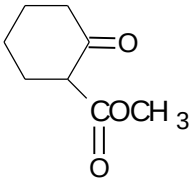
70. The end product of the following reaction would be



(A) 

(B) 

(C) 

(D) 

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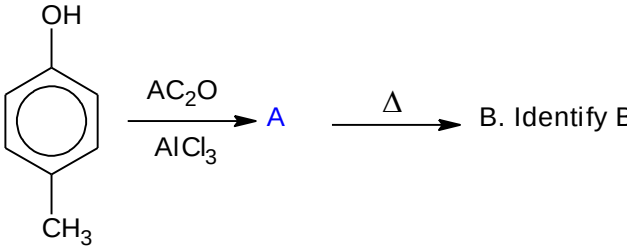
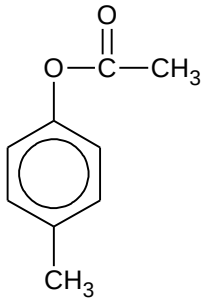
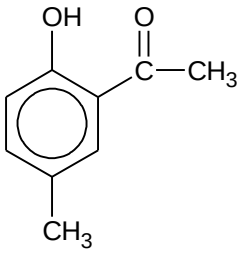
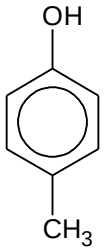
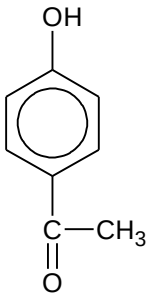
71.



(A) 

(B) 

(C) 

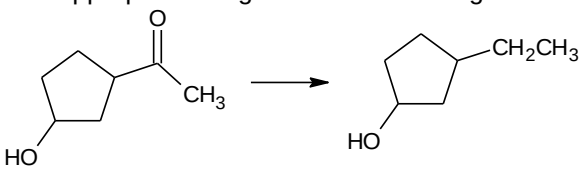
(D) 

72. If the Cannizzaro's reaction given below :

$2Ph-CHO \xrightarrow{OH^-} PhCH_2OH + PhCOO^-$ the slowest step is :

(A) the attack of OH^- at the carbonyl group (B) the transfer of hydride to the carbonyl group
(C) the abstraction of proton from the carboxylic acid
(D) the deprotonation of Ph–CH_2OH

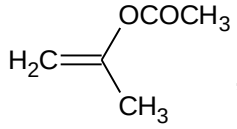
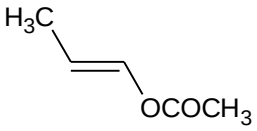
73. The appropriate reagent for the following transformation



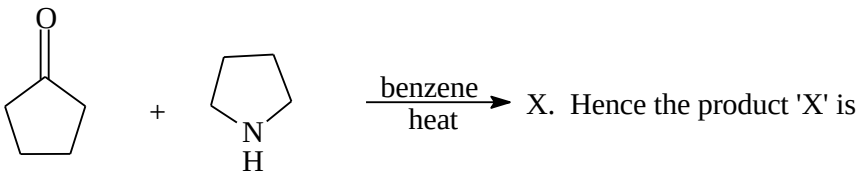
(A) Zn(Hg), HCl (B) NH_2–NH_2, OH^- (C) H_2/Ni (D) $NaBH_4$

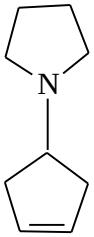
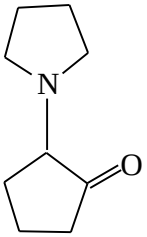
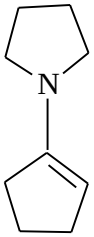
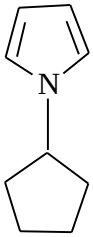
Space for rough work

74. The product of acid hydrolysis of [P] and [Q] can be distinguished by :

[P] =  , [Q] = 

(A) Lucas reagent
(B) 2, 4–DNP
(C) Fehling's solution
(D) $NaHSO_3$

75. 

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

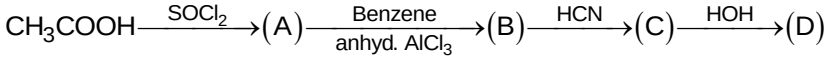
76. Identify A and B in the following reaction :

$CH_3CH_3 \xleftarrow{B} CH_3COOH \xrightarrow{A} CH_3CH_2OH$

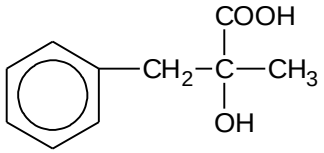
	A	B
(A)	HI + Red P	$LiAlH_4$
(B)	Ni/Δ	$LiAlH_4$
(C)	Pd–$BaSO_4$	Zn + HCl
(D)	$LiAlH_4$	HI + Red P

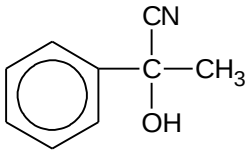
Space for rough work

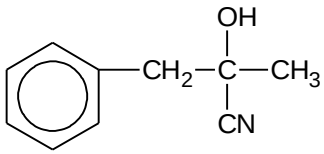
77. A set of reactions yielded a product (D) :

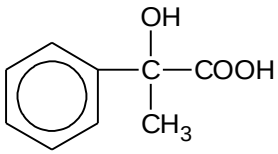


The structure of (D) would be :

(A) 

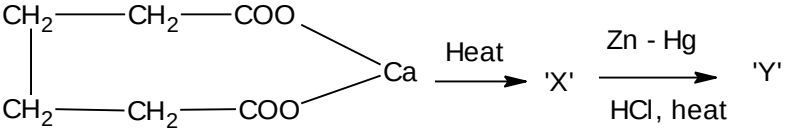
(B) 

(C) 

(D) 

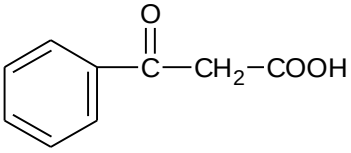
78. When acetyl chloride reacts with sodium propionate, the product formed is :
(A) acetic propionic anhydride (B) acetic anhydride
(C) n–propyl acetate (D) pent–2, 4–dione

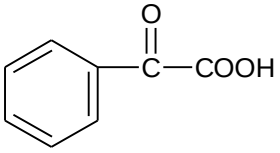
79. Identify the product 'Y' in the following reaction sequence :

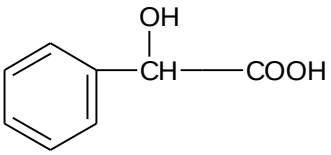


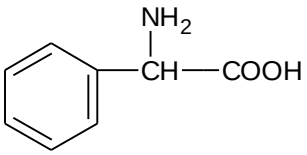
(A) pentane (B) cyclobutane (C) cyclopentane (D) cyclopentanone

80. Which of the following carboxylic acids undergoes decarboxylation most easily ?

(A) 

(B) 

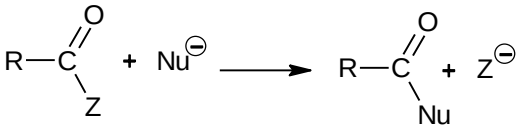
(C) 

(D) 

Space for rough work

81. The reaction of $R–CONH_2$ with a mixture of Br_2 and KOH gives $R–NH_2$ as a product. The intermediate involved in this reaction is :
(A) RCH_2-NHBr (B) R–N=C=O (C) R–NHBr (D) $R–CONBr_2$

82. Rate of the reaction,



is fastest when Z is :
(A) Cl (B) NH_2 (C) OC_2H_5 (D) $OCOCH_3$

83. Hydrolysis of an ester gives a carboxylic acid which on Kolbe's electrolysis yields ethane. The ester is :
(A) ethyl methanoate (B) methyl ethanoate
(C) methyl methanoate (D) methyl propanoate

84. Let us consider an esterification of isotopically labelled carboxylic acid :
$CH_3-CO-\overset{18}{O}H+CH_3CH_2OH\xrightarrow{H^+}(X)\text{and}(Y)$,
(X) and (Y) respectively are :
(A) $CH_3-CO\overset{18}{O}C_2H_5;H_2O$ (B) $CH_3-COOC_2H_5;H_2\overset{18}{O}$
(C) $CH_3-COOC_2H_5;H_2O$ (D) both (a) and (b)

85. A pure dextrorotatory monocarboxylic acid is treated with racemic mixture of an alcohol containing one chiral carbon. The ester formed will be :
(A) pure dextrorotatory (B) racemic mixture
(C) meso compound
(D) optically active mixture containing excess dextrorotatory compound

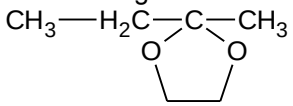
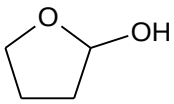
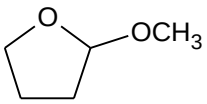
86. Which of the following reactions does not yield an amine ?
(A) $R-C\equiv N+H_2O\xrightarrow{H^+}.....$
(B) $R-X+NH_3\longrightarrow.....$
(C) $R-CH=NOH+[H]\xrightarrow[C_2H_5OH]{Na}....$
(D) $RCONH_2+4[H]\xrightarrow{LiAlH_4}.....$

Space for rough work

87. The boiling points of amines and their corresponding alcohols and acids vary in the order :
(A) $RCH_2NH_2 > RCOOH > RCH_2OH$ (B) $RCH_2NH_2 > RCH_2OH > RCOOH$
(C) $RCH_2NH_2 < RCOOH < RCH_2OH$ (D) $RCH_2NH_2 < RCH_2OH < RCOOH$

88. $CH_3CH_2Cl \xrightarrow{NaCN} (X) \xrightarrow{Ni/H_2} (Y) \xrightarrow{\text{Acetic anhydride}} (Z)$
(Z) in the above reaction sequence is :
(A) $CH_3CH_2CH_2NHCOCH_3$ (B) $CH_3CH_2CH_2NH_2$
(C) $CH_3CH_2CH_2CONHCH_3$ (D) $CH_3CH_2CH_2CONHCOCH_3$

89. The reaction of HCOOH with conc. H_2SO_4 gives.
(A) CO_2 (B) CO (C) oxalic acid (D) acetic acid

90. Which of the following would readily give Tollen's test ?
(A) 
(B) $CH_3–COCH_3$
(C) 
(D) 

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FIITJEE PET – III (CHAMPIONS_2ND YEAR)

MAINS_ANSWERS

DATE: 30.06.2018

MATHEMATICS

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

PHYSICS

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

CHEMISTRY

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