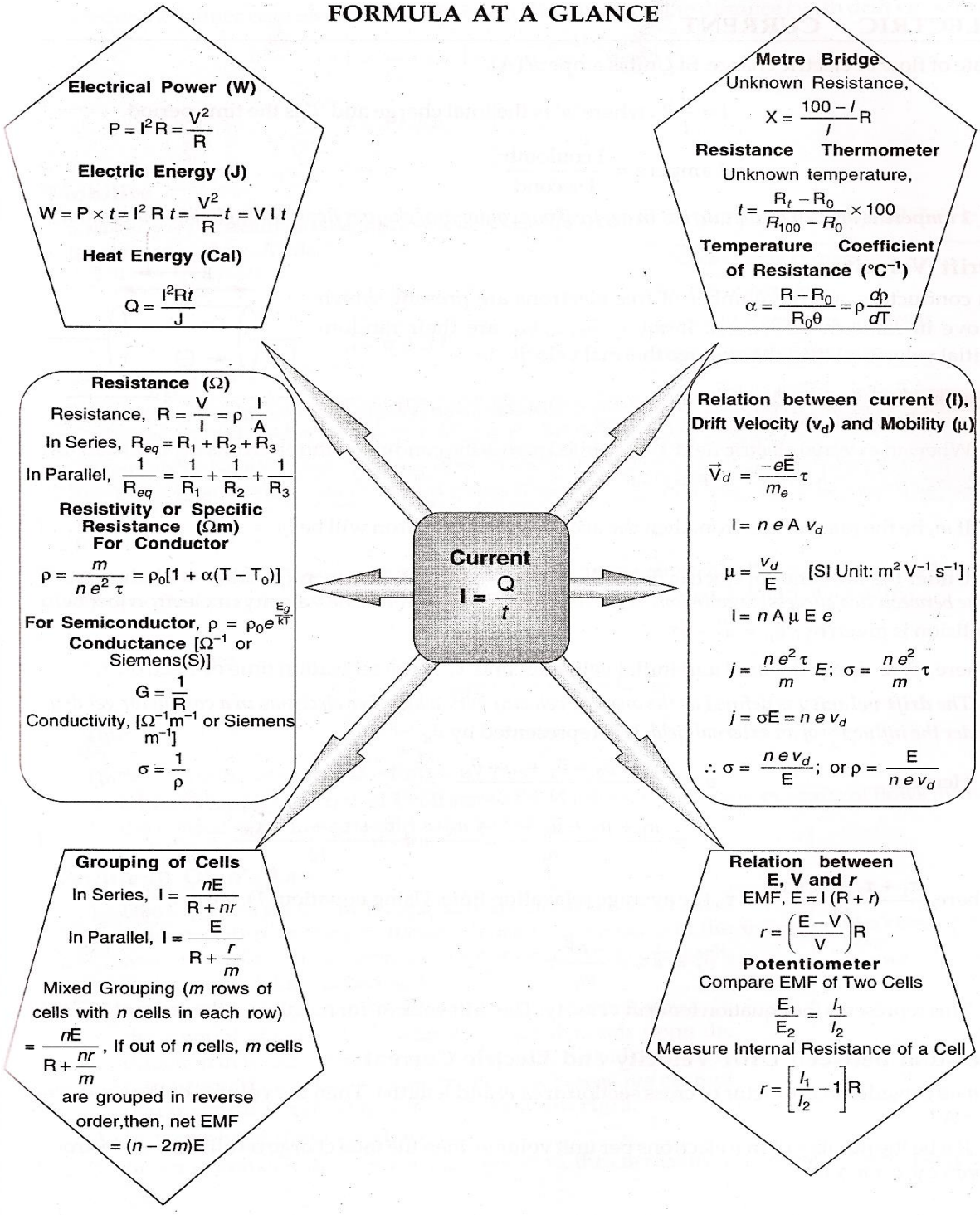
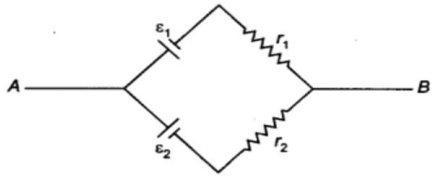
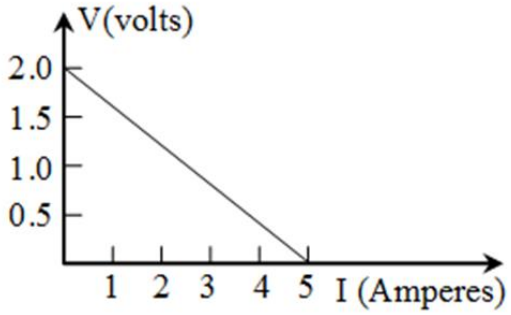
FORMULA AT A GLANCE

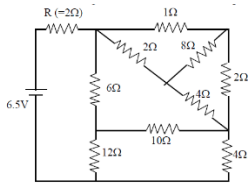
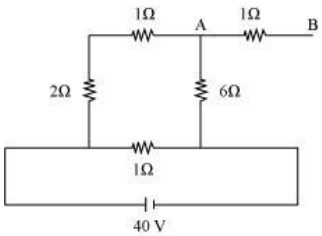


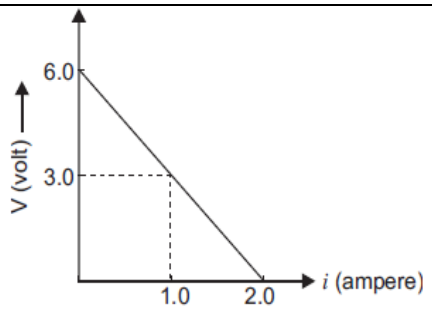
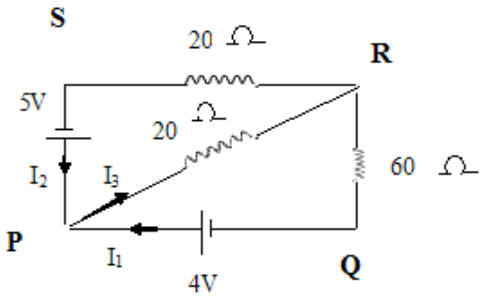
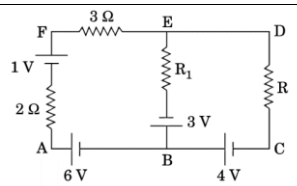
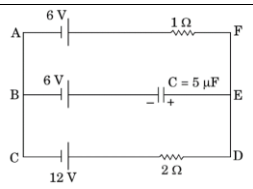
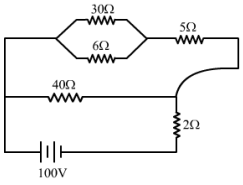
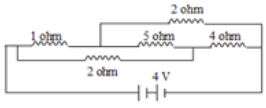
S.No.	Question Details	Marks
	MULTIPLE CHOICE QUESTIONS	
1.	Which of the following characteristics of electrons determine the current in a conductor? a) Drift velocity alone b) Thermal velocity alone c) Both drift velocity and thermal velocity d)Neither drift nor thermal velocity.	1
2.	Two batteries of emf E_1 and E_2 (E_2 is greater than E_1) and internal resistances r_1 and r_2 respectively are connected in parallel as shown in the figure:  a) The equivalent emf E_{eq} of the two cells is between E_1 and E_2. b) The equivalent emf E_{eq} is smaller than E_1 c)The E_{eq} is given by $E_{eq} = E_1 + E_2$ always d)E_{eq} is independent of internal resistances r_1 and r_2	1
3.	Resistivity of a conductor is: a) independent of temperature b) Inversely proportional to temperature c)Independent of dimensions of conductor d)Less than resistivity of a semiconductor	1
4.	If drift velocity of electron is v_d and intensity of electric field is E, then the relation obeys the Ohm's law is: a)v_d = constant b) $v_d \alpha E$	1

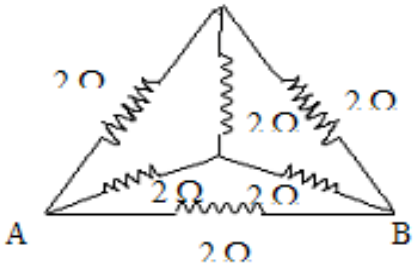
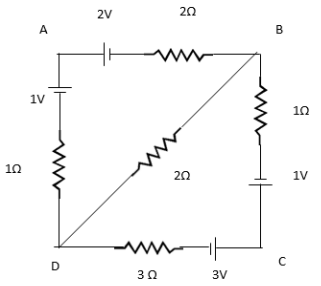
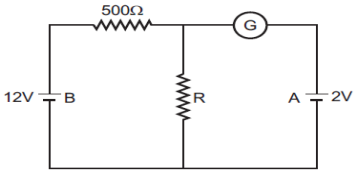
	c) $v_d \alpha \sqrt{E}$ d) $v_d \alpha E^2$	
5.	20 million electrons pass from point P to point Q in 2 microseconds. The direction and magnitude of the current is? a)1.5 X 10^{-10}A from X to Y b) 1.6 X 10^{-6}A from Y to X c)1.5 X 10^{-13}A from Y to X d) 1.6 X 10^{-4}A from X to Y	1
6.	The resistance of a 10m long wire is 10Ω.Its length is increased by 25%by stretching the wire uniformly. The resistance of the wire will change to a)12.5 Ω b)14.5 Ω c)15.6 Ω d)16.6 Ω	1
7.	Multiplication of resistivity and conductivity of any conductor depends on a) cross -section b) temperature c)length d) none of these	1
8.	Kirchhoff's second law is based on law of conservation of: a) sum of mass and energy b) momentum c)energy d) charge	1
9.	A steady current flow in a metallic conductor of non-uniform cross-section. The quantity/quantities constant along the length of the conductor is a) current, electric field and drift velocity b) drift speed only	1

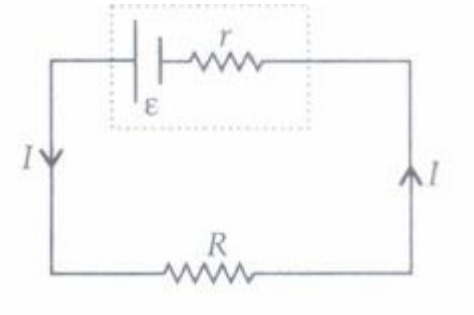
	c)current and drift speed d)current only	
10.	For a cell, the graph between the potential difference (V) across the terminals of the cell and the current (I) drawn from the cell is shown in figure. The emf and the internal resistance of the cell are -  a) 2V, 0.5 Ω b) 2V, 0.4 Ω c) > 2 V, 0.5Ω d) > 2 V, 0.4Ω	1
11.	The internal resistance of a 2.1 V cell which gives a current of 0.2A through a resistance of 10Ω is: a)0.2 Ω b)0.5 Ω c) 0.8 Ω d)1.0 Ω	1
	FILL IN THE BLANKS	
1.	For a given voltage and time, the heat produced in a conductor is……to the resistance of the conductor.	1
2.	The rate at which electric work is done by the source of emf in maintaining the current is called ……	1
3.	Two identical conductors maintained at different temperatures are given potential differences in the ratio 1:2. Then the ratio of their drift velocities is ……	1
4.	The internal resistance of a cell depends on ……and …….	1
5.	A potential difference Vis applied to a copper wire of length l and diameter d. If V is doubled, then the drift velocity is ……	1

6.	The amount of charge flowing per second per unit area normal to the flow is called ……	1
7.	Across a metallic conductor of non-uniform cross section, a constant potential difference is applied. The quantity which remains constant along the conductor is…….	1
8.	Electrical conductivity is the reciprocal of ……	1
9.	The temperature coefficient of resistance of an alloy used for making resistors is ……	1
	ASSERTION AND REASON a)If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion. b)If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion. c)If the Assertion is correct but Reason is incorrect. d) If both the Assertion and Reason are incorrect	
	Assertion : In a simple battery circuit, the point of the lowest potential is positive terminal of the battery. Reason : The current flows towards the point of the higher potential, as it does in such a circuit from the negative to the positive terminal.	
	Assertion : A larger dry cell has higher emf. Reason : The emf of a dry cell is proportional to its size.	
	Assertion: Voltmeter is connected in parallel with the circuit. Reason: Resistance of a voltmeter is very large	
	Assertion : Ohm's law is applicable for all conducting elements. Reason : Ohm's law is a fundamental law	
	.. Assertion : An electric bulb becomes dim, when the electric heater in parallel circuit is switched on. Reason : Dimness decreases after sometime.	
	VERY SHORT ANSWER QUESTIONS	
1.	State one condition for maximum current to be drawn from the cell?	1
2.	Draw the graph showing the variation of conductivity with temperature for a metallic conductor?	1
3.	Is the motion of a charge across junction momentum conserving. Justify?	1

4.	Name any one material having small value of temperature coefficient of resistance. Write one use of this material?	1
5.	What are the advantages of the null-point method in a Wheatstone bridge? What additional measurements would be required to calculate $R_{unknown}$ by any other method?	1
6.	Why are alloys used for making standard resistance coils?	1
7.	A cell of emf E and internal resistance r is connected across an external resistance R. Plot a graph showing the variation of P.D. across R, versus R.	1
8.	Two electric bulb P and Q have their resistance in the ratio 1:2. They are connected in series across the battery. Find the ratio of power dissipated in the bulb?	1
9.	How does he random motion of free electrons in a conductor get affected when a potential difference is applied across its ends?	1
	2 MARKS QUESTIONS	
10.	Find the current **I** through the resistor **R (=2Ω)** in the following circuit diagram. 	**2**
11.	Derive an expression for the drift speed of electrons in a good conductor in terms of the relaxation time of the electrons.	**2**
12.	What is the total current in the circuit (shown in the figure below)? 	**2**
13.	Sketch the variation of resistivity with temperature for a) conductor, b) Semiconductor	**2**
14.	Potential difference V is applied across the ends of copper wire of length (l) and diameter D. What is the effect on drift velocity of electrons if (1) V is doubled (2) l is doubled (3) D is doubled.	**2**
15.	A metallic wire of length 1m is stretched to double its length. Calculate the ratio of its initial and final resistance assuming that there is no change in its density on stretching.	**2**
16.	Two wires, one of manganin and other of copper have equal lengths and equal resistances. Which one of these wires will be thicker? Justify.	**2**
	3 MARKS QUESTIONS	

17.	Four identical cells of e.m.f 2 V are joined in parallel providing supply of current to external circuit consisting of two 15ohm resistors joined in parallel. The terminal voltage of cells as read by an ideal voltmeter is 1.6V. Calculate the internal resistance of each cell.[7.5ohms]		**3**
18.	The following graph shows the variation of terminal potential difference V, across a combination of three cells in series to a resistor, versus the current, i For what current i will the power dissipation of the circuit be maximum?		**3**
19.	Apply Kirchhoff's law to the loop PRSP and PRQP to write the expressions for the currents I_1,I_2 and I_3 in the given circuit.		**3**
20.	Use Kirchhoff 's rules to determine the potential difference between the points A and D when no current flows in the arm BE of the electric network shown in the figure		3
21.	In the given circuit, with steady current, calculate the potential difference across the capacitor and the charge stored in it.		3
22.	A **100 V** battery is connected to the electric network as shown. If the power consumed in the **2 Ω** resistor is **200 W**, determine the power dissipated in the **5 Ω** resistor.		3
23.	Calculate the current drawn from the battery in the given network [2A].		3

24.	Calculate (i) the equivalent resistance between A and B of the electrical network given below, and (ii) the current drawn by the network of a battery, if emf 8 V, internal resistance 1 Ω is connected across the points A and B.[1Ω,4A]		3
25.	Using Kirchhoff's laws, a) determine the **current** through each branch b) **p.d.** across point **B** & **D** for the network shown below [i1=5/13A,i2=1/13A, i=6/13A,p.d.=.15V]		3
26.	n the circuit shown in the figure, the galvanometer 'G' gives zero deflection. If the batteries A and B have negligible internal resistance, find the value of the resistor R.		3
27.	Two primary cells of e.m.f E1 and E_2 (E_1> E_2) are connected to the potentiometer wire AB as shown in the figure. Find the ratio of E_1 to E_2 [4.33]		3
	5 MARKS QUESTIONS		
28.	State Kirchoffs laws for an electrical network. Using Kirchoffs laws, find the relation between the resistances of four arms of a wheat stone bridge when the bridge is balanced.		**5**
	CASE STUDY		
	Question 1: Emf of a cell is the maximum potential difference between two electrodes of the cell when no current is drawn from the cell. Internal resistance is the resistance offered by the electrolyte of a cell when the electric current flows through it. The internal resistance of a cell depends upon the following factors; (i) distance between the electrodes (ii) nature and temperature of the electrolyte (iii) nature of electrodes (iv) area of electrodes. For a freshly prepared cell, the value of internal resistance is generally low and goes on increasing as the cell is put to more and more use. The potential difference		

	between the two electrodes of a cell in a closed circuit is called terminal potential difference and its value is always less than the emf of the cell in a closed circuit. It can be written as V = E – Ir.  	
1	When will the terminal potential difference of two electrodes of a cell is equal to emf of the cell?	
2	What is the formula for terminal potential difference of the cell of emf E with internal resistance r when it is being charged ?	
3	An external resistance R is connected to a cell of internal resistance r, under what condition is the current maximum through the external resistance?	
4	A cell of emf E and internal resistance r gives a current of 0.5 A with an external resistance of 12Ω and a current of 0.25 A with an external resistance of 25Ω . What is the value of the internal resistance of the cell?	
	Answers to Assertion and Reason	
	Answers:1d,2d,3c,4b,5b	