

POLICE DAV PUBLIC SCHOOL
HOLIDAYS HOMEWORK
CLASS-XII (SCIENCE)
CHEMISTRY

- For a cell given below
 $\text{Ag}/\text{Ag}^+//\text{Cu}^{2+}/\text{Cu}$
 $\text{Ag}^+ + \text{e}^- \rightarrow \text{Ag} \quad E^\circ = x$
 $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu} \quad E^\circ = y$
 E° cell is:
 a) $x + 2y$ b) $2x + y$
 c) $y - x$ d) $y - 2x$
- Standard reduction electrode potentials of three metals A, B and C are respectively +0.5 V, -3.0 V and -1.2 V. the reducing powers of these metals are-
 a) $C > B > A$ b) $A > C > B$
 c) $B > C > A$ d) $A > B > C$
- When during electrolysis of a solution of AgNO_3 9650 C of charge pass through the electroplating bath, the mass of silver deposited the cathode will be –
 a) 21.6 g b) 108 g
 c) 1.08 g d) 10.8 g
- The standard e.m.f of a cell, involving one electron change is found to be 0.591 V at 25 °C. the equilibrium constant of the reaction is
 a) 1.0×10^1 b) 1.0×10^5
 c) 1.0×10^{10} d) 1.0×10^{30}
- The limiting molar conductivities Λ° NaCl , KBr and KCl are 126, 152 and 150 $\text{Scm}^2\text{mol}^{-1}$ respectively. The Λ° for NaBr is-
 a) $128 \text{ Scm}^2\text{mol}^{-1}$ b) $176 \text{ Scm}^2\text{mol}^{-1}$
 c) $278 \text{ Scm}^2\text{mol}^{-1}$ d) $302 \text{ Scm}^2\text{mol}^{-1}$
- The first order rate constant for the decomposition of N_2O_5 is $6 \times 10^{-4} \text{ s}^{-1}$. The half-life period for this decomposition is
 a) 1155 s b) 1117 s
 c) 223.4 s d) 160.9 s
- If the initial concentration of the reactant is doubled, time for half reaction is also doubled: the order of the reaction is
 a) zero b) first
 c) second d) third
- The slope of the line obtained on plotting k against $\frac{1}{T}$ is equal to
 a) $\frac{Ea}{R}$ b) $-\frac{Ea}{R}$
 c) $\frac{Ea}{2.303R}$ d) $-\frac{Ea}{2.303R}$
- The reaction $\text{CH}_3\text{Br} + \text{OH}^- \rightarrow \text{CH}_3\text{OH} + \text{Br}^-$ is expected to occur through
 a) S_N^1 mechanism b) S_N^2 mechanism
 c) S_E^1 mechanism d) S_E^1 mechanism
- The reaction $\text{CH}_3\text{CH}_2\text{Br} + \text{KSH} \rightarrow \text{CH}_3\text{CH}_2\text{SH} + \text{KBr}$ is expected to occur through
 a) S_N^1 mechanism b) S_N^2 mechanism
 c) S_E^1 mechanism d) S_E^1 mechanism
- When chlorine is passed through boiling toluene in the presence of sunlight, the compound formed is
 a) Chlorobenzene b) benzyl chloride
 c) Both 'a' and 'b' d) None of these.
- What is the osmotic pressure of 0.0020 mol/dm^3 sucrose solution at 20 °C?
 a) 4870 Pa b) 4.87 Pa
 c) 0.00487 Pa d) 0.33 Pa
- 0.5 molal aqueous solution of a weak acid is 20 % ionised. If K_f for water is 1.86 K Kg/mol, then lowering in freezing point of the solution is:
 a) -0.56 K b) -1.12 K
 c) 0.56 K d) 1.12 K
- A 5% solution of cane sugar is isotonic with 1% of solution of an unknown solute in g/mol is:
 a) 34.2 b) 136.2
 c) 171.2 d) 68.4
- A 5.2 molal aqueous solution of methyl alcohol is supplied. What is the mole fraction of methyl alcohol in the solution?
 a) 0.050 b) 0.100
 c) 0.150 d) 0.086

SUBJECTIVE QUESTIONS

- Derive relationship between Van't Hoff factor and degree of dissociation.

- 2) An aqueous solution freezes at 272.07 K while pure water freezes at 273 K. determine the molality and boiling point of the solution. Given: $K_f = 1.86 \text{ K/m}$, $K_b = 0.512 \text{ K/m}$.
- 3) Calculate the molal elevation constant of water if molar enthalpy of vaporisation of water at 373 K is 40.585 KJ/mol. (HINT: $K_b = \frac{MRT^2}{1000 \times (\Delta_{vap}H)}$)
- 4) Calculate the boiling point of a solution containing 0.61 g of benzoic acid in 5 g of CS_2 . Assuming 84% dimerization of acid. The boiling point and K_b of CS_2 are 46.2 °C and 2.3 K Kg/mol respectively.
- 5) With the help of a graph explain why it is not easy to determine Λ_m° for a weak electrolyte by extrapolating the concentration – molar conductance curve as for strong electrolytes.
- 6) For a weak electrolyte, its molar conductivity in dilute solution increases sharply as its concentration in solution is decreased. Explain.
- 7) Predict the products of electrolysis obtained at the electrode in each case when the electrodes used are platinum:
 - (i) An aqueous solution of AgNO_3
 - (ii) An aqueous solution of H_2SO_4 .
- 8) Describe the role of zinc in cathodic protection of iron. Can we use tin in place of zinc for this purpose? Give reason for your answer.
- 9) Calculate the potential at a zinc-zinc ion electrode in which the zinc ion activity is 0.001 M.
- 10) How many grams of silver could be plated out on a shield by electrolysis of a solution containing Ag^+ ions for a period of 4 hours at a current strength of 8.5 amperes? (molar mass of Ag = 107.8 g)
- 11) A copper –silver cell is set up. The copper ion concentration in it is 0.10 M. the concentration of silver ion is not known. The cell potential measured is 0.422 V. determine the concentration of silver ion in the cell. Given: $E^\circ = +0.80 \text{ V}$ for Ag and $E^\circ = +0.34 \text{ V}$ for Cu.
- 12) Determine the values of equilibrium constant and ΔG° for the following reactions:
 $\text{Ni(s)} + 2 \text{Ag}^+(\text{aq}) \rightarrow \text{Ni}^{2+}(\text{aq}) + 2\text{Ag(s)}$; $E^\circ = 1.05 \text{ V}$
- 13) How many moles of mercury will be produced by electrolysing 1.0 M $\text{Hg}(\text{NO}_3)_2$ solution with a current of 2.00 A for 3 hours?
- 14) The molar conductivity of a 1.5 M solution of an electrolyte is found to be $138.9 \text{ Scm}^2/\text{mol}$. Calculate the conductivity of this solution.
- 15) What is over voltage?
- 16) Differentiate between: (i) molecularity and order of reaction. (minimum 4 points)
(ii) Rate of reaction and rate constant.
- 17) What aspect of a reaction is influenced by presence of catalyst which increases the rate of reaction?
- 18) The slope of the line for the graph of $\log k$ vs $\frac{1}{T}$ for the reaction $\text{N}_2\text{O}_5 \rightarrow 2 \text{NO}_2 + \frac{1}{2} \text{O}_2$ is -5000. Calculate the energy of activation of the reaction.
- 19) $\text{Cl}_2 + 2 \text{NO} \rightarrow 2 \text{NOCl}$

The following data were collected. All the measurements were taken at 263 K:

EXP NO.	INITIAL $[\text{NO}]$ (M)	INITIAL $[\text{Cl}_2]$ (M)	INITIAL RATE OF DISAPPEARANCE OF Cl_2
1	0.15	0.15	0.60
2	0.15	0.30	1.20
3	0.30	0.15	2.40
4	0.25	0.25	?

- (a) Write the expression for rate law.
- (b) Calculate the value of rate constant and specify its units.
- (c) What is the initial rate of disappearance of Cl_2 in exp 4?
- 20) A first order reaction has a rate constant of 0.0051 min^{-1} . If we begin with 0.10 M concentration of the reactant, what concentration of reactant will remain in solution after 3 hours?

- 21) What is the effect of surface area on the rate of reaction?
- 22) When does the rate of the reaction become equal to specific reaction rate?
- 23) What are the two necessary conditions for the collisions between the molecules to be effective?
- 24) Why does it take more time to boil an egg or cook rice at higher altitudes?
- 25) Temperature coefficient of a reaction is 2. By what factor, the rate will increase if there is 100° C rise in the temperature?
- 26) For a chemical reaction $X \rightarrow Y$ the rate of reaction increases by a factor of 2.25 when conc. Is increased by 1.5. What is the order of reaction?
- 27) The reactions $2NO + O_2 \rightarrow 2NO_2$; $2 CO + O_2 \rightarrow 2 CO_2$ look to be identical, yet the first is faster than the second. Why?
- 28) For every 10° rise in temperature, the rate of the reaction becomes two-fold. Explain.
- 29) What does the term A and $e^{-Ea/RT}$ signify in the Arrhenius equation?
- 30) Explain whether the following statements are right or wrong:
 - (i) In an exothermic reaction, the activation energy for the forward reaction is greater than that for the backward reaction.
 - (ii) A reaction with higher activation energy will proceed at a faster rate.
 - (iii) Catalysts have no effect on equilibrium constant.

INF. PRA :

JAVA Design Problems

Glamour garments has develop GUI Application for their company as shown below:



The company accept payments in 3 modes – Cheque, Cash and Credits Cards. The discount given as per mode of payments is as follows:

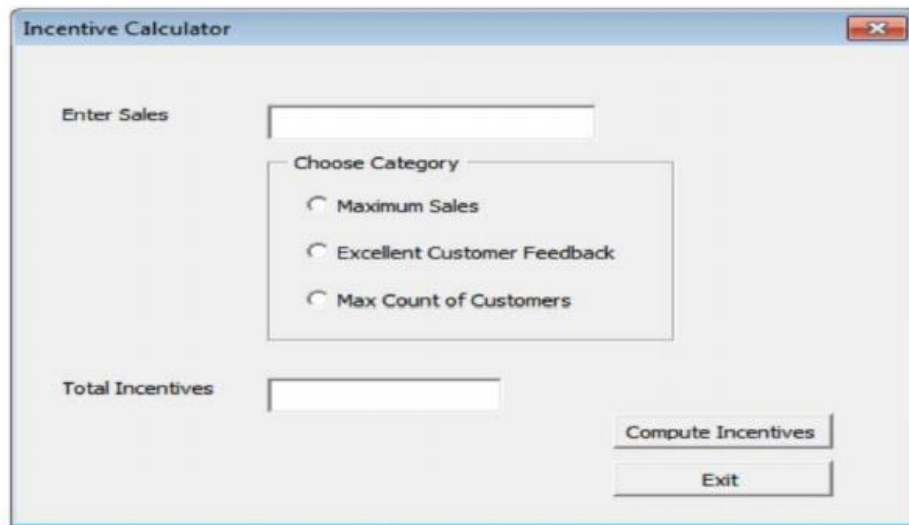
Mode of Payment	Discount
Cash	8%
Cheque	7%
Credit Card	Nil

- a. If the bill amount is more tan 15000 then additional 10% discount on bill amount will be given.

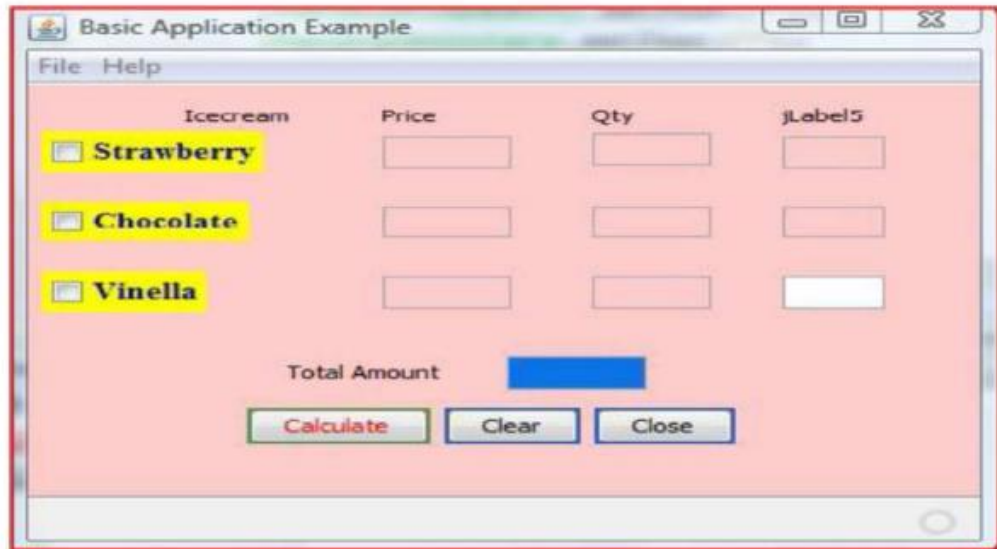
- b. Make discount and net amount non editable and write code to calculate them.
 - c. Write exit and reset code.
1. Create a Java Desktop Application to find the incentive (%) of Sales for a Sales Person on the basis of following feedbacks:

Feedback	Incentive (%)
Maximum Sales	10
Excellent Customer Feedback	8
Maximum Count Customer	5

Note: that the sales entry should not be space. Calculate the total incentive as : Sales amount* Incentive. The feedback will be implemented in JCheckBox controls. Using a JButton's (Compute Incentive) click event handler, display the total incentives in a JTextField control. Assume the nomenclature of the swing components of your own. Note that the JFrame from IDE window will be shown as given:

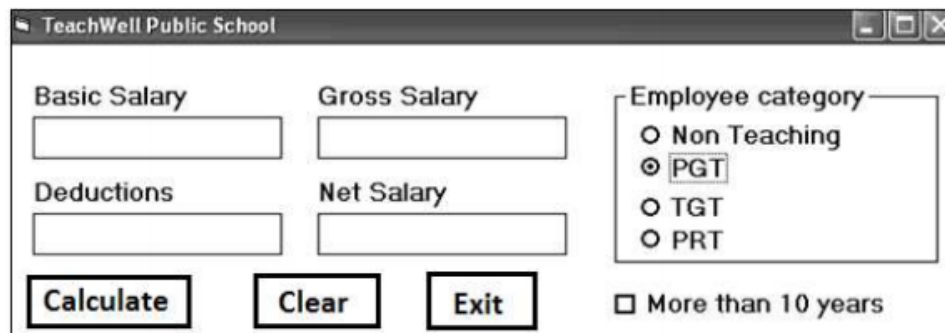


2. Assume the following interface built using Net beans used for bill calculation of a ice-cream parlor. The parlor offers three varieties of ice-cream – vanilla, strawberry, chocolate. Vanilla ice-cream costs Rs. 30, Strawberry Rs. 35 and Chocolate Rs. 50. A customer can chose one or more ice-creams, with quantities more than one for each of the variety chosen. To calculate the bill parlor manager selects the appropriate check boxes according to the varieties of ice-cream chosen by the customer and enter their respective quantities. Write Java code for the following:
- a. On the click event of the button ‘Calculate’, the application finds and displays the total bill of the customer. It first displays the rate of various ice-creams in the respective text fields. If a user doesn’t select a check box, the respective ice-cream rate must become zero. The bill is calculated by multiplying the various quantities with their respective rate and later adding them all.
 - b. On the Click event of the clear button all the text fields and the check boxes get cleared.
 - c. On the click event of the close button the application gets closed.



3. Read the following case study and answer the questions that follow.

- TeachWell Public School wants to computerize the employee salary section. The School is having two categories of employees :
- **Teaching and Non Teaching.** The Teaching employees are further categorized into PGTs, TGTs and PRTs having different Basic salary.
- The School gives addition pay of 3000 for employees who are working for more than 10 years.



Employee Type	Basic Salary	DA (% of Basic Sal)	HRA (% of Basic Sal)	Deductions (% of Basic sal)
Non-Teaching	25001	31	30	12
PGT	14500	30	30	12
TGT	12500	21	30	12
PRT	11500	20	25	12

a. Write the code to calculate the Basic salary, deductions, gross salary and net salary based on the given specification. Add 3000 to net salary if employee is working for more than 10 years.

$$\text{Gross salary} = \text{Basic salary} + \text{DA} + \text{HRA}$$

$$\text{Net salary} = \text{Gross salary} - \text{deductions}$$

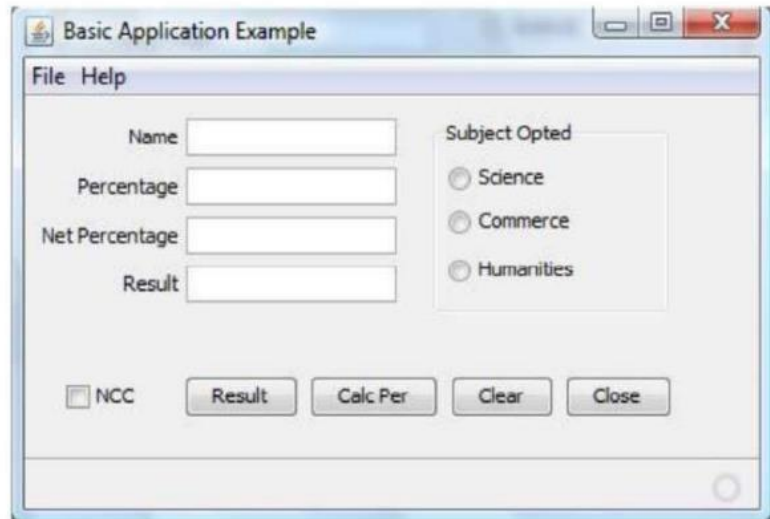
b. Write the code to exit the application.

c. Write the code to disable text fields for gross salary, deductions and netsalary.

4. ABC School uses the following interface built in java to check the eligibility of a student for a particular stream from science, commerce and humanities. The user first enters the total percentage and selects the

desired stream by selecting the appropriate option button. An additional 5% is marks is given to students of NCC. Write Java Code for the following

- On Action event of the button 'Calc Percentage' Net percentage of the student is calculated and displayed in the appropriate text filed. Net percentage is same as that of the actual percentage if the student doesn't opts for NCC otherwise 5% is added to actual percentage.
- On Action event of the button 'Result', the application checks the eligibility of the students. And display result in the appropriate text field. Minimum percentage for science is 70, 60 for commerce and 40 for humanities.
- On the Click event of the clear button all the text fields and the check boxes get cleared.
- On the click event of the close button the application gets closed.



SQL Problems

- Consider the following tables ACTIVITY and COACH. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).

Table: ACTIVITY

ACode	ActivityName	ParticipantsNum	PrizeMoney	ScheduleDate
1001	Relay 100x4	16	10000	23-Jan-2004
1002	High jump	10	12000	12-Dec-2003
1003	Shot Put	12	8000	14-Feb-2004
1005	Long Jump	12	9000	01-Jan-2004
1008	Discuss Throw	10	15000	19-Mar-2004

Table: COACH

PCode	Name	ACode
1	Ahmad Hussain	1001
2	Ravinder	1008
3	Janila	1001
4	Naaz	1003

- To display the name of all activities with their Acodes in descending order.
- To display sum of PrizeMoney for each of the Number of participants groupings (as shown in column ParticipantsNum 10,12,16).
- To display the coach's name and ACodes in ascending order of ACode from the table COACH.
- To display the content of the GAMES table whose ScheduleDate earlier than 01/01/2004 in ascending order of ParticipantNum.
- SELECT COUNT(DISTINCT ParticipantsNum) FROM ACTIVITY;
- SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM ACTIVITY;
- SELECT SUM(PrizeMoney) FROM ACTIVITY;

viii. SELECT DISTINCT ParticipantNum FROM COACH;

2. Consider the following tables GAMES and PLAYER. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).

Table: GAMES

GCode	GameName	Number	PrizeMoney	ScheduleDate
101	Carom Board	2	5000	23-Jan-2004
102	Badminton	2	12000	12-Dec-2003
103	Table Tennis	4	8000	14-Feb-2004
105	Chess	2	9000	01-Jan-2004
108	Lawn Tennis	4	25000	19-Mar-2004

Table: PLAYER

PCode	Name	Gcode
1	Nabi Ahmad	101
2	Ravi Sahai	108
3	Jatin	101
4	Nazneen	103

- To display the name of all Games with their Gcodes.
 - To display details of those games which are having PrizeMoney more than 7000.
 - To display the content of the GAMES table in ascending order of ScheduleDate.
 - To display sum of PrizeMoney for each of the Number of participation groupings (as shown in column Number 2 or 4).
 - SELECT COUNT(DISTINCT Number) FROM GAMES;
 - SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM GAMES;
 - SELECT SUM(PrizeMoney) FROM GAMES;
 - SELECT DISTINCT Gcode FROM PLAYER;
3. Consider the following tables HOSPITAL. Give outputs for SQL queries (i) to (iv) and write SQL commands for the statements (v) to (viii).

No	Name	Age	Department	Dateofadmin	Charge	Sex
1	Arpit	62	Surgery	21/01/06	300	M
2	Zayana	18	ENT	12/12/05	250	F
3	Kareem	68	Orthopedic	19/02/06	450	M
4	Abhilash	26	Surgery	24/11/06	300	M
5	Dhanya	24	ENT	20/10/06	350	F
6	Siju	23	Cardiology	10/10/06	800	M
7	Ankita	16	ENT	13/04/06	100	F
8	Divya	20	Cardiology	10/11/06	500	F
9	Nidhin	25	Orthopedic	12/05/06	700	M
10	Hari	28	Surgery	19/03/06	450	M

- Select SUM(Charge) from HOSPITAL where Sex='F';
- Select COUNT(DISTINCT Department) from HOSPITAL;
- Select SUM(Charge) from HOSPITAL group by Department;
- Select Name from HOSPITAL where Sex='F' AND Age > 20;
- To show all information about the patients whose names are having four characters only.
- To reduce Rs 200 from the charge of female patients who are in Cardiology department.
- To insert a new row in the above table with the following data : 11, 'Rakesh', 45, 'ENT', {08/08/08}, 1200, 'M'
- To remove the rows from the above table where age of the patient > 60.

4. Consider the following tables BOOKS. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).

Table : BOOKS

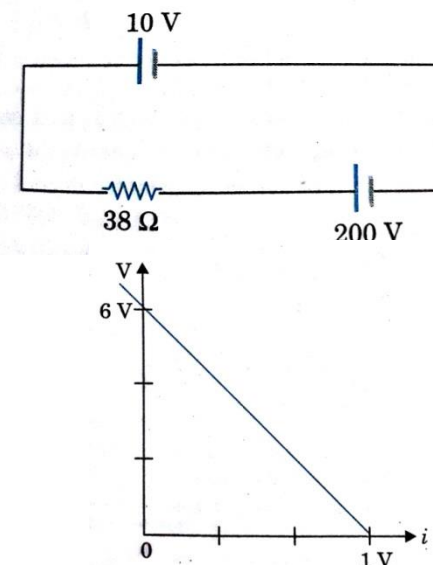
B Id	Book Name	Author Name	Publisher	Price	Type	Quantity
C01	Fast Cook	Lata Kapoor	EPB	355	Cookery	5
F01	The Tears	William Hopkins	First	650	Fiction	20

T01	My C++	Brain & Brooke	FPB	350	Text	10
T02	C++ Brain	A.W.Rossaine	TDH	350	Text	15
F02	Thuderbolts	Anna Roberts	First	750	Fiction	50

- To list the names from books of Text type.
- To display the names and price from books in ascending order of their price.
- To increase the price of all books of EPB publishers by 50.
- To display the Book_Name, Quantity and Price for all C++ books.
- Select max(price) from books;
- Select count(DISTINCT Publishers) from books where Price \geq 400;
- Select Book_Name, Author_Name from books where Publishers = 'First';
- Select min(Price) from books where type = 'Text';

PHYSICS

- Two wires of equal length, one of copper and other of manganin have the same resistance. Which wire is thicker.
- Draw the graph showing the variation of resistance of metal wire as a function of its diameter, keeping its length and temperature constant.
- Define the term electrical conductivity of a metallic wire. Write its SI unit.
- How does one explain the increase in resistivity of a metal with increase of temperature.
- Plot graph showing the variation of current versus voltage for
 - material GaAs
 - for a diode
- Two students A and B were asked to pick a resistor of 15 k Ω from a collection of carbon resistors. A picked a resistor with bands of colours brown, green, orange while B chose a resistor with bands of black green and red. Who picked the correct resistor?
- The emf of a cell is always greater than its terminal voltage. Why?
- A 10V battery of negligible internal resistance is connected across combination of a 200V battery and a resistance of 38 Ω as shown in fig. Find the value of current in the circuit.
- Name the device used for measuring the internal resistance of a secondary cell.
- What is the principle of working of a meter bridge?
- The plot of variation of potential difference across a combination of three identical cells in series versus current is as shown in fig. What is the emf of each cell.
- Define relaxation time of free electrons drifting in a conductor. How is it related to the drift velocity of free electrons? Use this relation to deduce the expression for the electrical resistivity of the material.



13. Electron drift speed is estimated to be of the order of mm s^{-1} . Yet large current of the order of few amperes can be set up in the wire. Explain briefly
14. Define the term mobility of charge carriers. Write the relation expressing mobility in terms of relaxation time. Write its SI unit.
15. Derive an expression for drift velocity of electrons in a conductor. Hence deduce ohm's law.
16. Write a relation between current and drift velocity of electrons in a conductor. Use this relation to explain how the resistance of conductor changes with rise in temperature.
17. Write the mathematical expression for the resistivity of a material in terms of relaxation time, number density and mass and charge of charge carriers in it. Explain using this relation why the resistivity of a metal increases and that of a semiconductor decreases with rise in temperature.
18. With the help of graphs, show how resistivity changes with temperature in the cases of
(i) Copper (ii) Nichrome and (iii) Semiconductor
Which property of Nichrome is used to make standard resistance coil?
19. Draw V-I graph for Ohmic and non Ohmic materials. Give one example for each.
20. (a) Write the sequence of colours present in a carbon resistor having value of $62 \times 10^4 \Omega \pm 20\%$.
(b) Write the name of the materials having resistivity of the order of
(i) $1.7 \times 10^{-8} \Omega\text{m}$ and (ii) $10^{15} \Omega\text{m}$ at 0°C .
21. A cell of emf E and internal resistance r is connected across a variable resistor R . Plot a graph showing variation of terminal voltage V of the cell versus the current I . Using the plot, show how the emf of the cell and its internal resistance can be determined.

22. State the two Kirchoff's laws.

23. A number of identical cells, n each of emf E , internal resistance r connected in series are charged by a d.c. source of emf E' , using a resistor R .

(i) Draw the circuit arrangement.

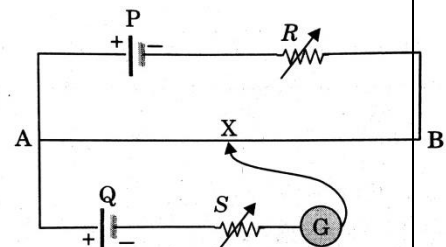
(ii) Deduce the expression for (a) the charging current and (b) the potential difference across the combination of the cells.

24. State the underlying principle of a potentiometer. Write two factors on which the sensitivity of a potentiometer depends.

In the potentiometer circuit shown in the fig., the balance point is at X. State giving reason, how the balance point is shifted when

(i) Resistance R is increased?

(ii) Resistance S is increased, keeping R constant?



25. A wire whose cross sectional area is increasing linearly from its one end to the other, is connected across a battery of V volts. Which of the following quantities remain constant in the wire?

(a) Drift speed

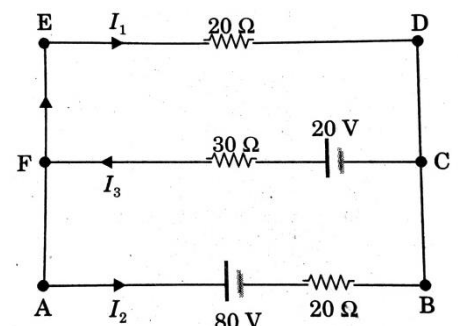
(b) Current density

(c) Electric Current

(d) Electric Field

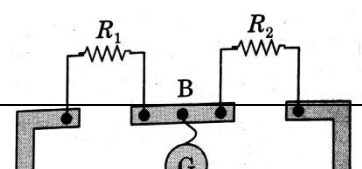
Justify your answer.

26. Use kirchoff's rules to determine the value of the current I_1 flowing in the circuit shown in the fig.

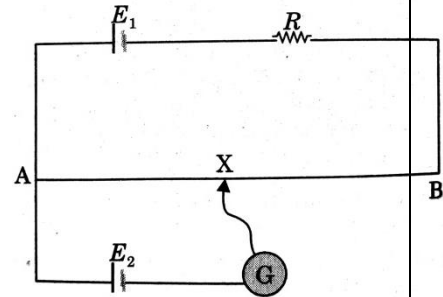


27. (i) Plot a graph showing the variation of voltage vs the current drawn from the cell. How can one get information from this plot about the emf of the cell and its internal resistance.

(ii) Two cells of emf E_1 and E_2 and internal resistance r_1 and r_2 are connected in parallel. Obtain the expression for the emf and internal resistance of a single equivalent cell that can replace this combination.



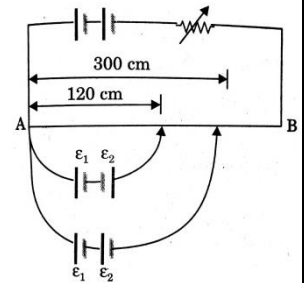
28. In the meter bridge experimental setup shown in fig., the null point D is obtained at a distance of 40 cm from end A of the meter bridge wire. If a resistance of 10Ω is connected in series with R_1 , null point is obtained at $AD = 60$ cm. Calculate the value of R_1 and R_2 .



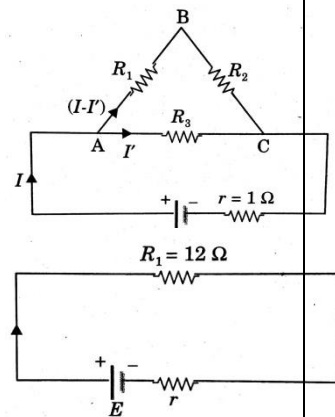
29. In the circuit diagram given below AB is the a uniform wire of resistance 15Ω and length 1m. It is connected to a cell E_1 of emf 2V and negligible internal resistance and a resistance R. The balance point with another cell E_2 of emf 75 mV is found at 30 cm from end A. Calculate the value of R.

- (i) Why is potentiometer preferred over a voltmeter for comparison of emf of cell
- (ii) Draw a circuit diagram to determine internal resistance of a cell in the laboratory

30. (a) State the principle of potentiometer. Define potential gradient. Obtain an expression for potential gradient in terms of resistivity of potentiometer wire.
 (b) The fig shows a long potentiometer wire AB having a constant potential gradient. The null points for the primary cells of emfs e_1 and e_2 connected in the manner shown are obtained at a distance of $l_1 = 120$ cm and $l_2 = 300$ cm from the end A. Determine (i) e_1 / e_2 and (ii) position of null point for the cell e_1 only.



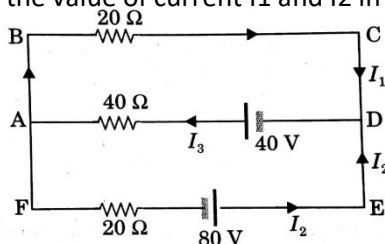
31. A uniform wire of resistance 12Ω is cut into three pieces so that the ratio of the resistances $R_1 : R_2 : R_3 = 1 : 2 : 3$ and the three pieces are connected to form a triangle across which a cell of emf 8V and internal resistance 1Ω is connected as shown. Calculate the current through each part of circuit.



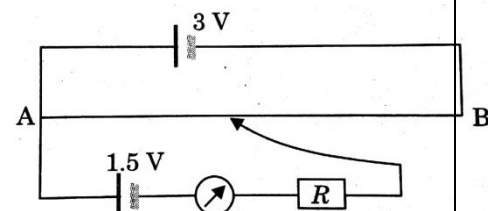
32. A battery of EMF E and internal resistance when connected across an external resistance of 12 ohm produces the current of 0.5A. When connected across a resistance of 25 ohm, it produces a current of 0.25 A. Determine the (i) EMF and (ii) Internal resistance of cell.

33. 3 cells of EMF $E_1=1.5V$, $E_2=2V$ and $E_3=3V$ having internal resistances $R_1=0.3\Omega$, $R_2=0.4\Omega$ and $R_3=0.6\Omega$ respectively are connected in parallel. Find out the equivalent emf and the equivalent resistance of a cell which can replace this combination.

34. Use Kirchoff rules to find out the value of current I_1 and I_2 in the electrical network as shown.



35. A potention meter wire of length 1m is connected to a driver cell of emf 3V as shown in figure. When a cell of 1.5V emf is used in the secondary circuit, the balance point is found to be 60cm. On



replacing this cell and using a cell of unknown emf, the balance point shifts to 80cm.

- (i) Calculate unknown emf of the cell
- (ii) Explain with reason, whether the circuit works, if the driver cell is replaced with a cell of emf 1V.
- (iii) Does the high resistance R used in the secondary circuit affect the balance point? Justify your answer.

BIOLOGY

1. _ pairs of consisting traits were studied by Mendel in pea plant
 - a) 6
 - b) 7
 - c) 8
 - d) 10
2. Which of the following character was not chosen by Mendel?
 - a) Pod shape
 - b) Pod colour
 - c) Location of flower
 - d) Location of pod
3. ABO blood grouping in human beings cites the example of
 - a) Incomplete dominance
 - b) Co-dominance
 - c) Multiple allelism
 - d) Both (b) and (c)
4. Genes which code for a pair of contrasting traits are known as
 - a) Dominant genes
 - b) Alleles
 - c) Linked genes
 - d) None of these
5. What will be the distribution of phenotypic features in the first filial generation after a cross between a homozygous female and a heterozygous male for a single locus
 - a) 3:1
 - b) 1:2:1
 - c) 1:1
 - d) None of these
6. A child has blood group 'O'. If father has blood group 'A' and mother has blood group 'B', work out the genotypes of the parents
 - a) $I^A I^A$ and $I^B i$
 - b) $I^A i$ and $I^B i$
 - c) $I^A i$ and ii
 - d) ii and $I^B I^B$
7. If both parents are carriers for thalassaemia, which is an autosomal recessive disorder, what are the chances of pregnancy resulting in an affected child?
 - a) 25%
 - b) 100%
 - c) No chance
 - d) 50%
8. In a monohybrid cross between two heterozygous individuals, percentage of pure homozygous individuals obtained in F_1 generation is
 - a) 25%
 - b) 50%
 - c) 75%
 - d) 100%
9. Which of the following crosses will give tall and dwarf pea plants in same proportions?
 - a) $TT \times tt$
 - b) $Tt \times tt$
 - c) $TT \times Tt$
 - d) $tt \times tt$
10. Phenotypic and genotypic ratio is similar in case of
 - a) Complete dominance
 - b) Incomplete dominance
 - c) Over dominance
 - d) Epistasis
11. How many types of gametes can be produced by a diploid organism who is heterozygous for 4 loci?
 - a) 4
 - b) 8
 - c) 16
 - d) 32
12. Law of independence assortment can be explained with the help of
 - a) Dihybrid cross
 - b) Test cross
 - c) Back cross
 - d) Monohybrid cross
13. Mendel's law of independent assortment does not hold true for the genes that are located closely on
 - a) Same chromosome
 - b) Non-homologous chromosome
 - c) X-chromosome
 - d) Autosomes
14. Chromosomal theory of inheritance was given by
 - a) Morgan *et al*
 - b) Sutton and Boveri
 - c) Hugo de Vries
 - d) Gregor J. Mendel
15. Experimental verification of 'chromosomal theory of inheritance' was done by
 - a) Sutton and Boveri
 - b) Morgan *et al*
 - c) Henking
 - d) Karl Correns
16. What is true about the crossing over between linked genes?
 - a) No crossing over at all
 - b) High percentage of crossing over
 - c) Hardly any crossing over
 - d) None of these
17. Chromosome maps/genetic maps were first prepared by
 - a) Sutton and Boveri (1902)
 - b) Bateson and Punnett (1906)
 - c) Morgan (1910)
 - d) Sturtevant (1911)

18. Distance between genes is measured by
- Angstrom
 - Map unit
 - Dobson unit
 - Milimetre
19. Grasshopper is an example of XO type of sex determination
- One X chromosome
 - One Y chromosome
 - Two X chromosomes
 - No X chromosome
20. In XO type of sex determination
- Females produce two different types of gametes
 - Males produce two different types of gametes
 - Females produce gametes with Y chromosome
 - Males produce gametes with Y chromosome
21. Select the incorrect statement regarding pedigree analysis
- Solid symbols show unaffected individuals
 - Proband is the person from which case history starts
 - It is useful for genetic counselors
 - It is an analysis of traits in several generations of a family
22. Which of the following is not example of recessive autosomal disease?
- Haemophilia
 - Cystic fibrosis
 - Phenylketonuria
 - Sickle-cell anemia
23. If a haemophilic man marries a carrier woman then which of the following holds true for their progenies?
- 50% daughters are carrier and 50% are haemophilic
 - All the daughters are haemophilic
 - All sons are haemophilic and all daughters are normal
 - All sons are normal, all daughters are carriers
24. Fine out the mismatched pair
- Haemophilia - Sex linked recessive
 - Cystic fibrosis - Autosomal recessive
 - Down's syndrome - Trisomy 21
 - Turner's syndrome - Y-linked
25. This abnormality occurs due to monosomy ($2n - 1$); the individual has $2n = 45$ chromosomes with $44 + XO$ genotype
- Edward's syndrome
 - Down's syndrome
 - Turner's syndrome
 - Klinefelter's syndrome
26. Failure of segregation of chromatids during cell division results in the gain or loss of chromosomes, this is called as
- Euploidy
 - Monoploidy
 - Aneuploidy
 - Polyploidy
27. If a double stranded DNA has 20% of cytosine, what will be the percentage of adenine in it?
- 20%
 - 40%
 - 30%
 - 60%
28. If the sequence of bases in one strand of DNA is ATGCATGCA, what would be the sequence of bases on complementary strand?
- ATGCATGCA
 - AUGCAUGCA
 - TACGTACGT
 - UACGUACGU
29. Chemically, RNA is (i) reactive and (ii) stable as compared to DNA
- (i) equally, (ii) equally
 - (i) less, (ii) more
 - (i) more, (ii) less
 - (i) more, (ii) equally
30. DNA as an acidic substance present in nucleus was first identified by ____ in 1869; he named it as ____
- Meischer, nuclein
 - Watson and Crick, DNA
 - Chargaff, nuclein
 - Wilkins and Franklin, double helix
31. If the DNA of a virus is labelled with ^{32}P and the protein of the virus is labelled with ^{35}S , after transduction which molecule(s) would be present inside the bacterial cells?
- ^{32}P only
 - ^{35}S only
 - Both ^{35}S and ^{32}P
 - Neither molecule would be present inside the cell
32. Which of the following phenomena was experimentally proved by Meselson and Stahl?
- Transformation
 - Transduction
 - Semi-conservative DNA replication
 - Central dogma
33. Other than DNA polymerase, which are the enzymes involved in DNA synthesis
- Topoisomerase
 - Helicase
 - RNA primase
 - All of these
34. Methyl guanosine triphosphate is added to the 5' end of *hnRNA* in a process of
- Splicing
 - Capping
 - Tailing
 - None of these
35. In the sequence of bases in coding strand of DNA is ATTCGATG, then the sequence of bases in mRNA will be
- TAAGCTAC
 - UAAGCUAC
 - ATTCGATG
 - AUUCGAUG
36. The enzyme DNA dependent RNA polymerase catalyses the polymerization reaction in ____ direction
- Only 5' - 3'
 - Only 3' - 5'
 - Both the directions
 - None of these
37. Transcription unit
- Starts with TATA box
 - Starts with pallendrous regions and ends with rho factor
 - Starts with promoter region and ends in terminator region
 - Starts with CAAT region
38. Which out of the following statement is incorrect?
- Genetic code is ambiguous
 - Genetic code is degenerate
 - Genetic code is universal

- d) Genetic code is non-overlapping
39. Sickle cell anaemia results from a single base substitution in a gene, thus it is an example of
- a) Point mutation b) Frame-shift mutation
c) Silent mutation d) Both (a) and (b)
40. The three codons which result in the termination of polypeptide chain synthesis are
- a) UAA, UAG, GUA b) UAA, UAG, UGA
c) UAA, UGA, UUA d) UGU, UAG, UGA
41. Amino acid acceptor end of tRNA lies at
- a) 5' end b) 3' end
c) T C loop d) DHU loop
42. In an mRNA molecule, untranslated regions (UTRs) are present at
- a) 5'-end (before start codon)
b) 3'-end (after stop codon)
c) Both (a) and (b)
d) No UTRs present in mRNA
43. Regulation of gene expression occurs at the level of
- a) Transcription b) Processing/splicing
c) Translation d) All of these

1. Reproduction is an essential life process, which help in

- a) Change in habitat
b) Continuity of race
c) Remain alive
d) Change in size

2. The period of pregnancy is known as

- a) Menstruation
b) Gestation period
c) Incubation period
d) Blastulation

3. Some scientist consider virus as living entities because they can

- a) Survive in tough environment
b) Reproduce inside the host
c) Respire
d) Can cause disease

4. Largest bird is

- a) Kiwi
b) Ostrich
c) Penguin
d) Emu

5. The period from birth to death of an organism represents

- a) Life span
b) Juvenile period
c) Reproductive life
d) Adulthood

6. The living organism can be unexceptionally differ from non-living on the basis of

- a) Growth and movement

- b) Reproduction
c) Response to touch
d) Interaction with environment and evolution

7. Most of animals are unisexual but a few are bisexual too as

- a) lizard
b) Earthworm
c) cockroach
d) frog

8. Genetic variation is created and inherited during

- a) evolution
b) mutation
c) regeneration
d) reproduction

9. When two parents participate in reproductive process and also involve fusion of their gametes, it is called

- a) Vegetative reproduction
b) Asexual reproduction
c) Artificial reproduction
d) Sexual reproduction

10. Parrots have life span of about

- a) 15 years
b) 140 years
c) 40 years
d) 5 years

SEXUAL REPRODUCTION IN FLOWERING PLANTS

11. Flower is the site of

- a) Vegetative reproduction
b) Sexual reproduction
c) Asexual reproduction
d) Artificial reproduction

12. In some plants anther and stigma mature at same time this condition is called

- a) Allogamy
b) Syngamy
c) Chasmogamy
d) Homogamy

13. The flower which possesses both androecium and gynoecium is called perfect or:-

- a) Dioecious
b) Complete flower
c) Hermaphrodite
d) Unisexual

14. Which of the following plant contain unisexual flower

- a) Hibiscus
b) Rose
c) Papaya
d) Lotus

15. The Gynoecium of flower having two or more carpel fuse together are called

- a) Apocarpous
b) Syncarpous
c) Microcarpous
d) Megacarpous

16. During Hybridisation process anther of bisexual flower is removed before it dehisces is called
- Mastication
 - Dissection
 - Thrastication
 - Emasculation
17. Which of the following occupies central position in flower
- Sepal
 - Pistil
 - Stamen
 - Carpel
18. Insect pollinated flowers are
- Small and without fragrance
 - Large and without fragrance
 - Colorless and without nectar
 - Colorful and contain nectar
19. Which type of flower have ovary superior?
- Perigynous
 - None of these
 - Epigynous
 - Hypogynous
20. The flower which do not open at all are called
- Autogamous flower
 - Cleistogamous flower
 - Chasmogomous flower
 - Xenogamous flower

HUMAN REPRODUCTION

21. Which of the following is a primary sex organ of female?
- Fallopian tube
 - Uterus
 - Ovary
 - Vagina
22. Seminal plasma in human males is rich in
- Glucose and Calcium
 - Ribose and Potassium
 - DNA and testosterone
 - Fructose and Calcium
23. External genitalia of human female is called as
- Vulva
 - Uterus
 - Cervix
 - Vagina
24. Head of epididymis is called as
- None of these
 - Caput epididymis
 - Corpus epididymis
 - Cauda epididymis
25. The primary sex organ of human male is
- Urethra
 - Testis
 - Scrotum
 - Penis
26. The endometrium in female is the lining of
- Ovary
 - Vagina
 - Bladder
 - Uterus
27. The opening of vagina is often covered partially by a membrane called

- Labia manora
 - Urethral opening
 - Hymen
 - Clitoris
28. Which of the followings are called dual gland?
- Pancreas and liver
 - Heart and lung
 - Testis and ovary
 - Penis and vulva
29. The part of fallopian tube closest to ovary is
- Infundibulum
 - Isthmus
 - Ampulla
 - Cervix
30. Prostate gland and seminal vehicle perform the function of
- Nutrition and fluid medium for sperm movement
 - Penetration of ovum
 - All of these
 - Secretion of pregnancy hormone

REPRODUCTIVE HEALTH

31. RCH stands for
- Reproduction care house
 - Reproductive and child health care
 - Rehabilitation and care of health
 - Recovery and care of health
32. Reproductive health includes
- Child and mother care only
 - Child education
 - Protection from STD's, contraceptive and ARTs
 - Financial independence
33. Which one is not a sexually transmitted disease?
- Syphilis
 - Hepatitis-B
 - AIDS
 - Genital herpes
34. In ET technique embryo is transferred into
- Always uterus
 - Ovary
 - Always fallopian tube
 - Fallopian tube or uterus
35. Introduction of sex education in schools should be encouraged to
- To avoid interaction between boys and girls
 - Having misconceptions about sex-related aspects
 - To provide right information to the young
 - To discourage attraction towards opposite sex
36. Disease or infections which are transmitted through sexual intercourse are collectively called
- Viral disease
 - Fungal disease
 - Venereal disease
 - Bacterial disease
37. Indian population is
- Ageing population
 - Mature population
 - None of these
 - Young population
38. Action plans and programmes to attain total reproductive health called family planning were initiated in India in.

- a) 1987
- b) 1981
- c) 1972
- d) 1951

39. Which of the following contraceptive method is useful to control STD's as well as unwanted pregnancy

- a) Copper-T
- b) Tubectomy

- c) Condom
- d) Oral pills

40. A dark stained body present in the somatic cells of human female but absent from those of male is

- a) Cytoplasm
- b) Mitochondria
- c) Barr body
- d) Golgi bodies