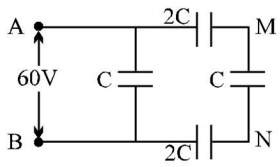
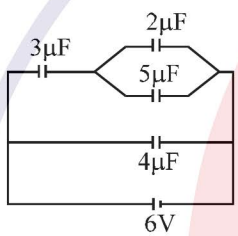
1. In the circuit shown, a potential difference of 60V is applied across AB. The potential difference between the point M and N is :-



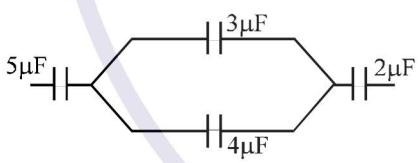
(1) 10 V (2) 15 V
(3) 20 V (4) 30 V

2. In the circuit shown in figure, the ratio of charges on 5μF and 4μF capacitor is :-



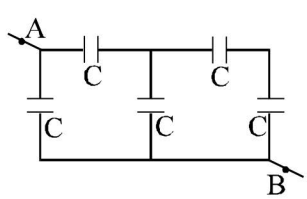
(1) 4/5 (2) 3/5
(3) 3/8 (4) 1/2

3. If charge on left plate of the 5μF capacitor in the circuit segment shown in the figure is –20μC, the charge on the right plate of 3μF capacitor is :-



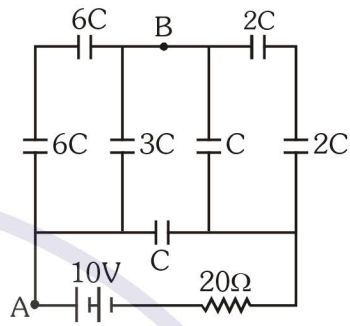
(1) +8.57 μC (2) –8.57 μC
(3) +11.42 μC (4) –11.42 μC

4. What is the equivalent capacitance of the system of capacitors between A & B as shown in the figure.



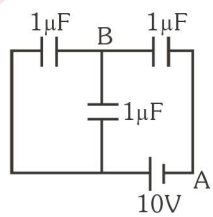
(1) $\frac{7}{6}$C (2) 1.6 C (3) C (4) None

5. For the circuit shown here, the potential difference between points A and B is



(1) 2.5 V (2) 7.5 V
(3) 10 V (4) Zero

6. If potential of A is 10V, then potential of B is -



(1) 25/3 V (2) 50/3 V
(3) 100/3 V (4) 50 V

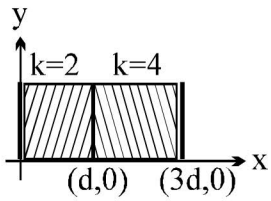
7. A parallel plate capacitor has an electric field of 10^5V/m between the plates. If the charge on the capacitor plate is 1μC, then the force on each capacitor plate is

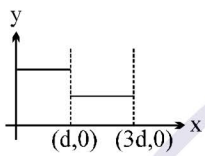
(1) 0.1Nt (2) 0.05Nt
(3) 0.02Nt (4) 0.01Nt

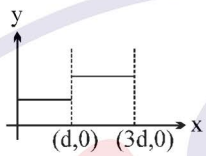
8. A conducting body 1 has some initial charge Q, and its capacitance is C. There are two other conducting bodies, 2 and 3, having capacitances : C_2 = 2C and $C_3 \to \infty$. Bodies 2 and 3 are initially uncharged. "Body 2 is touched with body 1. Then, body 2 is removed from body 1 and touched with body 3, and then removed." This process is repeated N times. Then, the charge on body 1 at the end must be

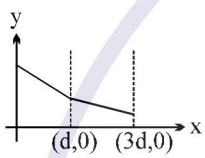
(1) $Q/3^N$ (2) $Q/3^{N-1}$
(3) Q/N^3 (4) None

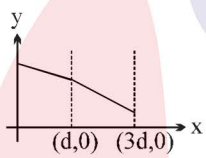
9. A parallel plate capacitor has two layers of dielectric as shown in figure. This capacitor is connected across a battery. The graph which shows the variation of electric field (E) and distance (x) from left plate is



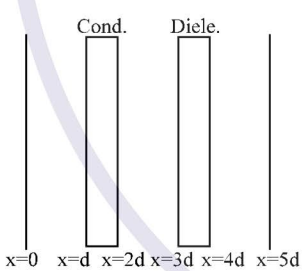
(1) 

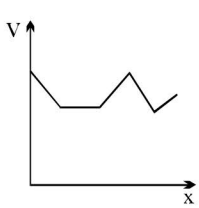
(2) 

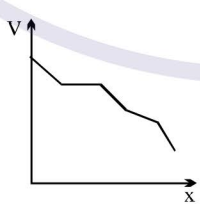
(3) 

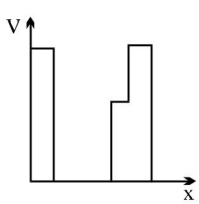
(4) 

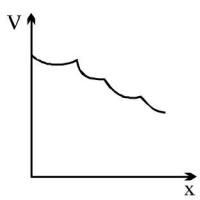
10. The distance between plates of a parallel plate capacitor is 5d. Let the positively charged plate is at x=0 and negatively charged plate is at x=5d. Two slabs one of conductor and other of a dielectric of equal thickness d are inserted between the plates as shown in figure. Potential versus distance graph will look like :



(1) 

(2) 

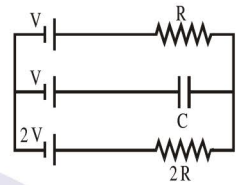
(3) 

(4) 

11. Three capacitors 2 μF, 3 μF and 5 μF can withstand voltages to 3V, 2V and 1V respectively. Their series combination can withstand a maximum voltage equal to

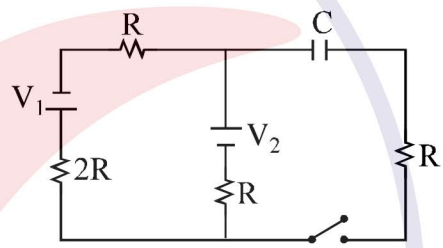
(1) 5 Volts (2) (31/6) Volts
(3) (26/5) Volts (4) None

12. In the given circuit, with steady current the potential drop across the capacitor must be :-



(1) V (2) $\frac{V}{2}$ (3) $\frac{V}{3}$ (4) $\frac{2V}{3}$

13. In the transient circuit shown the time constant of the circuit is :

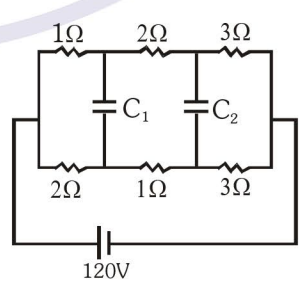


(1) $\frac{5}{3}$RC (2) $\frac{5}{2}$RC (3) $\frac{7}{4}$RC (4) $\frac{7}{3}$RC

14. A parallel plate capacitor is connected to a battery. The quantities charge, voltage, electric field and energy associated with the capacitor are given by Q_0, V_0, E_0 and U_0 respectively. A dielectric slab is introduced between plates of capacitor but battery is still in connection. The corresponding quantities now given by Q, V, E and U related to previous ones are

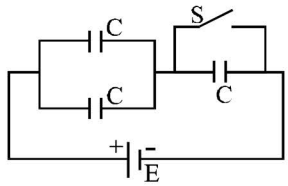
(1) $Q > Q_0$ (2) $V > V_0$
(3) $E > E_0$ (4) $U < U_0$

15. In the circuit shown in figure $C_1=C_2 = 2\mu F$. Then charge stored in



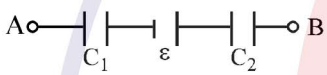
(1) capacitor C_1 is zero
(2) capacitor C_2 is zero
(3) both capacitor is zero
(4) capacitor C_1 is 40 μC

16. In the circuit shown, each capacitor has a capacitance C. The emf of the cell is E. If the switch S is closed



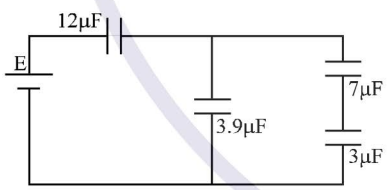
(1) positive charge will flow out of the positive terminal of the cell
(2) positive charge will enter the positive terminal of the cell
(3) the amount of charge flowing through the cell will be CE.
(4) the amount of charge flowing through the cell will be 4/3 CE.

17. A circuit shown in the figure consists of a battery of emf 10 V and two capacitance C_1 and C_2 of capacitances 1.0 μF and 2.0 μF respectively. The potential difference $V_A - V_B$ is 5V



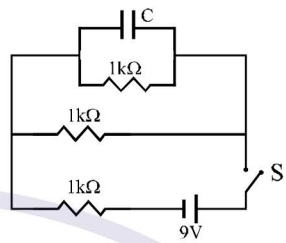
(1) charge on capacitor C_1 is equal to charge on capacitor C_2
(2) Voltage across capacitor C_1 is 5V.
(3) Voltage across capacitor C_2 is 10 V
(4) Energy stored in capacitor C_1 is two times the energy stored in capacitor C_2.

18. Four capacitors and a battery are connected as shown. The potential drop across the 7 μF capacitor is 6 V. Then the :



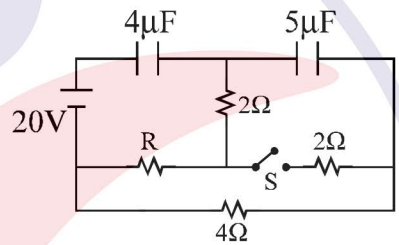
(1) potential difference across the 3 μF capacitor is 10 V
(2) charge on the 3 μF capacitor is 42 μC
(3) e.m.f. of the battery is 30 V
(4) potential difference across the 12 μF capacitor is 10 V.

19. A capacitor C = 100 μF is connected to three resistor each of resistance 1 kΩ and a battery of emf 9V. The switch S has been closed for long time so as to charge the capacitor. When switch S is opened, the capacitor discharges with time constant



(1) 33 ms (2) 5 ms (3) 3.3 ms (4) 50 ms

20. Find heat produced on closing the switch S



(1) 0.0002 J (2) 0.0005 J
(3) 0.00075 (4) zero

ANSWER KEY — Exercise-I

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**4**	**3**	**1**	**2**	**1**	**2**	**2**	**1**	**1**	**2**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**2**	**3**	**3**	**1**	**2,4**	**1,4**	**1,4**	**2,3,4**	**4**	**4**