Sri Chaitanya IIT Academy.,India.

A.P T.S KARNATAKA TAMILNADU MAHARASTRA DELHI RANCHI

A right Choice for the Real Aspirant

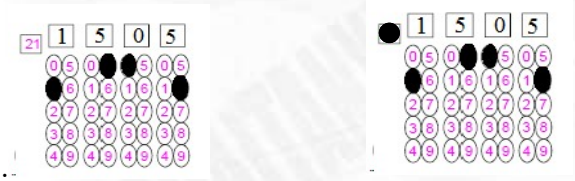
ICON Central Office - Madhapur - Hyderabad

SEC: Sr.Super60(Incoming)_STERLING BT	**JEE-MAIN**	**Date: 19-04-2025**
Time: 09:00AM to 12:00PM	**WTM-29**	**Max. Marks: 300**

IMPORTANT INSTRUCTION:

1. Immediately fill in the Admission number on this page of the Test Booklet with **Blue/Black** Ball Point **Pen** only.
2. The candidates should not write their Admission Number anywhere (except in the specified space) on the Test Booklet/ Answer Sheet.
3. The test is of **3 hours** duration.%
4. The Test Booklet consists of **75 Questions.** The maximum marks are **300.**
5. There are **three** parts in the question paper 1,2,3 consisting of **Mathematics, Physics** and **Chemistry** having **25 Questions** in each subject and subject having **two sections.**
   (I) Section –I contains **20 Multiple Choice Questions** with only one correct option.
   Marking scheme: +4 for correct answer, **0** if not attempt and **-1** in all other cases.
   (II) Section-II contains **05 Numerical Value Type Questions.**
   - The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11).**

   To cancel any attempted question bubble on the question number box.
   For example: To cancel attempted Question 21. Bubble on 21 as shown below



   Question Answered for Marking Question Cancelled for Marking
   Marking scheme: +4 for correct answer, **0** if **not attempt** and **-1** in all other cases.
6. Use **Blue / Black Point Pen only** for writing particulars / marking responses on the Answer Sheet. **Use of pencil is strictly prohibited.**
7. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electron device etc, except the Identity Card inside the examination hall.
8. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
9. On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Hall. **However, the candidate are allowed to take away this Test Booklet with them.**
10. **Do not fold of make any stray marks on the Answer Sheet**

Name of the Candidate (in Capital): _____

Admission Number: | | | | | | | | | |

Candidate's Signature:_____ **Invigilator's Signature:** _____

19-04-25_Sr.Super60(Incoming)_STERLING BT_Jee-Main_WTM-29_Test Syllabus

MATHEMATICS : Indefinite integrals:- Standard formulas,Method of substitution, Integration of rational functions,irrational functions, Integration by partial fractions

PHYSICS : CAPACITORS: Capacitance, Capacitance of an isolated spherical conductor, Capacitor and its principle, Capacitance of a parallel-plate capacitor, Spherical and cylindrical capacitorForce on each plate of a charged parallel plate capacitor, Energy stored in a charged capacitor, Charging of a capacitor, Sharing of charge between two capacitor, Heat dissipated during sharing of chargeKirchoffs laws and sharing of charge among multiple connected capacitorCombination of capacitors, Capacitors in series and parallel, Wheatstone bridge, Symmetry Dielectrics and electric polarization

CHEMISTRY : ELECTRO CHEMISTRY-II :Electrolytic cell - electrolysis, Faraday's laws of Electrolyis, Electrolysis of different type of solutions,Conductance: Specific, Molar, equivalent Conductance,Kohlrausch law, corrosion and fuel cells, batteries

MATHEMATICS

Max Marks: 100

SECTION-I (SINGLE CORRECT ANSWER TYPE)

This section contains **20 Multiple Choice Questions.** Each question has 4 options (1), (2), (3) and (4) for its answer, out of which ONLY ONE option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and –1 in all other cases.

1. The value of $\int \frac{1+\sin x}{1-\sin x}dx$ is

1) $2\tan\left(\frac{x}{2}+\frac{\pi}{4}\right)+C$ 2) $2\tan\left(\frac{x}{2}+\frac{\pi}{4}\right)+x+C$

3) $2\tan\left(\frac{x}{2}+\frac{\pi}{4}\right)-x+C$ 4) $2\tan^2\left(\frac{x}{2}+\frac{\pi}{4}\right)-x+C$

2. The value of $\int \frac{dx}{\sqrt{4x-3-x^2}}$ is equal to

1) $\sin^{-1}(x-1)+C$ 2) $\log\left|(x-2)+\sqrt{4x-3-x^2}\right|$

3) $\log\left|(x-1)+\sqrt{4x-3-x^2}\right|+C$ 4) $\sin^{-1}(x-2)+C$

3. If $\int \frac{2x-\sqrt{\sin^{-1}x}}{\sqrt{1-x^2}}dx = C-2\sqrt{1-x^2}-\frac{2}{3}\sqrt{f(x)}$ then $f(x)$ is equal to

1) $\sin^{-1}x$ 2) $2\sin^{-1}x$ 3) $\left(\sin^{-1}x\right)^3$ 4) $3\left(\sin^{-1}x\right)^3$

4. If $\int \frac{dx}{1+\sqrt[3]{x+1}} = \frac{3}{2}(x+1)^{2/3}-3(x+1)^{1/3}+f(x)+C$ then $f(x)$ is equal to

1) $\log\left|1+\sqrt[3]{x+1}\right|$ 2) $3\log\left|1+\sqrt[3]{x+1}\right|$ 3) $\frac{2}{3}\log\left|1+\sqrt[3]{x+1}\right|$ 4) $\frac{1}{3}\log\left|1+\sqrt[3]{x+1}\right|$

5. If $\int \frac{3^{x+1}-7^{x-1}}{21^x}dx = K_1 3^{-x}+K_2 7^{-x}+C$ then

1) $K_1=\frac{1}{7\log 3}, K_2=\frac{1}{3\log 7}$ 2) $K_1=\frac{1}{7\log 3}, K_2=-\frac{1}{3\log 7}$

3) $K_1=\frac{1}{7\log 3}, K_2=-\frac{3}{\log 7}$ 4) $k_1=\frac{3}{\log 7}, k_2=\frac{-7}{\log 3}$

6. If $\int \cos x\cos 2x\cos 5x dx = A_1\sin 2x+A_2\sin 4x+A_3\sin 6x+A_4\sin 8x+C$ then

1) $A_1=\frac{1}{2}, A_2=\frac{1}{4}$ 2) $A_1=\frac{1}{4}, A_2=\frac{1}{8}$ 3) $A_2=\frac{1}{16}, A_3=\frac{1}{8}$ 4) $A_1=\frac{1}{8}, A_4=\frac{1}{32}$

7. If $\int \frac{(x-1)^2}{(x^2+1)^2}dx = \tan^{-1}x+g(x)+K$ then $g(x)$ is equal to

1) $\tan^{-1}(x/2)$ 2) $\frac{1}{x^2+1}$ 3) $\frac{1}{2(x^2+1)}$ 4) $\frac{-1}{x^2-1}$

8. If the antiderivative of $f(x)=\frac{\sin x}{\sin^2 x+4\cos^2 x}$ is $(1/\sqrt{3})\tan^{-1}\left((1/\sqrt{3})g(x)\right)+C$ then $g(x)$ is equal to

1) $\sec x$ 2) $\tan x$ 3) $\sin x$ 4) $\cos x$

9. The value of integral $\int\frac{dx}{x\sqrt{1-x^3}}$ is given by

1) $\frac{1}{3}\log\left|\frac{\sqrt{1-x^3}+1}{\sqrt{1-x^3}-1}\right|+C$ 2) $\frac{1}{3}\log\left|\frac{\sqrt{1-x^3}-1}{\sqrt{1-x^3}+1}\right|+C$

3) $\frac{2}{3}\log\left|\frac{1}{\sqrt{1-x^3}}\right|+C$ 4) $\frac{1}{3}\log\left|1-x^3\right|+C$

10. The integral $\int\frac{\cos 4x-1}{\cot x-\tan x}$ is equal to

1) $-\frac{1}{2}\cos 4x+C$ 2) $-\frac{1}{4}\cos 4x+C$ 3) $-\frac{1}{2}\sin 2x+C$ 4) $\frac{1}{2}\log|\cos 2x|-\frac{1}{4}\cos^2 2x+c$

11. If $\int\frac{dx}{x\sqrt{5x^2-3}}=K\tan^{-1}f(x)+C$ then

1) $f(x)=\sqrt{\frac{5}{3}x^2+1}, K=\frac{1}{\sqrt{3}}$ 2) $f(x)=\sqrt{\frac{5}{3}x^2-1}, K=\frac{1}{\sqrt{3}}$

3) $f(x)=\frac{1}{2}\sqrt{5x^2-3}.K=\frac{1}{\sqrt{5}}$ 4) None of these

12. If $\int\sqrt{1+\sec x}dx=K\sin^{-1}\left(f(x)\right)+C$ then

1) $f(x)=\sqrt{2}\sin(x/2), K=2$ 2) $f(x)=\sqrt{2}\cos(x/2), K=2$

3) $f(x)\sqrt{2}\tan(x/2), K=2$ 4) $f(x)=\sqrt{2}\sin(x/2), K=\sqrt{2}$

13. The function f whose graph passes through $(0,7/3)$ and whose derivative is $x\sqrt{1-x^2}$ is given by

1) $f(x)=(1/3)\left(\left(1-x^2\right)^{3/2}+7\right)$ 2) $f(x)=(3/2)\left[\sin^{-1}x+6\right]$

3) $f(x)=-(1/3)\left[\left(1-x^2\right)^{3/2}-8\right]$ 4) $f(x)=-1(2/3)\left[\left(1-x^2\right)^{3/2}-8\right]$

14. If $f(x)$ is the primitive of $\frac{\sin\sqrt[3]{x}\log(1+3x)}{\left(\tan^{-1}\sqrt{x}\right)^2\left(e^{\sqrt[3]{x}}-1\right)}(x\neq 0)$ then $\lim_{x\to 0}f'(x)$ is

1) 0 2) 3/5 3) 5/3 4) 3

15. Let $f(x)=\frac{1}{x^6+x^4}$ and F be antiderivative of f such that $F(1)=\frac{\pi}{4}+\frac{2}{3}$

Statement-I: $F\left(\frac{1}{\sqrt{3}}\right)=\frac{\pi}{6}$

Statement-II : $F(x)=\tan^{-1}x+\frac{1}{3x}-\frac{1}{x^3}$

1) Both **Statement-I** and **Statement-II** are false
2) Only **Statement-II** is true
3) Only **Statement-I** is true
4) Both **Statement-I** and **Statement-II** are true

16. The value of $\int\frac{dx}{\sqrt{x}+\sqrt[3]{x}}$ is

1) $2\sqrt{x}-3.\left(\sqrt[3]{x}\right)+\sqrt[6]{x}-\log\left(\sqrt[6]{x}+1\right)+C$
2) $2\sqrt{x}-3\left(\sqrt[6]{x}\right)-6\log\left(\sqrt[6]{x}+1\right)+C$
3) $2\sqrt{x}-3\sqrt[3]{x}+6\sqrt[6]{x}-6\log\left(\sqrt[6]{x}+1\right)+C$
4) $2\sqrt{x}+3\left(\sqrt[6]{x}\right)+6\log\left(\sqrt[6]{x}+1\right)+C$

17. Match the following :-

Column-I	Column-II
A) $\int\frac{dx}{x^2+4}=$	P) $\log\left\|x+\sqrt{x^2+9}\right\|+C$
B) $\int\frac{dx}{x^2-4}=$	Q) $\frac{1}{2}\tan^{-1}\left(\frac{x}{2}\right)+C$
C) $\int\frac{dx}{\sqrt{9-x^2}}=$	R) $\frac{1}{4}\log\left\|\frac{x-2}{x+2}\right\|+C$
D) $\int\frac{dx}{\sqrt{x^2+9}}=$	S) $\sin^{-1}\left(\frac{x}{3}\right)+C$

1) A–Q, B–R, C–S, D–P
2) A–R, B–S, C–R, D–Q
3) A–S, B–R, C–Q, D–Q
4) A–P, B–Q, C–S, D–R

18. $\int\frac{7x^{13}+5x^{15}}{\left(x^7+x^2+1\right)^3}$ equals

1) $\frac{x^{14}}{\left(x^7+x^2+1\right)^2}+C$
2) $\frac{x^{14}}{2\left(x^7+x^2+1\right)^2}+C$
3) $\frac{x^7}{\left(x^7+x^2+1\right)}+C$
4) $\frac{x^7}{2\left(x^7+x^2+1\right)}+C$

19. If $\int \frac{1-5\sin^2 x}{\cos^5 x \sin^2 x}dx = \frac{f(x)}{\cos^5 x}+C$, then $f(x)$:

1) $-\cos ec\, x$ 2) $\cos ecx$ 3) $\cot x$ 4) $-\cot x$

20. If $\int \frac{1-x^9}{x\left(1+x^9\right)}dx = A\log|x| + B\log\left|1+x^9\right| + C$, then the ratio $A:B$ is equal to

1) $-2:9$ 2) $2:9$ 3) $9:-2$ 4) $9:2$

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions.** The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11).**

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases.

21. The value of $I = \sqrt{2}\int \frac{\sin x}{\sin\left(x-\pi/4\right)}dx$ is $x+\log\left|\sin\left(x-k\right)\right|+C$ then k=_____

22. $I = \int \frac{x^2-1}{x^3\sqrt{2x^4-2x^2+1}}dx$ equal to $\frac{\sqrt{2x^4-2x^2+1}}{Px^2}$ then P=_____

23. Let $f(x) = \int e^{x^2}(x-2)(x-3)(x-4)dx$ then f increases on (a,b) then $a+b=$_____

24. $I = \int \cos\left\{2\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right\}dx$ is equal to $\frac{1}{k}x^2+c$ then k=_____

25. $I = \int \frac{\sin^{10}x - \cos^8 x\sin^2 x + \sin^8 x\cos^2 x - \cos^{10}x}{1-2\sin^2\cos^2 x}dx$ is equal $-\frac{1}{a}\sin bx + c$ then $a+b=$_____

PHYSICS **Max Marks: 100**

SECTION-I (SINGLE CORRECT ANSWER TYPE)

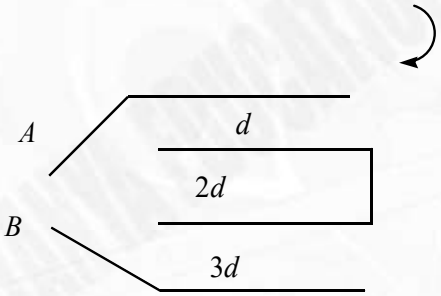
This section contains **20 Multiple Choice Questions.** Each question has 4 options (1), (2), (3) and (4) for its answer, out of which ONLY ONE option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and –1 in all other cases.

26. Find the capacitance of a system of two identical metal balls of radius 'a' if the distance between their centres is equal to 'b', with $b >> a$. Then system is located in a uniform dielectric with relative permittivity ε

1) $C = \pi\varepsilon_0\varepsilon a$ 2) $C \approx 5\pi\varepsilon_0\varepsilon a$ 3) $C \approx 2\pi\varepsilon_0\varepsilon a$ 4) $C \approx 2\pi\varepsilon_0\varepsilon / a$

27. If the area of each plate is S and the successive separations are d, 2d and 3d then the equivalent capacitance across A and B is x times $\frac{\varepsilon_0 A}{d}$. as shown in figure. Find the value of x_____



1) 0.25 2) 0.5 3) 0.75 4) 1

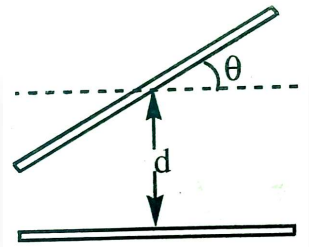
28. A capacitor 1mF withstands a maximum voltage of 6KV while another capacitor 2mF withstands a maximum voltage of 4KV. If the capacitors are connected in series, the system will withstand a maximum voltage of

1) 2 KV 2) 4 KV 3) 6 KV 4) 9 KV

29. Two isolated conducting spheres each of radius R and carrying charges Q and 2Q. They are connected by a wire. Find the amount of heat produced during the transfer of charge from one sphere to other sphere.

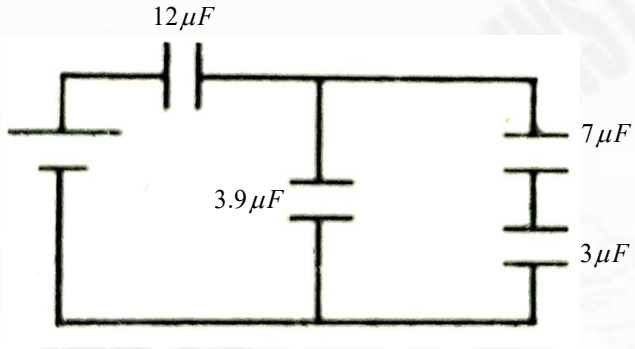
1) $kQ^2 / 4R$ 2) $kQ^2 / 2R$ 3) kQ^2 / R 4) $2kQ^2 / 4R$

30. One plate of a parallel plate capacitor is tilted by a small angle about its central line as shown in the figure. The tilt angle 'θ' is small. Both the plate are square in shape with side length a and separation between their centers is 'd'. Find the capacitance of the capacitor.



1) $\frac{\varepsilon_0 a^2}{d}\left[1+\frac{a^2\theta^2}{12d^2}\right]$ 2) $\frac{\varepsilon_0 a^2}{d}\left[1-\frac{a^2\theta^2}{10d^2}\right]$ 3) $\frac{\varepsilon_0 a^2}{d}\left[1-\frac{a^2\theta^2}{6d^2}\right]$ 4) $\frac{\varepsilon_0 a^2}{d}\left[1-\frac{a^2\theta^2}{5d^2}\right]$

31. The potential drop across $7\mu F$ capacitor is 6V. Then

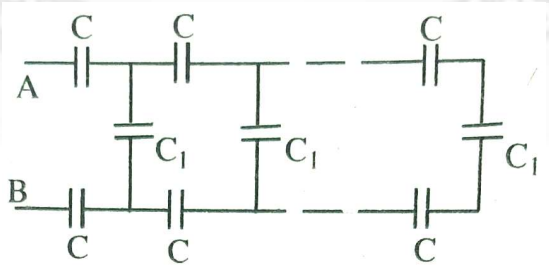


1) Potential drop across $3\mu F$ capacitor is 10V
2) Charge on $3\mu F$ capacitor is $21\mu C$
3) emf of the cell is 30V
4) P.D across $12\mu F$ capacitors is 5V

32. n identical condensers are joined in parallel and are charge to potential V so that energy stored in each condenser is E. If they are separated and joined in series, then the total energy and total potential difference of the combination will be

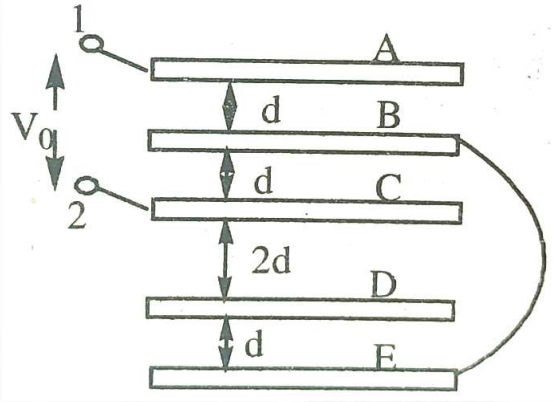
1) nE and $\frac{V}{n}$ 2) n^2E and nV 3) $\frac{E}{n^2}$ and $\frac{V}{n^2}$ 4) nE and nV

33. If in the infinite series circuit, $C=9\mu F$ and $C_1=6\mu F$ then the capacity across AB is in $\_\_\_\_\mu F$.



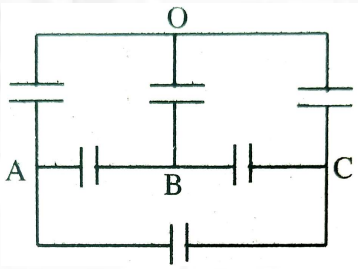
1) $3\mu F$ 2) $6\mu F$ 3) $9\mu F$ 4) $4.5\mu F$

34. Five identical conducting plates each of face area "A" are arranged as shown in figure. If a potential difference of 'V_0' is created between plate A and C then the charge on plate 'E' will be [Given $C = \frac{\varepsilon_0 A}{d}$].



1) $\frac{3CV_0}{8}$ 2) $\frac{5CV_0}{7}$ 3) $\frac{5CV_0}{8}$ 4) $\frac{CV_0}{7}$

35. Six identical capacitors of each capacitance C_0 are arranged as shown in fig. In **column-I,** equivalent capacitance between two selected points is defined. Match them for their values given in **column-II.**



Column-I	**Column-II**
I) C_{AB}	p) $2C_0$
II) C_{AC}	q) $\frac{3}{2}C_0$
III) C_{OA}	r) $\frac{5}{3}C_0$
IV) C_{OB}	s) $\frac{4}{3}C_0$

1) $I-p, II-q, III-r, IV-s$ 2) $I-p, II-p, III-p, IV-s$
3) $I-p, II-p, III-r, IV-s$ 4) $I-p, II-p, III-p, IV-p$

36. **Assertion (A) :** When charge are shared between two bodies, there occurs no loss of charge but there does occur a loss of energy.
Reason (R): In case of sharing of charges, conservation of energy fails.

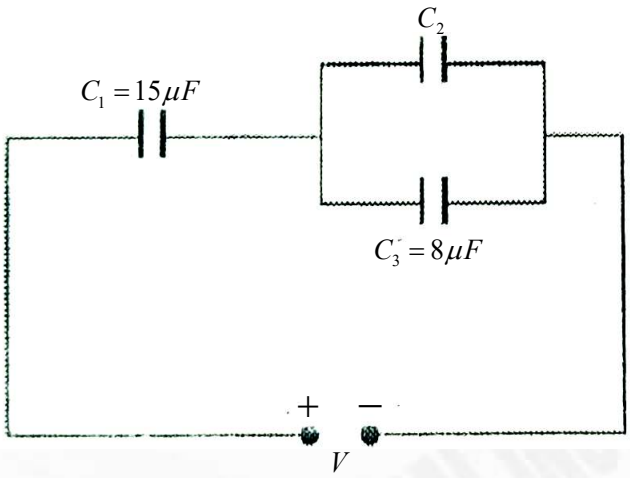
1) Assertion is true, Reason is True; Reason is correct explanation for Assertion
2) Assertion is True, Reason is True; Reason is not correct explanation for Assertion
3) Assertion is True , Reason is False
4) Assertion is False Reason is True

37. **Assertion (A) :** A parallel plated capacitor is connected across battery through a key. A dielectric slab of dielectric constant K is introduced between the plates. The energy which is stored becomes K times.
Reason (R): The surface density of charge on the plated remains constant or uncharged.
1) Assertion is true, Reason is True; Reason is correct explanation for Assertion
2) Assertion is True, Reason is True; Reason is not correct explanation for Assertion
3) Assertion is False, Reason is True
4) Assertion is True Reason is False

38. **Statement1 :** If the distance between parallel plates of a capacitor is halved and dielectric constant is three times, then the capacitor becomes 6 times.
Statement2 : Capacity of a capacitor does not depend upon the nature of the material.
1) Statement-1 and Statement-2 are Correct ; Statement-1 is correct explanation for Statement-2
2) Statement-1 and Statement-2 are Correct ; Statement-1 is not correct explanation for Statement-2
3) Statement-1 is True,Statement-2 is False
4) Statement-1 is False ,Statement-2 is True

39. **Statement-1 :** Circuits containing high capacity capacitors, charged to high voltage should be handled with cation, even when the current in the circuit is switched off.
Statement-2: When an isolated capacitor is touched by hand or any other part of the human body, there is an easy path to the ground available for the discharge of the capacitor.
1) Statement-1 and Statement-2 are Correct ; Statement-1 is correct explanation for Statement-2
2) Statement-1 and Statement-2 are Correct ; Statement-1 is not correct explanation for Statement-2
3) Statement-1 is True,Statement-2 is False
4) Statement-1 is False ,Statement-2 is True

40. In the circuit shown in the figure, the total charge is 750 μC and the voltage across capacitor C_2 is 20V. Then the charge on capacitor C_2 is :

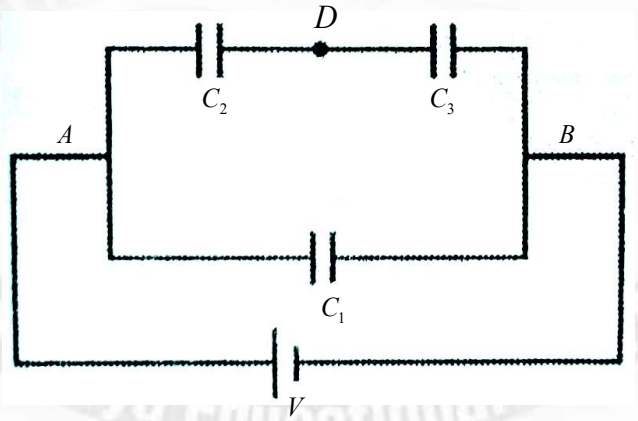


1) $590\mu C$ 2) $450\mu C$ 3) $650\mu C$ 4) $160\mu C$

41. Two capacitors of capacitance 2C and C are joined in parallel and charged up to potential V. the battery is removed and the capacitor of capacity C is filled completely with a medium of dielectric constant K. The potential difference across the capacitors will now be :

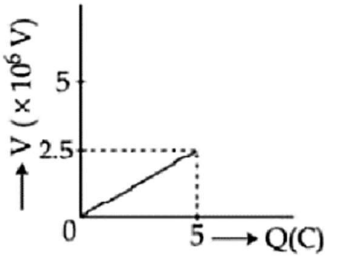
1) $\frac{V}{K+2}$ 2) $\frac{V}{K}$ 3) $\frac{3V}{K+2}$ 4) $\frac{3V}{K}$

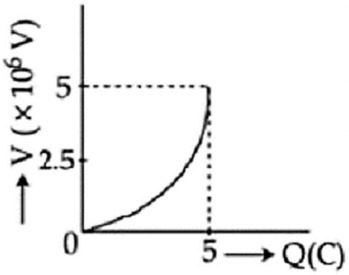
42. Thee capacitors $C_1 = 2\mu F, C_2 = 6\mu F$ and $C_3 = 12\mu F$ are connected as shown in figure. Find the ratio of the charges on capacitors C_1, C_2 and C_3 respectively.

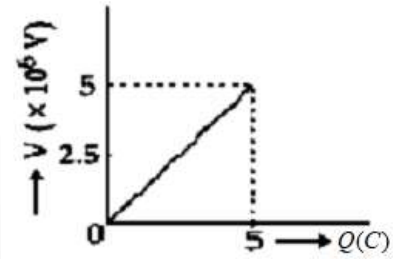


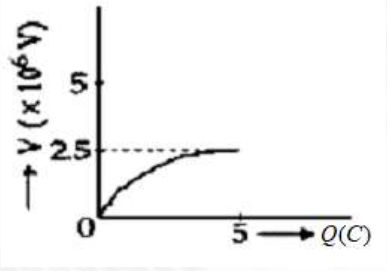
1) 2:1:1 2) 2:3:3 3) 1:2:2 4) 3:4:4

43. A condesor of $2\,\mu F$ capacitance is charged to 5C. Which of following graph represents correctly the variation of potential difference (V) across its plates with respect to the charge (Q) on the Condesor ?

1) 

2) 

3) 

4) 

44. Two Identical thin metal plates has charge q_1 *and* q_2 Such that $q_1 > q_2$ .The plates were brought close to each other to form a parallel plate capacitor of Capacitance C. The Potential difference between them is:

1) $\frac{(q_1+q_2)}{C}$ 2) $\frac{(q_1-q_2)}{C}$ 3) $\frac{(q_1-q_2)}{2C}$ 4) $\frac{2(q_1-q_2)}{C}$

45. If the Charge on the capacitor is increased by 2 C, the energy stored in increases by 44% . The original Charge on the Capacitor is in (C)

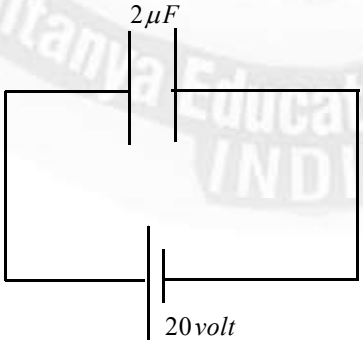
1) 10 2) 20 3) 30 4) 40

SECTION-II (NUMERICAL VALUE TYPE)

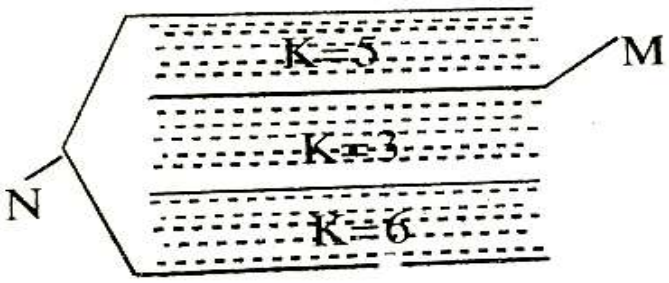
This section contains **5 Numerical Value Type Questions.** The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11).**

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

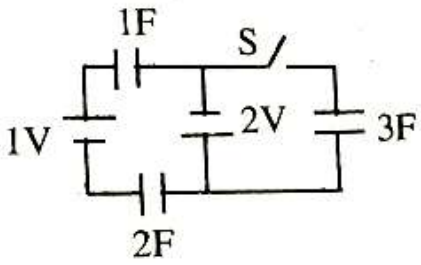
46. In the figure a capacitor of capacitance $2\mu F$ connected to a cell of emf 20 volt. The plates of the capacitor are drawn apart slowly to double the distance between them. The work done by the external agent on the plates is: (of the order of $10^{-6} J$)



47. In the given arrangement of parallel plates each of plate area A and distance between two consecutive plates is d. Equivalent capacitance of the structure between MN is n times of $\frac{\in_0 A}{d}$ then the value of n is

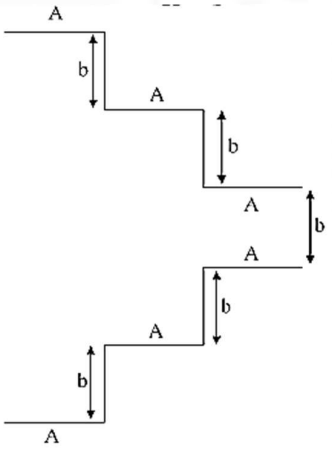


48. There is no charge on 3F capacitor when 'S'is open. How much heat (in Joule) is developed in the circuit after 'S' is closed ?



49. A $60\,pF$ is fully charged by a 20V supply. It is then disconnected from the supply and is connected to another uncharged $60\,pF$ Capacitor in parallel. The electrostatic energy that is lost in this process by the time the charge is redistributed between them is (in n J).

50. A parallel Plate capacitor is made up of stair like structure with plate. Area A of each stair and that is connected with a wire of length b,as shown in the figure. The capacitance of the arrangement is $\frac{x}{15}\frac{\in_0 A}{b}$. the value of x is _____



CHEMISTRY

Max Marks: 100

SECTION-I (SINGLE CORRECT ANSWER TYPE)

This section contains **20 Multiple Choice Questions.** Each question has 4 options (1), (2), (3) and (4) for its answer, out of which ONLY ONE option can be correct.

Marking scheme: +4 for correct answer, 0 if not attempted and –1 in all other cases.

51. How many Coulombs of electricity are required for the reduction of 1 mol of MnO_4^- to Mn^{2+}

1) 96500 C 2) $1.93\times10^5 C$ 3) $4.83\times10^5 C$ 4) $9.65\times10^6 C$

52. Calculate the current (in mA) required to deposit 0.195 g of platinum metal in 5.0 hours From a solution of $PtCl_6^{2-}$: (Atomic weight : $Pt=195$)

1) 310 2) 31 3) 21.44 4) 5.36

53. A highly concentrate solution of potassium sulphate in water is electrolysed using inert electrodes. The products at the cathode and anode are respectively.

1) H_2, O_2 2) O_2, H_2 3) O_2, Na 4) $H_2, S_2O_8^{2-}$

54. The Metals that are employed in the battery industries are

a) Fe b) Mn c) Ni d) Cr e) Cd

Choose the correct answer from the options given below:

1) B, C and E only 2) A, B, C, D and E

3) A, B, C and D only 4) B, D, E only

55. Which of the following reaction occurs at the cathode during the charging of lead storage battery?

1) $Pb^{+2}+2e^-\rightarrow Pb$ 2) $Pb^{2+}+SO_4^{-2}\rightarrow PbSO_4$

3) $Pb\rightarrow Pb^{2+}+2e^-$ 4) $PbSO_{4(S)}+2H_2O\rightarrow PbO_{2(S)}+4H^++So_4^{-2}+2e^-$

56. When a lead storage battery is discharged

1) Lead sulphate is consumed 2) SO_2 is evolved

3) Sulphuric acid is consumed 4) Lead is formed

57 . Passage of a current for 548 seconds through a silver coulometer results in the deposition of 0.746 g of silver. What is the current (in A)

1) 1.22 2) 1.16 3) 1.07 4) 1.00

58. Rusting of iron is catalyzed by which of the following

1) Fe 2) O_2 3) Zn 4) H^+

59. At 25^0C The molar conductance at infinite dilution for the strong electrolyte NaOH, NaCl & $BaCl_2$ are $248\times10^{-4}, 126\times10^{-4}$ *and* $280\times10^{-4}\ S.m^2.mol^{-1}$ respectively. $\Delta_m^0 Ba(OH)_2$ is _____ $s.m^2\ mol^{-1}$

1) 52.5×10^{-4} 2) 524×10^{-4} 3) 402×10^{-4} 4) 262×10^{-4}

60. Given below are two statements:
Statement – I: For KI, molar conductivity increases steeply with dilution.
Statement-II: For carbonic acid, molar conductivity increases slowly with dilution.
In the light of the above statements, choose the correct answer from the options below:
1) Both Statement-I and Statement-II are true
2) Both Statement-I and Statement-II are False
3) Statement-I is True But Statement-II is False
4) Statement- I is False But Statement-II is True

61. A solution of aluminum chloride is electrolyzed for 30 minutes using a current of 2A. The amount of the aluminum deposited at the cathode is _____ [Given : molar mass of aluminum and chlorine are $27\,g\,mol^{-1}$ *and* $35.5\,g\,mol^{-1}$ respectively, Faraday constant $= 96500\,C\,mol^{-1}$]
1) 1.660 g 2) 1.007 g 3) 0.336 g 4) 0.441 g

62. In a hydrogen-oxygen fuel cell, combustion of hydrogen occurs to
1) Generate heat
2) Create potential difference between the two electrodes
3) Produce high purity water
4) Remove adsorbed oxygen from electrode surface.

63. Compound A used as a strong oxidizing agent is amphoteric in nature. It is a part of lead storage batteries. Compound A is
1) PbO_2 **2)** $PbSO_4$ **3)** Pb_3O_4 **4)** PbO

64. During electrolysis of $CH_3COONa_{(aq)}$, the mole ratio of gases products formed at cathode and anode is
1) 1: 2 2) 2:1 3) 3:1 4) 1:3

65. **Assertion:** Hydrogen gas always evolved only at cathode during electrolysis
Reason : H^+ ions undergo reduction by gaining electrons
1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
2) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion
3) Assertion is true but Reason is false
4) Assertion is false but Reason is true

66. Which of the following electrolysis would not evolve oxygen at the anode.
1) Dilute H_2SO_4 with platinum electrode
2) Aqueous $AgNO_3$ using platinum electrodes
3) Na_2SO_4 with platinum electrodes.
4) $50\%\,H_2SO_4$ with platinum electrodes

67. Equivalent Conductance can be expressed in terms of specific conductance (k) and concentration (N) in gram Equivalent per dm^{-3}

1) $K \times N$ 2) $\frac{K \times N}{1000}$ 3) $K \times N \times 1000$ 4) $\frac{K \times 1000}{N}$

68. Which of the following statements is not correct about rusting of iron?

1) Coating of iron surface by tin prevents rusting, even if the tin coating is peeling off.

2) When pH lies above 9 or 10, rusting of iron does not take place.

3) Dissolved acidic oxides SO_2, NO_2 in water act as catalyst in the process of rusting.

4) Rusting of iron is envisaged as setting up of electrochemical cell on the surface of iron object.

69. A current of 2A passed for 5 hour through a molten metal salt, deposited 22.2 g of metal having atomic mass 177. The oxidation state of metal in metal salt is:

$Cr_2O_7^{2-}(aq.1M) + 14H^+(aq) + 6e^- \rightarrow 2Cr^{3+}(aq,1M) + 7H_2O(l)$

1) 1 2) 2 3) 3 4) 4

70. **Statement-1:** 1 coulomb electricity deposits 1 g –equivalent of a Substance.

Statement-2: 1 faraday is charge on 1 mole of electricity.

1) Both Statement-1 and Statement-2 are true and Statement-2 is the correct explanation of Statement-1

2) Both Statement-1 and Statement-2 are true and Statement-2 is not the correct explanation of Statement-1

3) Statement-1 is true but Statement-2 is false

4) Statement-1 is false but Statement-2 is true

SECTION-II (NUMERICAL VALUE TYPE)

This section contains **5 Numerical Value Type Questions.** The Answer should be within **0 to 9999.** If the Answer is in **Decimal** then round off to the **Nearest Integer** value (Example i,e. If answer is above **10** and less than **10.5** round off is **10** and If answer is from **10.5** and less than **11** round off is **11**).

Marking scheme: +4 for correct answer, 0 if not attempt and -1 in all other cases

71. One faraday of electricity Liberates $x \times 10^{-1}$ *gram atom* of Copper from copper sulphate , x is _____

72. In rusting of iron, iron is oxidized and O_2 is reduced. The no. of electrons used during reduction of O_2 are.

73. When a molten salt was electrolysed for 5 min with 9.65 A current, 0.18 g of the metal was deposited.

Calculate the equivalent wt. of metal.

74. During the electrolysis of a Concentrated brine solution. Calculate the moles of chlorine gas produced by the passage of 4F electricity.

75. Calculate the Molar conductivity of $0.1M$ Solution and its resistivity is 50Ω

Sri Chaitanya
Educational Institutions & Techno Schools

Infinity Learn

39 Years of Excellence 1986-2024

EMPOWERING EVERY STUDENT
TO BECOME EXTRAORDINARY

1 ALL INDIA RANK

K C BASAVA REDDY
APPL.No. 240310618179*

PROUDLY ACHIEVED 222 RANKS IN TOP 1000

SEIZES 4 RANKS IN TOP 10 IN ALL-INDIA RANKS

ALL INDIA RANK **3**

THOTAMSETTY NIKILESH
APPL.No. 240310813888* — RANK

ALL INDIA RANK **6**

HIMANSHU THALOR
APPL.No. 240310580429* — RANK

ALL INDIA RANK **9**

REDDI ANIL
APPL.No.240310238514 — RANK

SECURED 25 RANKS IN TOP 100
ALL INDIA OPEN CATEGORY

Sri Chaitanya - Nagpur DLP Student

1 RANK	9 RANK	14 RANK	20 RANK	21 RANK	22 RANK	26 RANK	28 RANK
G N NIRMALKUMAR Appl.No. 240310385062*	REDDI ANIL Appl.No. 240310238514*	K C BASAVA REDDY Appl.No. 240310618179*	THOTAMSETTY NIKILESH Appl.No. 240310813888*	A V TANISH REDDY Appl.No. 240310807613	HIMANSHU THALOR Appl.No. 240310580429*	VEDANT SAINI Appl.No. 240310182830	P MEET VIKRAMBHAI Appl.No. 240310157524*

34 RANK	40 RANK	43 RANK	46 RANK	49 RANK	52 RANK	53 RANK	57 RANK
SANVI JAIN Appl.No. 240310150036*	VISHARAD SRIVASTAVA Appl.No. 240310046262*	T JAYADEV REDDY Appl.No. 240310167365	ISHAAN GUPTA Appl.No. 240310100229*	MAVURU JASWITH Appl.No. 240310542275*	DORISALA SRINIVASA REDDY Appl.No. 240310682440*	ARCHIT RAHUL PATIL Appl.No. 240310512311*	KRISHNA AGRAWAL Appl.No. 240310285850*

60 RANK	68 RANK	70 RANK	76 RANK	92 RANK	93 RANK	95 RANK	96 RANK	98 RANK
AYUSH GANGAL Appl.No. 240310270709	PALAGIRI SATHISH REDDY Appl.No. 240310905497	MD K GHOUSE MOHIUDDIN Appl.No. 240310176352	T V S SAI NAGA BHUSHAN Appl.No. 240310868568	M M PRUTHVI RAJ Appl.No. 240311084545	M SAI SIVA LOCHAN Appl.No. 240310866829*	RAJDEEP MISHRA Appl.No. 240310265621*	MANOJ SOHAN GAJULA Appl.No. 240310529661	KRISH NARSARIA Appl.No. 240310028286*

Below 100 All-India Open Category Ranks — **25**

Below 500 All-India Open Category Ranks — **108**

Below 1000 All-India Open Category Ranks — **222**

Below 100 All-India All Category Ranks — **97**

Below 1000 All Category Ranks — **888**

TOTAL QUALIFIED RANKS FOR JEE ADVANCED-2024 **21,987**

FOR OFFER ON JEE MAIN & JEE ADVANCED COURSES

SCAN THE **QR CODE**

www.srichaitanya.net | Ph: 040 660 60606

* DLP | @ Gen-EWS | $ OBC-(NCL) | % SC | # ST | & GEN