

ગુજરાત માધ્યમિક અને

ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ,

સેક્ટર-10 બી, જૂના સચિવાલય પાસે,

ગાંધીનગર. તા.24/03/2021

પ્રતિ,

જિલ્લા શિક્ષણાધિકારીશ્રી, (તમામ)

જિલ્લા શિક્ષણાધિકારીશ્રીની કચેરી,

ગુજરાત રાજ્ય.

વિષય:- શૈક્ષણિક વર્ષ-2020-21 માટે ધોરણ-10 અને ધોરણ-12 ના અંગ્રેજી માધ્યમના પ્રશ્નપત્ર પરિરૂપ મોકલવા બાબત.

સંદર્ભ :- અત્રેની કચેરીનો પત્રકમાંક:મઉમશબ/સંશોધન/2020/3584-3625, તા.19/11/2020.

ઉપરોક્ત વિષય અને સંદર્ભ અન્વયે જણાવવાનું કે કોવિડ-19 ની પરિસ્થિતિમાં શૈક્ષણિક વર્ષ-2020/21 માટે ધોરણ-9 થી 12ની પરીક્ષા પદ્ધતિમાં કરવામાં આવેલ ફેરફાર અન્વયે અત્રેની કચેરી દ્વારા ધોરણ-10 અને 12ના નીચે દર્શાવેલ વિષયોના તજજ્ઞો દ્વારા તૈયાર કરવામાં આવેલ ગુજરાતી માધ્યમના પ્રશ્નપત્ર પરિરૂપ, ગુણભાર અને નમૂનાના પ્રશ્નપત્રો શિક્ષકો અને વિદ્યાર્થીઓના માર્ગદર્શન માટે બોર્ડ દ્વારા અગાઉ જાહેર કરવામાં આવેલ હતા. ઉક્ત વિષયોના અંગ્રેજી માધ્યમના પ્રશ્નપત્ર પરિરૂપ, ગુણભાર અને નમૂનાના પ્રશ્નપત્રો તજજ્ઞો દ્વારા અનુવાદિત કરવામાં આવેલ છે. જે આ સાથે સામેલ છે. ઉક્ત પ્રશ્નપત્ર પરિરૂપ, ગુણભાર અને નમૂનાના પ્રશ્નપત્રો માત્ર શૈક્ષણિક વર્ષ-2020/21 માટે જ અમલમાં રહેશે.

ક્રમ	ધોરણ	વિષય
1	10	સામાજિક વિજ્ઞાન (10)
2	10	વિજ્ઞાન (11)
3	10	ગણિત (12)

4	12	ગણિત (050)
5	12	રસાયણ વિજ્ઞાન (052)
6	12	ભૌતિક વિજ્ઞાન (054)
7	12	જીવવિજ્ઞાન (056)

ઉક્ત પ્રશ્નપત્ર પરિરૂપ, ગુણભાર અને નમૂનાના પ્રશ્નપત્રો આપના તાબાની તમામ માધ્યમિક/ઉચ્ચતર માધ્યમિક શાળાઓને જાણ તથા અમલ સારું મોકલી આપવા માટે વિનંતી છે. જે વિદીત થાય.



(બી.એન.રાજગોર)

સંયુક્ત નિયામક

ગુજરાત માધ્યમિક અને

ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ,

ગાંધીનગર.

બિડાણ:- ઉપર મુજબ.

નકલ સવિનય રવાના (જાણ સારું) :-

- માન. અધ્યક્ષશ્રી, ગુ.મા. અને ઉ.મા.શિ. બોર્ડ, ગાંધીનગર.
- ખાસ ફરજ પરના અધિકારીશ્રી, ગુ.મા. અને ઉ.મા.શિ. બોર્ડ, ગાંધીનગર.

નકલ રવાના :-

- સચિવશ્રી, ગુ.મા. અને ઉ.મા.શિ. બોર્ડ, ગાંધીનગર. (જાણ સારું)
- નાયબ નિયામકશ્રી, પરીક્ષા (વિ.પ્ર./સા.પ્ર.), ગુ.મા. અને ઉ.મા.શિ. બોર્ડ, ગાંધીનગર. (જાણ તથા જરૂરી કાર્યવાહી સારું)
- પરીક્ષા સચિવશ્રી (SSC), ગુ.મા. અને ઉ.મા.શિ. બોર્ડ, ગાંધીનગર. (જાણ તથા જરૂરી કાર્યવાહી સારું)

મ.નં. /મી-૨/૨૦૨૧/૫૦૭૩

તા. ૨૦/૦૩/૨૦૨૧

પ્રતિ,

આચાર્યશ્રી,

સુરત જિલ્લા / શહેરી તમામ મા. અને ઉ.મા. શાળાઓ.

જાણ તથા જરૂરી કાર્યવાહી સારું

મ. રાજગોર
નિયામકશ્રી
ગુજરાત માધ્યમિક અને
ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

શૈક્ષણિક વર્ષ 2020-21 માટે

STD.-12 (SCIENCE STREAM) PHYSICS (054) ANNUAL EXAM

TIME : 3 Hours

SCHEME OF QUESTION PAPER

Total Marks - 100

NOTE : This blueprint is for the guidance of students, Teachers, Examiners, Moderators etc. The moderators, Teachers and experts in higher secondary of the respective subject may do essential changes keeping the objectives in mind.

Weightage as per objective :

Objectives	Knowledge (K)	Understanding (U)	Application (A)	Higher order thinking skill		Total Marks
Part-A Mark	06	15	16	13	-	50
Part-B Mark	06	15	16	08	05	50
Total Mark	12	30	32	21	05	100

Weightage as per type of question : PART-A

No.	Type of Question	No. of Question	Total Marks
1.	Multiple choice questions (MCQs)	50	50

Weightage as per type of question : PART-B

No.	Type of Question	No. of Question		Total Marks
		Without General Option	With General Option	Without Option
1.	Short Answer Type (SA-I)	08	12	16
2.	Short Answer Type (SA-II)	06	09	18
3.	Long Answer Type (LA)	04	06	16
	કુલ	18	27	50

Weightage as per Chapter :

No.	Name of Chapter	Chapterwise Weightage			Unitwise Weightage
		PART-A Mark	PART-B		Without Option
			General Optional	General with Option	
1.	Electric charges and fields	5	2	5	Unit-1 24 Mark
2.	Electrostatic potential and capacitance	4	4	6	
3.	Current Electricity	4	2	9	
4.	Moving charges and magnetism	3	2	5	Unit-2 26 Mark
5.	Magnetism and matter	3	2	2	
6.	Electromagnetic induction	3	2	5	
7.	Alternating current	4	4	6	
8.	Electromagnetic waves	3	2	2	
9.	Ray optics and optical instruments	5	7	7	Unit-3 25 Mark
10.	Wave optics	5	3	5	
11.	Dual nature of Radiation and matters	3	3	9	Unit-4 18 Mark
12.	Atoms	3	4	4	
13.	Nuclei	3	2	5	
14.	Semiconductor Electronics : Materials, Devices and Simple circuits	2	5	5	Unit-5 7 Mark
	Total Marks	50	50	75	100

Note : Chapter weightage may be change for different question paper. But unit weightage can not be change.



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

શૈક્ષણિક વર્ષ 2020-21 માટે

STD.-12 (SCIENCE STREAM) PHYSICS (054)

ANNUAL EXAM

TIME : 3 Hours

SCHEME OF QUESTION PAPER

Total Marks - 100

Que. No.	Question Detail	Marks
PART - A		
1 to 50	50 Question of one Mark MCQ type	50
PART - B		
SECTION - A		
1 to 12	<ul style="list-style-type: none"> • Short answer type 12 questions of 2 marks. • Write the answer of any 8 questions. 	16
SECTION - B		
13 to 21	<ul style="list-style-type: none"> • Short answer type 9 questions of 3 marks. • Write the answer of any 6 questions. 	18
SECTION - C		
22 to 27	<ul style="list-style-type: none"> • Long answer type 6 questions of 4 marks. • Write the answer of any 4 questions. 	16
Total Marks		100

- Note :**
- Time one hour for Part-A
 - Time two hour for Part-B



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શૈક્ષણિક વર્ષ 2020-21 માટે

STD.-12 (SCIENCE STREAM) PHYSICS (054)

ANNUAL EXAM

TIME : 3 Hours

SCHEME OF QUESTION PAPER

Total Marks - 100

Time :1 Hour

PART - A

Marks : 50

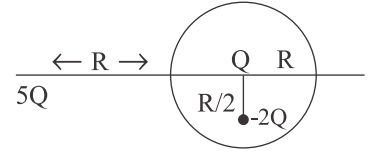
- Instructions :** (1) There are 50 objective type (M.C.Q.) questions in part-A and all questions are Compulsory.
- (2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
- (3) Read each question carefully, select proper alternative and naswer in the O.M.R. Sheet.
- (4) The OMR Sheet is given for answering the questions. The answer of each question is represented by (A) O, (B) O, (C) O , (D) O. Darken the circle (●) of the correct answer with ball-pen.
- (5) Rough work is to be done in the Spare provided for this purpose in the Test Booklet only.
- (6) Set No. of Question Paper Printed on the upper most right side of the question paper is to be written in the column provided in the OMR Sheet.
- (7) Students may use a Simple Calculator and log-table, if necessary.

- (1) The dimension formula of Electric flux is.....
- (A) $M^1 L^1 T^{-2} A^{-2}$ (B) $M^2 L^1 T^{-3} A^{-1}$ (C) $M^1 L^1 T^{-3} A^{-1}$ (D) $M^1 L^3 T^{-3} A^{-1}$
- (2) Figure shows electric field lines in which an electric dipole \vec{p} is placed as shown. Which of following statements is correct ?
- (A) The dipole will not experience only force
- (B) The dipole will not experience a force towards right
- (C) The dipole will experience a force towards left.
- (D) The dipole will experience a force upwards.
- (3) A system has two charge $q_A = 2.5 \times 10^{-2} C$ and $q_B = 2.5 \times 10^{-7} C$ located at points A : (0, 0, -15) cm and B : (0, 0, 15) cm suggestively what is electric dipole wasent of the system is _____ cm.
- (A) 7.5×10^{-8} (B) 3.75×10^{-8}
- (C) 1.25×10^{-8} (D) 2.5×10^{-8}
- (4) A point charge q is placed at the centre of a cube of side L . The electric flux emerging from the cube is _____.
- (A) $q \epsilon_0$ (B) Zero (C) $\frac{62 L^2}{\epsilon_0}$ (D) $\frac{q}{6L^2 \epsilon_0}$



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

- (5) Refer to the arrangement of charge in fig and a gaussian surface of radius R with Q at the Centre. Then



- (A) Flux through the surface of sphere due to $5Q$ is $5Q/\epsilon_0$
- (B) Total flux through the surface of the sphere is $-Q/\epsilon_0$
- (C) Field on the surface of the sphere is $\frac{-Q}{4\pi\epsilon_0 R^2}$
- (D) Field on the surface of sphere due to $-2Q$ is same every where.
- (6) The potential at a point due to a charge of $4 \times 10^{-7} \text{ C}$ located 9 cm away is _____ V.
- (A) 0.36×10^{-7} (B) 2.25×10^4 (C) 4×10^4 (D) 3.6×10^{-9}
- (7) Equipotentials at a great distance from a collection of charge. Whose total sum is not Zero are approximately.
- (A) Spheres (B) Planes (C) Paraboloids (D) Ellipsoids
- (8) For a separation between conductor of the order of 1 cm and electric field strength $3 \times 10^6 \text{ Vm}^{-1}$ then potential difference is _____ V.
- (A) 4×10^3 (B) 3×10^8 (C) 0 (D) 3×10^4
- (9) If have energy of a $100 \mu\text{F}$ capacitor changes to 6 KV could all the used to lift a 50 Kg mass, than the greatest vertical height through which mass could be raised is _____ m.
- (A) 3.6 (B) 0.6 (C) 1.2 (D) 12
- (10) The SI unit of the current density is _____
- (A) CS^{-1} (B) Am^{-2} (C) Cm^{-2} (D) A^5
- (11) The storage battery of a car has an emf of 12 V. If the internal resistance of the battery is 0.3Ω . What is the maximum current that can be drawn from the battery?
- (A) 30 A (B) 20 A (C) 40 A (D) 0.4 A
- (12) Kirchhoff's junction rule is a reflection of
- (A) Conservation of charge (B) Conservation of energy
- (C) Conservation of current density vector (D) Conservation of momentum
- (13) A metal rod length 10 cm and a rectangular cross-section of $1 \text{ cm} \times \frac{1}{2} \text{ cm}$ is connected to a battery across opposite faces. The resistance will be
- (A) Maximum when the battery is connected across $1 \text{ cm} \times \frac{1}{2} \text{ cm}$ faces.
- (B) Maximum when the battery is connected across $10 \text{ cm} \times 1 \text{ cm}$
- (C) Maximum when the battery is connected across $10 \text{ cm} \times \frac{1}{2} \text{ cm}$ faces.
- (D) Same irrespective of the three faces.



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

- (14) A permanent magnet in the shape of a thin cylinder of length 10 cm has $M=10^6$ A/m. Calculate the magnetization current I_m _____.
- (A) 10^2 A (B) 10^4 A (C) 10^5 A (D) 10^6 A
- (15) The relation between ϵ_0 the permittivity of free space μ_0 , the permeability of free space and C , the speed of light in vacuum is _____.
- (A) C^2 (B) \sqrt{C} (C) C^{-2} (D) C^1
- (16) What is the radius of the path of an electron (mass 9×10^{-31} kg and charge 1.6×10^{-19} C) moving at a speed of 3×10^8 m/s in a magnetic field of 6×10^{-4} T perpendicular in it?
- (A) 1.28×10^{-2} m (B) 28.12 cm (C) 12.8×10^{-4} m (D) 2.812×10^{-3} m
- (17) What is the magnitude of the equatorial fields due to a bar magnet of length 5 cm at a distance of 50 cm from its mid-point? The magnetic moment of the bar magnet is 0.40 Am^2 .
- (A) 1.6×10^{-7} T (B) 6.4×10^{-7} T (C) 3.2×10^{-7} T (D) Zero
- (18) In the magnetic meridian of a certain place, the horizontal component of the earth's magnetic field is 0.40 G and the dip angle is 60° . What is the magnetic field of the earth at this location?
- (A) 0.26 G (B) 0.52 G (C) 0.13 G (D) 0.114 G
- (19) The dimensions of Permeability of free space is
- (A) $\text{MLT}^{-2}\text{A}^{-2}$ (B) MT^2A^{-1} (C) L^{-2}A (D) L^{-1}A
- (20) A closed loop moves in a constant electric field between the plates of a large capacitor, a current induced in the loop.
- (A) When it is wholly inside the region between the capacitor plates
(B) When it is partially outside the plates of the capacitor
(C) The electric field is normal to the plane of the loop
(D) Current can not be induced by changing the electric flux.
- (21) A 1 m long metal wire moving perpendicular with speed 5 ms^{-1} in a magnetic field of 0.1 T. Then the induced emf between two ends of wire is _____ V.
- (A) 1 (B) 2 (C) 0.5 (D) 0.25
- (22) Which of the following is not the unit of inductance?
- (A) ΩS^{-1} (B) VSA^{-1} (C) Wb A^{-1} (D) $\text{Wb C}^{-1}\text{S}^{-1}$
- (23) A light bulb is rated at 100W for a 220 V supply. The resistance of the bulb is _____.
- (A) 022 (B) 484 (C) 022,000 (D) 311
- (24) A capacitor of $250 \mu\text{F}$ is connected parallel with an inductor 0.16 mH. If the effective resistance is 20Ω then resonant frequency _____ Hz.
- (A) 9×10^4 (B) 16×10^7 (C) 8×10^5 (D) 9×10^3



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

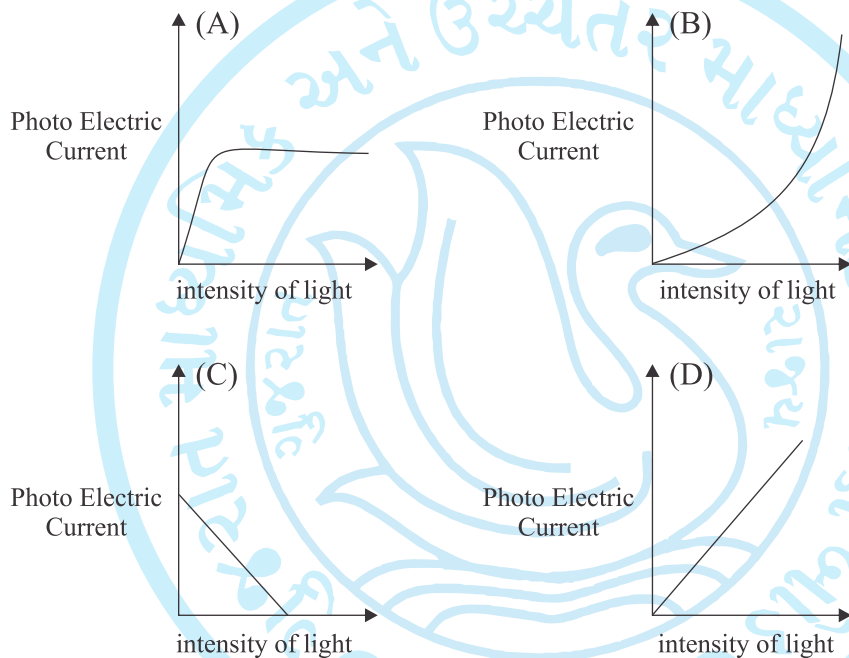
- (25) The output of a step-down transformer is measured to be 24 V. When connected to a 12 W light bulb. The value of the peak current is _____ A.
- (A) $\frac{1}{\sqrt{2}}$ (B) $\sqrt{2}$ (C) 2 (D) $2\sqrt{2}$
- (26) The mechanical quantities force constant K analogy to the electrical quantities _____.
(A) inductance L (B) Reciprocal capacitance $(1/C)$
(C) Charge q (D) Current $I d^2/dt$
- (27) The ratio of contribution made by the electric field and magnetic field components to the intensity of an EM waves is _____.
(A) $C : 1$ (B) $C^2 : 1$ (C) $1 : 1$ (D) $\sqrt{29} C : 1$
- (28) The electric field intensity by the radiations consing from 100W bulb at a 3m distance is E . The electric field intensity produced by the radiations coming from 50W bulb at the same distance is _____.
(A) $E/2$ (B) $2E$ (C) $E/\sqrt{2}$ (D) $\sqrt{2} E$
- (29) In a plane electro magetic wave, the electric field oscillates sinusoidally at a frequency of 1.0×10^{10} Hz and amplitude 48 V/m. What is the wavelength of the Wave ?
($C = 3 \times 10^8 \text{ ms}^{-1}$)
(A) $1.6 \times 10^{-7} \text{ m}$ (B) $1.24 \times 10^{-6} \text{ m}$ (C) $1.5 \times 10^{-2} \text{ m}$ (D) $24 \times 10^{-3} \text{ m}$
- (30) If lower half of a concave mirror is blackned then,
(A) image distance increases (B) image distance decreases
(C) image intensity increases (D) image intensity decreases
- (31) When a light wave travels from air to glass,
(A) Its wavelength decreases (B) Its wavelength increases
(C) There is no change in wavelength (D) Its frequency decreases
- (32) A fish which is at a depth of 12 cm in water ($\mu = 4/3$) is viewed by an observer on the bank of a lake. Its apparent depth as observed by the observer is cm.
(A) 3 (B) 9 (C) 12 (D) 16
- (33) In an equilateral prism if incident angel is 45° then minimum deviation is
(A) 30° (B) 60° (C) 45° (D) 90°
- (34) Astigmatism for a human eye can be removed by using
(A) Concave lens (B) Convex lens (C) Cylindrical lens (D) Prismatic lens
- (35) In young's double slit experiment, if the width of 4th bright fringe is $2 \times 10^{-2} \text{ cm}$, then the width of 6th bright tringe will be cm
(A) 10^{-2} (B) 3×10^{-2} (C) 2×10^{-2} (D) 1.5×10^{-2}
- (36) The bending of beam of light around corners of obstancles is called
(A) Reflection (B) Refraction (C) Diffraction (D) Interference



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

- (37) Two slits are made 1 mm apart and the screen is placed 1 m away. What is the fringe separation when blue green light of wave length 500 nm is used ?
(A) 0.5 mm (B) 5 cm (C) 50 mm (D) 0.05 mm
- (38) For what distance is ray optics a good approximation when the aperture is 3mm wide and the wave length is 500 nm ?
(A) 12 m (B) 18 m (C) 10 m (D) 8 m
- (39) The condition for obtaining secondary maxima in the diffraction pattern due to single slit is
(A) $a \sin \theta = n \lambda$ (B) $a \sin \theta = (2n-1)\lambda/2$ (C) $a \sin \theta = (2n-1)\lambda$ (D) $a \sin \theta = n\lambda/2$

- (40) Variation of photo electric current with intensity of light is shown by graph



- (41) An X-ray tube is operated at 50 KV, the maximum wavelength produced is Å
(A) 0.75 (B) 0.25 (C) 1 (D) 2.5
- (42) De-Broglie wavelength associated with an electron, accelerating through a potential
(A) Gamma rays (B) X-rays (C) Ultra violet (D) Visible region
- (43) If E_p and E_k represent potential energy and kinetic energy respectively of an orbital electron, then according to bohr's theory,
(A) $E_k = -E_p/2$ (B) $E_k = E_p$ (C) $E_k = 2 E_p$ (D) $E_k = -2E_p$
- (44) Highest energy level of an electron corresponds to $n = \infty$ and it has an energy ofeV
(A) Zero (B) ∞ (C) 13.6 (D) -13.6



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- (45) A hydrogen atom in its ground state absorbs 10.2 eV of energy. The orbital angular momentum is increased by Js. ($h=6.6 \times 10^{-34}$ J.S.)
- (A) 1.05×10^{-34} (B) 3.16×10^{-34} (C) 2.11×10^{-34} (D) 4.22×10^{-34}
- (46) Heavy stable nucle have more neutrons than protons this is because of
- (A) Neutrons are heavier than proton
(B) Electrostatic force between protons are repulsive
(C) Neutrons decay into protons through β decay
(D) Nuclear forces between neutrons are weaker than that between protons.
- (47) A radioactive substance decays to $1/16$ th of its initial mass in 40 days. The half - life of the substance is day.
- (A) 20 (B) 10 (C) 5 (D) 2.5
- (48) If the mass of Al nucleus is 26.84 u and $A=27$ then the radius is _____ m.
- (A) 3.6×10^{-15} (B) 2.7×10^{-15} (C) 2.29×10^{-15} (D) 4.05×10^{-15}
- (49) In ideal junction diode as shown in figure, the current flowing through AB is A
-
- (A) 10^{-2} (B) 10^{-1} (C) 10^{-3} (D) 0
- (50) The Boolean expression of NOR gate is
- (A) $y = \overline{A}$ (B) $y = A + B$ (C) $y = A \cdot B$ (D) $y = \overline{A + B}$



TIME : 2 Hours

PART - B

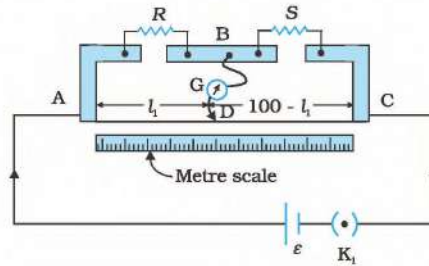
Total Marks - 50

- Instructions :**
- (1) Write in a clear legible handwriting.
 - (2) There are THREE sections A, B and C in Part-B.
 - (3) All sections are compulsory and general options are given in each section.
 - (4) The number at the right side represent the marks of the section.
 - (5) Start new section on new page.
 - (6) Maintain sequence of questions in the section.
 - (7) Use of simple calculator and log table is allowed , if required.

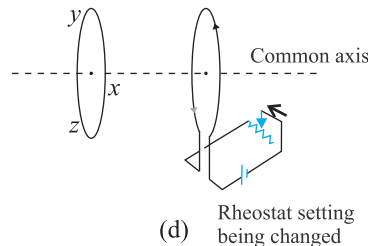
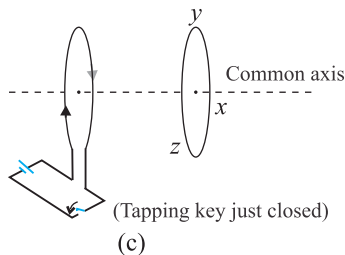
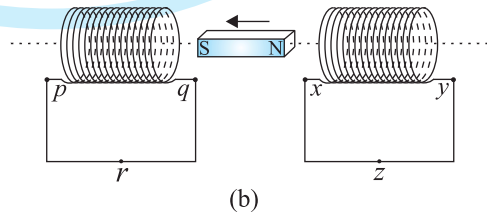
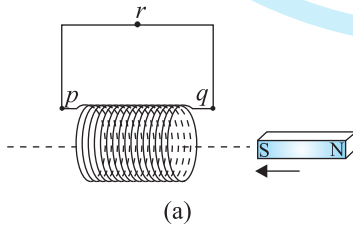
Section - A

- Answer any 8 questions from given following question no. 1 to 12. [16]
(Each carry 2 marks)

- (1) Define electric line of force and give its two important properties.
- (2) In a meter bridge, the null point is found at a distance of 33.7 cm from A. If a resistance of 12Ω is connected in parallel with S, the null point occurs at 51.9 cm. Determine the values of R and S.



- (3) At room temperature (27°C) the resistance of a heating element is 100Ω . What is the temperature of the element if the resistance is found to be 117Ω . Given that the temperature coefficient of the material of the resistor is $1.70 \times 10^{-4} \text{C}^{-1}$
- (4) A closely wound solenoid of 800 turns and area of cross section $2.5 \times 10^{-4} \text{m}^2$ carries a current of 3.0 A. is suspended through its centre allowing it to turn in a horizontal plane what is the magnetic moment of solenoid?
- (5) Predict the direction of induced current in the situations described by the following figs. (a) to (d).





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- (6) Give any four characteristic of electro magnetic waves.
- (7) Explain the nuclear binding energy with example of ${}^{16}_8\text{O}$
- (8) Write a short note on P-type semiconductor.
- (9) A system consisting of two charges $7\mu\text{C}$ and $-2\mu\text{C}$ placed at $(-9\text{ cm}, 0, 0)$ and $(9\text{ cm}, 0, 0)$ respectively are placed in a rectangular electric field $E = A(1/r^2)$, $A = 9 \times 10^5 \text{ NC}^{-1} \text{ m}^2$, what would the electrostatic energy of the configuration be?
- (10) Two concentric, circular coils, one of small radius r_1 and the other of large radius r_2 such that $r_1 \ll r_2$ are placed, coaxially with centres coinciding. Obtain the mutual inductance of the arrangement.
- (11) Show that the distance between two consecutive bright fringes $\beta = \frac{\lambda D}{d}$
- (12) The work function of caesium is 2.14 eV . Find the wavelength of the incident light if the photo current is brought to zero by a stopping potential of 0.66 V .

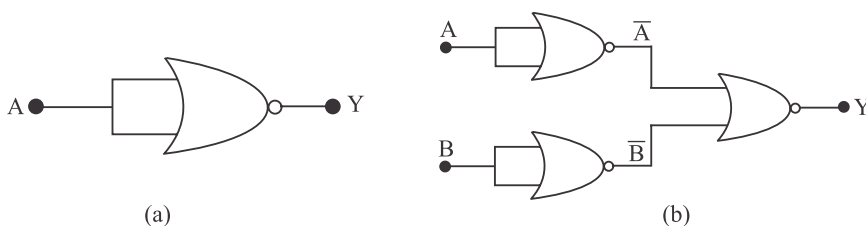
Section - B

- Answer any 6 questions from given following questions no. 13 to 21. [18]
(Each carry 3 marks)

- (13) A room has AC run for 5 hours a day at a voltage of 220 V . The wiring of the room consists of Cu of 1 mm radius and a length of 10 m . Power consumption per day is 10 commercial units. What fraction of it goes in the joule heating in wires? What would happen if the wiring is made of aluminium of the same dimensions?

$$[\rho_{\text{Cu}} = 1.7 \times 10^{-8} \Omega \text{ m}, \rho_{\text{Al}} = 2.7 \times 10^{-8} \Omega \text{ m}]$$

- (14) For a circular coil of radius R and N turns carrying current I , Prove that the magnitude of the magnetic field at a point on its axis at a distance X from its centre is given by $B = \frac{\mu_0 I R^2 N}{2(x^2 + R^2)^{3/2}}$
- (15) A small bulb is placed at the bottom of a tank containing water to a depth of 80 cm . What is the area of the surface of water through which light from the bulb can emerge out? Refractive index of water is 1.33 .
- (16) In Young's double slit experiment using monochromatic light of wavelength λ , the intensity of light at a point on the screen where path difference is λ , is K units. What is the intensity of light at a point where path difference is $\lambda/3$?
- (17) What is the de Broglie wavelength associated with (a) an electron moving with a speed of $5.4 \times 10^6\text{ m/s}$ and (b) a ball of mass 150 g travelling at 30.0 m/s ?
- (18) Write the truth table for the circuits given in Fig. consisting of NOR gates only. Identify the logic operations (OR, AND, NOT) performed by the two circuits.





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- (19) Consider three charges q_1, q_2, q_3 , each equal to q at the vertices of an equilateral triangle of side l . What is the force on a charge Q (with the same Sign as q) placed at the centroid of the triangle.
- (20) A jet plane is travelling towards at a speed of 1800 km/h. What is the Voltage difference developed between the ends of the Wing having a span of 25 m, if the earth's magnetic field at the location has a magnitude of 5×10^{-4} T and the dip is 30.
- (21) Derive the law of radioactive decay.

Section - C

- **Answer any 4 questions from given following question no. 22 to 27. [16]**
(Each Carry 4 marks)

- (22) A 600 pF Capacitor is charged by a 200 V Supply. It is then disconnected from the supply and is connected to another uncharged 600 pF capacitor. How much electrostatic energy is lost in the process ?
- (23) A resistor of 200Ω and a capacitor of $15.0 \mu F$ are connected in series to a 220 V, 50 Hz ac source.
- (a) Calculate the current in the circuit.
- (b) Calculate the voltage (rms) across the resistor and the capacitor. Is the algebraic sum of these voltages more than the source voltage ? If yes, resolve the paradox.
- (24) Use the mirror equation to deduce that :
- (a) An object placed between f and $2f$ of a concave mirror produces a real image beyond $2f$.
- (b) A convex mirror always produces a virtual image independent of the location of the object.
- (c) The virtual image produced by a convex mirror is always diminished in size and is located between the focus and the pole.
- (25) A hydrogen atom initially in the ground level absorbs a photon, which excites it to the $n = 4$ level. Determine the wavelength and frequency of the photon.
- (26) Explain drift of electrons and the origin of resistivity and derive $\sigma = \frac{ne^2}{m} \tau$
- (27) The work function of caesium metal is 2.14 eV. When light of frequency 6×10^{14} Hz is incident on the metal surface, photo emission of electron occurs. What is the
- (a) maximum kinetic energy of the emitted electrons
- (b) stopping potential, and
- (c) maximum speed of the emitted photo electrons.



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Std. 12 : (Science Stream) Biology (056)

Annual Exam

Time : 3 hrs.

Paper Scheme

Total marks : 100

Note : This blue print is for the guidance of students, teachers, Examiners, moderators etc. The Moderators, teacher and experts in higher secondary of the respective subject may do essential changes keeping the objectives in mind.

Weightage as per objective :

Objectives	Knowledge	Understanding	Application	Higher order thinking skill		Total
				Synthesis/ Analysis	Inference/ Evaluative	
Part-A Mark	05	15	15	08	07	50
Part-B Mark	05	15	15	09	06	50
Total Mark (%)	10	30	30	17	13	100

Weightage as per type of question : PART-A

No.	Type of Question	No. of Question	Total Marks
1.	Multiple choice questions	50	50

Weightage as per type of question : PART-B

No.	Type of Question	No. of Question		Total Question	Total Marks
		No.	Optional No.		
1.	Short Answer Type (SA-I)	08	04*	12	16
2.	Short Answer Type (SA-II)	06	03*	09	18
3.	Long Answer Type (LA)	04	02*	06	16
	Total	18	09*	27	50

Weightage as per Chapter :

No.	Name of Chapter	Chapterwise Weightage			Unitwise Weightage
		PART-A Mark	PART-B		Without Option
			General Optional	General with Option	
1.	Reproductions in organisms	3	2	3	Unit-1 26
2.	Sexual Reproduction in flowering plants	3	6	-	
3.	Human Reproduction	3	4	-	
4.	Reproductive Health	5	-	2	
5.	Principle of Inheritance and variation	3	9	-	Unit-2 22
6.	Molecular basis of inheritance	5	5	6	
7.	Evolution	-	-	-	
8.	Human health and disease	4	5	3	Unit-3 18
9.	Strategies for enhancement in food production	-	-	-	
10.	Microbes in Human welfare	6	3	2	
11.	Biotechnology : Principles and process	4	4	3	Unit-4 16
12.	Biotechnology and its Applications	5	3	-	
13.	Organisms and Populations	6	4	4	Unit-5 18
14.	Ecosystem	-	-	-	
15.	Biodiversity and conservation	3	5	2	
16.	Environmental Issues	-	-	-	
	Total Marks	50	50	25	100

Note :

- Unitwise weightage can not be changed, chapter wise marks can be changed judiciously.
- Marks for the general option shown in above format is for given sample paper. It may be different for other question paper.



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Std. 12 : (Science Stream) Biology (056) Annual Exam

Time : 3 hrs.

Scheme of Questions Paper

Total marks : 100

Question No.	Details of Section / Question	Marks
	PART - A	
1 to 50	50 Multiple Choice Questions, each of 1 mark	50
	PART - B	
	SECTION - A	
1 to 12	8 Short Answer type questions, (SA-I) Each of 2 marks Attend any 8 out of 12 questions	16
	SECTION - B	
13 to 21	6 Short Answer type Questions, (SA-I) Each of 3 marks Attend any 6 out of 9 questions	18
	SECTION - C	
22 to 27	4 Long Answer Type Questions, (LA) Each of 4 marks Attend any 4 out of 6 questions	16
	Total Marks	100

- Note :**
- Time : one hour for Part - A
 - Time : two hours for Part - B



Biology 056 (E)
Std. 12 (Science Stream)

Time : 3 Hours

Class - XII

Total Marks : 100

Time : 1 Hour

PART-A

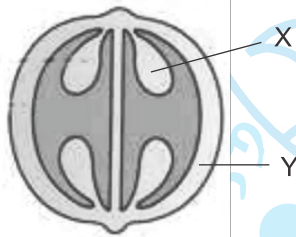
Total Marks : 50

- Introductions :** (1) There are 50 objective type (MCQ) questions in Part-A and all questions are compulsory.
(2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
(3) Read each question carefully, select proper alternative and answer in the OMR sheet.
(4) The OMR sheet given for answering the questions. The answer of each questions is represented by (A) O, (B) O, (C) O, (D) O. Darken the circle (●) of the correct answer with ball pen.
(5) Rough work is to be done in the space provided for this purpose in the test booklet only.
(6) Set No. of question paper printed on the upper most right side of the question Paper is to be written in the column provided in the OMR Sheet.

- (1) What is the speciality of *Strobilanthus kunthiana* for flowering ?

- (A) Everyday flowering shown
(B) Every year flowering shown in particular season.
(C) Every year only one day flowering shown.
(D) Every 12 years flowering shown.

- (2) Identify X and Y from given diagram.



- (A) X = Seed, Y = Embryo.
(B) X = Pericarp, Y = Embryo
(C) X = Seed, Y = Pericarp
(D) X = Pericarp, Y = Seed

- (3) By which organ vegetative propagation take place in banana ?

- (A) Runner (B) Bulbil (C) Sucker (D) Rhizome

- (4) **Assertion A :** Pollen grain can withstand high temperature and strong acids and alkali.

Reason R : Exine of pollen grain made up of sporopollenin.

- (A) A and R both are true and R is true expatiation of A.
(B) A and R both are true but R is not correct explanation of A.
(C) A is correct but R is wrong.
(D) A is wrong but R is correct.

- (5) Which temperature is suitable for storage of pollen grain for long duration.

- (A) 0° C (B) 37° C (C) 100° C (D) -196° C

- (6) Identify group from following which have perisperm.

- (A) Black pepper, Sugar beet (B) Black pepper, Pea
(C) Sugar beat, gram (D) Pea, Bean



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(7) Match the Column-I and Column-II properly.

Column-I

- (P) Myometrium
- (Q) Perimetrium
- (R) Endometrium
- (S) Mons pubis

Column-II

- (i) Outer most layer of uterus
- (ii) middle layer of uterus
- (iii) Inner most layer of uterus
- (iv) It is made up of fatty tissue

- (A) (P-i), (Q-ii), (R-iv), (S-iii)
- (B) (P-ii), (Q-i) (R-iii), (S-iv)
- (C) (P-ii), (Q-iii), (R-iv), (S-i)
- (D) (P-iv), (Q-iii), (R-ii), (S-i)

(8) Choose the option from the following for correct statements.

- (1) Sperms take the nutritions from sertoli cells.
- (2) Sertoli cells produced androgens.
- (3) Leyding cells synthesized androgens.
- (4) Leyding cells produces from the Ovaries.
- (5) Menstrual cycle not shown during the pregnancy.

- (A) 1, 3 and 5 are correct
- (B) 3 and 5 are correct
- (C) 2, 4, 5 are correct
- (D) 3, 4 5 are correct

(9) After the use of which method no possibility of repregnancy ?

- (A) Physical barrier method
- (B) Chemical barrier method
- (C) Sterility method
- (D) Natural barrier method

(10) Sexual tramitted diseases transmitted by which micro organisms ?

- (A) Virus, Bacteria
- (B) Fungi, protozoan
- (C) Virus, Bacteria, Fungi
- (D) Virus, Fungi, Bacteria, Protozoan.

(11) **Assertion - A :** During 10 to 17 days of menstrual cycle couple should away from the sexual inter course.

Reason -R : During the 10 to 17 days of meanstrual cycle maximum possibility of fertilization is there.

- (A) A and R both are correct and R is correct explanation of A.
- (B) A and R both are correct but R is not correct explanation of A.
- (C) A is correct but R is wrong.
- (D) A is wrong but R is correct.

(12) The function of copper ion relasing from IUDs copper device placed in uterus is _____.

- (A) More protection given to sperms.
- (B) Prevent the process of to release ovum.
- (C) Prepare the uterus for embryo implantation.
- (D) Obstrac the motility of sperms and fertilization ability.

(13) Chromosomes behaviour is also like genes. Which scientist studied it ?

- (A) Correns and Tshermak
- (B) Morgan and De'vries
- (C) Sutton and Boveri
- (D) Mendel and Boveri.

(14) Which situation is responsible for turner's syndrome ?

- (A) XXY
- (B) XXX
- (C) XYY
- (D) XO

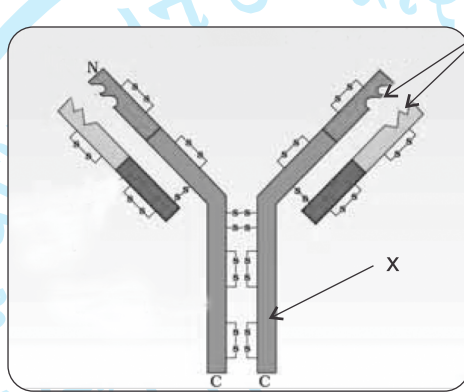
(15) What is the ratio of colour blindness in man ?

- (A) 0.4%
- (B) 8%
- (C) 40%
- (D) 80 %



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- (16) Which genetic codon associates with two functions ?
(A) UAA (B) AUG (C) CUC (D) GAG
- (17) Give the full form of VNTR.
(A) Variable Number of Tandem Repeats
(B) Variable Nucleotides of Tandem Repeats
(C) Variable Nucleotide of Tandem Ribosomes
(D) Variable Number of Tandem Ribosomes.
- (18) Isolation of segments of DNA by the help of which method ?
(A) Gas Chromatography (B) Electrophoresis
(C) PCR (D) Lygase
- (19) Continuous more fever, weakness, pain in abdomen portion headache and pores produce in gut symptoms are seen in which disease these ?
(A) Pneumonia (B) Typhoid (C) Filariasis (D) Malaria
- (20) Labelled X and Y in given diagram.



- (A) X = Heavy chain, Y = Light Chain
(B) X - Heavy chain, Y = Antigen binding site.
(C) X = Light chain, Y = Antigen binding site.
(D) X = Antigen binding site, Y = Light chain
- (21) Match the columns and choose correct option.
- | Column-I | Column-II |
|-------------------------------------|---------------------|
| (i) Physical barrier | (P) Leucocytes |
| (ii) Physiological barrier | (Q) Skin |
| (iii) Cellular barrier | (R) Interferon |
| (iv) Cytoplasmic barrier (cytokine) | (S) Tears from eyes |
- (A) (i-P), (ii-S), (iii-R), (iv-Q)
(B) (i-Q), (ii-S), (iii-P) (iv-R)
(C) (i-Q), (ii-P), (ii-R), (iv-S)
(D) (i-P), (ii-R), (iii-Q), (iv-S)
- (22) Choose related option.
(A) Aspergillus niger - Acetic acid
(B) Acetobacter aceti - citric acid
(C) Trichoderma polysporum - Statins
(D) Clostridium butylicum - Butyric acid



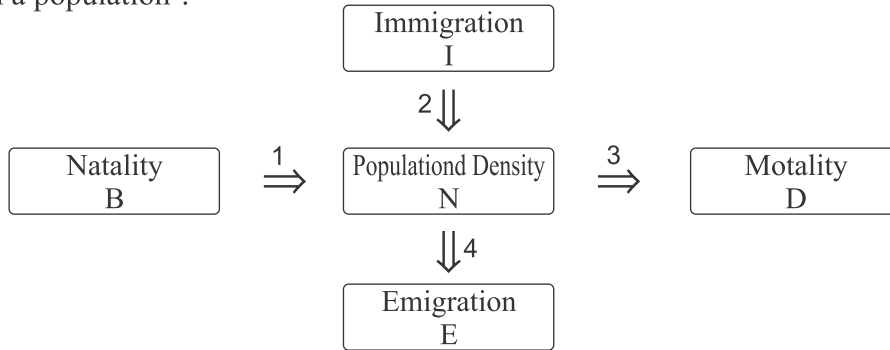
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- (23) Free living fungus *Trycoderma* is useful _____
- (A) For killing the insects
(B) For killing the ladybug and dragon by
(C) As a biocontroller of plant disease
(D) For the production of antibiotics
- (24) Mycorrhiza : glomus fungus : Free living bacteria for nitrogen fixation : _____
- (A) Rhizobium (B) Thiobacillus
(C) Pseudomonas (D) Azatobater
- (25) **Statement-X** : Bakulo virus causes the disease in insects and other arthropoda.
Statement-Y : Bakulo virus act as in placed under biocontroller which nucleopolyhydro virus genus.
- (A) X and Y both the statements are correct.
(B) X is correct but Y is wrong.
(C) X is wrong but Y is correct
(D) X an Y both the statements are wrong.
- (26) Function of restriction endonuclease enryme is _____
- (A) It cuts the DNA molecule from specific site.
(B) It identify specific squence for the lined DNA lygase.
(C) It inhibits the mechanism of DNA polymerase.
(D) It removes the nucleotide from ends of DNA molecule.
- (27) Which is/are the step/steps for the formation of genetically modified organism.
- (A) Identification of DNA with desirable genes.
(B) Introductin of the identified DNA into the host.
(C) Maintenance of introduced DNA in the host and transfer of DNA to its progeny.
(D) All of these.
- (28) According to PCR method which is the correct sequeue for the three steps.
- (A) Extension - Annealing - Denaturation
(B) Denaturation - Annealing - Extension
(C) Annealing - Denaturation - Extension
(D) Denaturation - Extension - Annealing
- (29) For getting desirable product in bioreactor which desirable situation is provided ?
- (A) Temperature, pH, O₂ and CO₂ (B) Temperature, pH, O₂ and vitamin
(C) Reactant, Salt, pH and Density (D) Salt, Vitamin, O₂ and Pressure
- (30) Which vitamin is more present in golden rice ?
- (A) Vitamin -D (B) Vitamin -C
(C) Vitamin -A (D) Vitamin -B₁₂
- (31) First time genetheraphy was used in the treatment of
- (A) Adenosine deaminase (B) Arthritis
(C) Diabetes melitus (D) Small pox



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- (32) Choose the correct option for 1, 2, 3 and 4. What kind of changes are represented by this chart in a population ?



- | | 1 | 2 | 3 | 4 |
|-----|----------|----------|----------|----------|
| (A) | Increase | Decrease | Increase | Decrease |
| (B) | Decrease | Increase | Decrease | Increase |
| (C) | Increase | Increase | Decrease | Decrease |
| (D) | Decrease | Decrease | Increase | Increase |
- (33) Which of the following organism reproduces once during its life span ?
 (A) Pacific salman (B) Bamboo
 (C) Parrot (D) A and B both
- (34) Where principle states that two closely related species competing for the same resources cannot coexist indefinitely and competitively inferior one will be eliminated eventually ?
 (A) Darwin (B) Gausse's competitive exhaustion principle
 (C) Morgan (D) Mendel
- (35) The birds from Siberia and other extremely cold northern region arrive in which national park of India as host ?
 (A) Kevladev (Kedala) National Park - Bharatpur, Rajastham
 (B) Kaziranga National Park - Assam
 (C) Kanha National Park - Madhya Pradesh
 (D) Gir national Park - Gujarat
- (36) From the following which represents maximum species at global biodiversity ?
 (A) Algae (B) Lichens
 (C) Moss (D) Fungi
- (37) How many new regions are added in the list of Hot spots ?
 (A) 9 (B) 25 (C) 34 (D) 10
- (38) How many species extinct according to IUCN Red list (2004) documented in last 500 years ?
 (A) 784 (B) 748 (C) 27 (D) 584
- (39) Human partein Anti-trypsin is used in the treatment of which disease ?
 (A) Arthritis (B) Alzimer (C) Amphysema (D) Cancer



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- (40) Which hormones in female are produced during pregnancy only ?
(A) HCG (B) hPL (C) Relaxing (D) All Given
- (41) The final aim of these techniques is to conceive a child, from the following which option is correct.
(A) GIFT, ICSI, ZIFT (B) GIFT, PIDs, SITs
(C) PIDs, SITs, ZIFT (D) ET, MTP, IUI PIDs
- (42) What is the time taken by E coli to complete replication ?
(A) 10 min (B) 2 hours (C) 24 hours (D) 18 min
- (43) In eukaryotes, coding sequence means...
(A) introns (B) exons (C) terminator (D) Cistron
- (44) Which cells engulfs and kill the microbes ?
(A) PMNL (B) Monocytes (C) Natural killer cells (D) All given
- (45) Which of the following produces citric acid ?
(A) Clostridium butircum (B) Aspergilus nizer
(C) Lactobacilus (D) A, B both
- (46) Which of the following is free living N_2 - fixing bacteria ?
(A) Azospirillum (B) Azatobacter
(C) Rhizobium (D) A, B both
- (47) Which of the following is the method for cellular protection in all eukauyotes ?
(A) RNAi (B) Splicing (C) Caping (D) Tailing
- (48) Which bond binds both the strand - strand A and Strand - B in insulin ?
(A) H-bond (B) Peptide (C) Disulphide (D) Glycocidic
- (49) Choose the correct option from the following, which explains parasitism better.
(A) One organism gets benefited
(B) Both the organisms get benefited
(C) One gets benefit, but other is not affected.
(D) One gets benefit, but other is affected
- (50) Which plant takes support of sexual deceit ?
(A) Mediterrean orchid (B) Fig tree
(C) Strobilus Kunthiana (D) Commelina

• • •



Time : 2 Hours

PART-B

Total Marks : 50

- Introduction :** (1) Write in a clear legible hand writing.
 (2) There are three sections in Part-B of the question paper and total 1 to 18 questions are there.
 (3) General options are given.
 (4) The numbers at right side represents the marks of the questions.
 (5) Start new section on new page.
 (6) Maintain sequence.

Section-A

- **Answer any 8 questions from question number 1 to 12 Each of 2 marks. [16]**
 - (1) Explain the formation of zygote.
 - (2) Explain the process of microporogenesis.
 - (3) Explain about infertility.
 - (4) Describe briefly about Co-dominance.
 - (5) Explain the words nucleosome and nucleoids.
 - (6) Explain the molecular structure of antibody. (Diagram is not necessary)
 - (7) 'In Ecology water is represented as abiotic factor' - Explain this statement.
 - (8) Explain alien species invasions with example.
 - (9) Explain about : Medical Termination of pregnancy.
 - (10) Explain : Biochemical characterisation of transforming principle.
 - (11) Explain the role of microbes as biofertilisers.
 - (12) Explain : Ex-situ conservation.

Section-B

- **Answer any 6 questions from question number 13 to 21 Each of 3 marks. [18]**
 - (13) Give main characteristics of genetic code.
 - (14) Explain about allergies.
 - (15) Explain the role of microbes in production of chemicals and enzymes.
 - (16) Describe in brief about genetically engineered Insulin.
 - (17) Why do we conserve and protect the bio-diversity ?
 - (18) Describe about carbon - cycle. (Chart is not necessary)
 - (19) Explain asexual reproduction in plants with examples.
 - (20) What is Immunity ? Explain the barriers of Innate immunity.
 - (21) Describe briefly separation and isolation of DNA fragments.

Section-C

- **Answer any 4 question from question number 22 to 27 Each of 4 marks. [16]**
 - (22) Explain with chart the process of female gamete formation in human.
 - (23) Describe the inheritance of two genes with chart in pea according to Mendel.
 - (24) Describe experiment of Meselson and Stahl.
 - (25) Explain vector PBR 322 with restriction sites and cloning sites in *E. Coli*.
 - (26) Describe salient features of Human genome project (HGP)
 - (27) Describe any four population interactions.

• • •



Std. 12 : (Science Stream) Biology (056)

Annual Exam

Sample Blueprint

Time : 3 hrs.

Total marks : 100

Que : 1 Perform the practical work for given material (8)
Illustrate your observation table and conclusion, show it to the examiner and answer the viva.

- Practicals included in this question : 9, 10, 23, 24

-- Distribution of marks :

• Practical work	02
• Observation table/conclusion	02
• Performance	02
• Viva	02
	<hr/>
	08

- Note : • InPractical 9 and 10 per availability of time, less number of beads can be given to the student.
- These practicals can be performed in a pair of students.

Que : 2 Perform the practical work for given Material. (07)
Illustrate your observation table and conclusion, show it to the examiner and answer the viva.

- Practicals included in the question : 11, 12, 15, 16

-- Distribution of marks :

• Observation table/conclusion	04
• Viva	03
	<hr/>
	07

Que : 3 Perform the experiment for the given. (07)
Illustrate your observation table and conclusion, show it to the examiner and answer the viva.

- Practicals included : 1,2,3,13

Note : • For practical - 1, give any one available flower.

-- Distribution of marks :

• Write two points	:	0.5 x 2 = 01
(One point from androecium and second point from gynoecium)		
• Draw two diagram as per points	:	0.5 x 2 = 01
• Performance	:	03
• Viva	:	02
		<hr/>
		07



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- marks distribution for practical : 2,3,13
 - Observation table/conclusion/ : 04
Practical work/any one chart drawn
 - Viva : 03
- 07**

Que : 4 Identify and draw labelled diagram and describe arranged apparatus/photo graph/slide/chart. (8)

(6 Specimens are there. Each of 4 marks.)

- Practicals included : 4,5,8,14,17,18
 - Arrange one specimen from above practicals.
 - Distribution of marks :
 - Identification of specimen : 01
 - Diagram of Specimen : 01
 - Description of Specimen : 02
- 04**
- Total 6 specimens and each specimen carries 4 marks.

Que : 5 Journal (4)

...



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For Academic year 2020-21 Std. 12 : Maths (050) (Science Stream)

Annual Exam

Time : 3 hrs.

PAPER SCHEME

Total marks : 100

Note : This Paper scheme acts as guideline to teachers, paper-setter, moderators etc. Along with the aims of Secondary and Higher Secondary Education, there is a spar to make some changer in question paper for paper setter as well as moderator as per subject.

Weightage as per objective :

Objectives	Knowledge	Understanding	Application	Higher order thinking skill		Total
				Synthesis/ Analysis	Inference/ Evaluative	
Part-A Mark	10	15	13	10	02	50
Part-B Mark	10	15	13	09	03	50
Total Mark (%)	20	30	26	19	05	100

Marks as per type of question : PART-A

No.	Type of Question	No. of Question	Total Marks
1.	Objective	50	50

Marks as per type of question : PART-B

No.	Type of Question	Without Option	With Option	Total Marks
1.	Short Answer Type (SA-I)	08	12	16
2.	Short Answer Type (SA-II)	06	09	18
3.	Long Answer Type (LA)	04	06	16
	Total	18	27	50

Makes as per type of Question (PART-A):

No.	Name of Chapter	Chapterwise weightage				Unitwise weightage	
		Without Option		Part-B		Unitwise Mark	Unitwise Weightage
		Part-A	Part-B	Optional Mark	Total Marks with Option		
1.	Relations and Functions	3	3(1)		6	U-1	
2.	Inverse Trigonometric Functions	4	2(1)	2(1)*	8	12	14
3.	Matrix	4	3(1)	4(1)*	11	U-2	
4.	Determinants	3	4(1)	3(1)*	10	14	21
5.	Continues and Differentiability	3	3(1), 2(1)	4(1)*	12	U-3	
6.	Application of Derivatives	4	4(1)	3(1))*	11		
7.	Integrates	8	4(1), 2(1)		14	44	53
8.	Application of Integrates	3	2(1), 2(1)		07		
9.	Differential Equations	3	4(1)	2(1)*	09		
10.	Vector Algebra	6	2(1)	3(1)*	11	U-4	
11.	Three Dimensional Geometry	3	3(1), 2(1)	2(1)*	10	16	21
12.	Linear Programing	3	3(1)		06	U-5, 06	06
13.	Probability	3	3(1), 2(1)	2(1)*	10	U-6, 08	10
Total Marks		50	50(18)	25(9)*	125	100	125



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Std. 12 : (Science Stream) Maths (050) Annual Exam

Time : 3 hrs.

Scheme of Paper

Total marks : 100

No. of Question	Details of Section / Question	Marks
	PART - A	
1 to 50	50 Multiple Choice Questions, each of 1 mark	50
	PART - B	
	SECTION - A	
1 to 8	12 Short Answer type questions, Each carries 2 marks • Attempt any 8 questions. (SA-I)	16
	SECTION - B	
9 to 14	Short Answer type Questions, Each carries 3 marks • Attempt any 6 questions. (SA-II)	18
	SECTION - C	
15 to 18	Long Answer Type Questions, Each carries 4 marks • Attempt any 4 questions. (LA)	16
	Total Marks	100

- Note :**
- Time first one hour for Part-A
 - Time remaining two hours for part-B



Std. 12 (Science Stream) Maths-050
Annual Examination
Sample Paper

Time : 3 Hours

Total Marks : 100

Time : 1 Hours

Total Marks : 50

- Instructions :** (1) There are 50 objective type (MCQ) questions in Part-A and all questions are compulsory.
(2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
(3) Read each question carefully, select proper option and answer in the OMR Sheet.
(4) The OMR Sheet is given for answering the questions. The answer of each circle (●) of the correct answer with ball-pen.
(5) Rough work is to be done in the space provided for this purpose in the Test Booklet only.
(6) Set No of question paper printed on the upper most right side of the question paper is to be written in the column provided in the OMR Sheet.

PART - A

- (1) Relation $R = \{(1,1), (2,2), (3,3), (1,2), (2,3)\}$ in the set $A = \{1, 2, 3\}$ is _____.
(A) symmetric (B) Not reflexive (C) not transitive (D) an equivalence
- (2) Number of binary operations on the set $\{p, q, r\}$ are _____.
(A) 9 (B) 3^{27} (C) 3^9 (D) 2^9
- (3) Let $f: N \times N \rightarrow N - \{1\}$, $f(x, y) = x + y$ is _____.
(A) neither one-one nor onto (B) one-one and onto
(C) one-one but not onto (D) not one-one but onto
- (4) The Principle value of $\cot^{-1}(-\sqrt{3})$ is _____.
(A) $\frac{5\pi}{6}$ (B) $\frac{\pi}{6}$ (C) $\frac{2\pi}{3}$ (D) $-\frac{\pi}{6}$
- (5) If $\sin^{-1} x = y$, $x \in [0, 1]$ then _____.
(A) $0 \leq y \leq \frac{\pi}{2}$ (B) $0 \leq y \leq \pi$ (C) $\frac{\pi}{2} \leq y \leq \pi$ (D) $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
- (6) $\sin(\sec^{-1} x + \operatorname{cosec}^{-1} x) =$ _____ (Where $|x| \geq 1$)
(A) 0 (B) 1 (C) $\frac{1}{\sqrt{2}}$ (D) -1
- (7) $\sin^{-1}(\sin 3) =$ _____.
(A) 3 (B) $\pi - 3$ (C) $3 - \pi$ (D) π



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- (8) Which of the given values of x and y make the following pair of matrices equal

$$\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}, \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$$

- (A) $x = \frac{-1}{3}, y = 7$ (B) Not possible to find (C) $y = 7, x = \frac{-2}{3}$ (D) $x = \frac{-1}{3}, y = -\frac{2}{3}$

- (9) If $A = \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$ and $A + A^T + \sqrt{3} I = O$, then the value of α is = _____

- (A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$ (C) $\frac{2\pi}{3}$ (D) $\frac{5\pi}{6}$

- (10) For $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is $A^2 = I$, then _____

- (A) $1 + \alpha^2 + \beta\gamma = 0$ (B) $1 - \alpha^2 + \beta\gamma = 0$ (C) $1 - \alpha^2 - \beta\gamma = 0$ (D) $1 + \alpha^2 - \beta\gamma = 0$

- (11) If $y = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ and $2x + y = \begin{bmatrix} 1 & 0 \\ -3 & 2 \end{bmatrix}$, then $x =$ _____

- (A) $\begin{bmatrix} -1 & -1 \\ -2 & 1 \end{bmatrix}$ (B) $-\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} -1 & -1 \\ 2 & -1 \end{bmatrix}$ (D) $-\begin{bmatrix} 1 & 1 \\ -3 & 1 \end{bmatrix}$

- (12) The area of triangle whose vertices are (3, 8) (-4, 2) and (5, 1) is _____

- (A) 61 (B) $\frac{61}{2}$ (C) $\frac{9}{2}$ (D) $\frac{89}{2}$

- (13) If $A = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$, then $A^{-1} =$ _____

- (A) $\begin{bmatrix} \frac{1}{3} & 0 & 0 \\ 0 & \frac{1}{4} & 0 \\ 0 & 0 & \frac{1}{5} \end{bmatrix}$ (B) $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ (C) $\begin{bmatrix} -3 & 0 & 0 \\ 0 & -4 & 0 \\ 0 & 0 & -5 \end{bmatrix}$ (D) $60 \begin{bmatrix} \frac{1}{3} & 0 & 0 \\ 0 & \frac{1}{4} & 0 \\ 0 & 0 & \frac{1}{5} \end{bmatrix}$

- (14) The cofactor of 4 for determinant $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$ is _____

- (A) 13 (B) -13 (C) 30 (D) 27

- (15) Function $f(x)$ is defined by $f(x) = \begin{cases} ax+1 & x \leq 3 \\ bx+3 & x > 3 \end{cases}$ is continuous at $x = 3$ then _____

- (A) $a - b = \frac{2}{3}$ (B) $b - a = \frac{2}{3}$ (C) $a = b + \frac{3}{2}$ (D) $a = b - \frac{3}{2}$



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- (16) $\frac{d}{dx} (\tan x^\circ) =$ _____
 (A) $\sec^2 x^\circ$ (B) $\sec^2 x^\circ \tan^2 x^\circ$ (C) $\frac{\pi}{180} \sec^2 x^\circ$ (D) $\frac{180}{\pi} \sec^2 x^\circ$
- (17) If $x = a \cos^3 \Theta$ and $y = a \sin^3 \Theta$ then $\frac{dy}{dx} =$ _____.
 (A) $\tan \Theta$ (B) $-\cot \Theta$ (C) $\sqrt[3]{\frac{y}{x}}$ (D) $-\sqrt[3]{\frac{y}{x}}$
- (18) If $f(x) = x^2 + ax + 1$ is increasing on $[1, 2]$, then smallest value of a is _____.
 (A) -2 (B) -3 (C) -4 (D) -5
- (19) The slope of normal to the curve $y = 3x^4 - 4x$ at $x = 4$ is _____.
 (A) 764 (B) $\frac{-1}{764}$ (C) $\frac{-1}{674}$ (D) 1
- (20) The point on the curve $x^2 = 2y$ which is nearest to the point $(0, 5)$ is _____.
 (A) $(2\sqrt{2}, 4)$ (B) $(2\sqrt{2}, 0)$ (C) $(0, 0)$ (D) $(2, 2)$
- (21) The line $y = mx + 1$ is a tangent to the curve $y^2 = 4x$ then $2m =$ _____.
 (A) 2 (B) 4 (C) 6 (D) 1
- (22) If $\frac{d}{dx} f(x) = 4x^3 - \frac{3}{x^4}$ and $f(2) = 0$, then $f(x) =$ _____.
 (A) $x^4 + \frac{1}{x^3} - \frac{129}{8}$ (B) $x^3 + \frac{1}{x^4} + \frac{129}{8}$ (C) $x^4 + \frac{1}{x^3} + \frac{129}{8}$ (D) $x^3 + \frac{1}{x^4} - \frac{129}{8}$
- (23) $\int \frac{x^5 - 1}{x - 1} dx =$ _____ + c
 (A) $\sum_{i=1}^6 \frac{x^i}{i}$ (B) $\sum_{i=1}^4 \frac{x^i}{i}$ (C) $\sum_{i=1}^5 \left(\frac{x^i}{i}\right)$ (D) $\sum_{i=1}^5 (i \cdot x^i)$
- (24) $\int (\cos x + \sin x) \left(1 - \frac{1}{2} \sin x \cos x\right) \sec^2 x \operatorname{cosec}^2 x dx =$ _____.
 (A) $\operatorname{cosec} x + \sec x$ (B) $\operatorname{cosec} x - \sec x$ (C) $-\operatorname{cosec} x + \sec x$ (D) $-\operatorname{cosec} x - \cot x$
- (25) $\int \frac{dx}{\sin^4 x \sec^2 x} dx =$ _____ + c
 (A) $-\frac{\cot^3 x}{3}$ (B) $\frac{\cot^3 x}{3}$ (C) $\frac{\tan^3 x}{3}$ (D) $-3 \cot^3 x$
- (26) $\int \frac{dx}{\sqrt{e^x - 1}} =$ _____ + C
 (A) $2\sqrt{e^x - 1}$ (B) $\frac{1}{2}\sqrt{e^x - 1}$ (C) $-2 \operatorname{cosec}^{-1} e^{\frac{x}{2}}$ (D) $2 \sec^{-1} (e^x)$



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(27) $\int_{\frac{1}{3}}^1 \frac{(x-x^3)^{\frac{1}{3}}}{x^4} dx$ નું મૂલ્ય = _____

- (A) 6 (B) 0 (C) 3 (D) 4

(28) $\int_{\log \frac{1}{2}}^{\log 2} \log \left(\frac{5-x}{5+x} \right) dx = \text{_____}$

- (A) 0 (B) $2 \log 5$ (C) $\frac{1}{2} \log 5$ (D) $-2 \log 5$

(29) $\int_{-2}^3 |x| dx = \text{_____}$

- (A) 0 (B) $\frac{13}{2}$ (C) $\frac{9}{2}$ (D) $\frac{15}{2}$

(30) Area bounded by $y^2 = 4x$ and its latusrectum is _____

- (A) $\frac{8}{3} a^2$ (B) $\frac{4}{3} a^2$ (C) $\frac{8}{3}$ (D) $\frac{4}{3}$

(31) Area bounded by $y = \sin x : x = -\pi$ to $x = 2\pi$ and x -axis is _____

- (A) 4 (B) 6 (C) 8 (D) 2

(32) Area bounded by $4x^2 + 9y^2 = 1$ is _____

- (A) 6π (B) 12π (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{12}$

(33) The number of arbitrary constants in the general solution of a differential equation of fourth order are _____

- (A) 0 (B) 2 (C) 3 (D) 4

(34) The order and degree of differential equation $e^{\frac{d^2y}{dx^2}} = x$ are _____ respectively.

- (A) 2 and not defined (B) 1 and 1
(C) 1 and 2 (D) 2 and 1

(35) The general solution of $\frac{dy}{dx} = (1+x^2)(1+y^2)$ is _____

- (A) $\tan^{-1} x + \tan^{-1} y = C$ (B) $\tan^{-1} x - \tan^{-1} y = C$
(C) $\tan^{-1} y - x - \frac{x^3}{3} = C$ (D) $\tan^{-1} x - y - \frac{y^3}{3} = C$

(36) The magnitude of the unit vector in the opposite direction of sum of vectors

$\vec{a} = 2\hat{i} + 2\hat{j} - 5\hat{k}$ and $\vec{b} = 2\hat{i} + \hat{j} + 3\hat{k} = \text{_____}$.

- (A) -1 (B) 1 (C) $\sqrt{29}$ (D) $-\sqrt{29}$



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- (37) For vectors \vec{a} and \vec{b} if $|\vec{a}| = 2$ and $|\vec{b}| = 3$ and $\vec{a} \cdot \vec{b} = 4$, then $|\vec{a} - \vec{b}| =$ _____
 (A) 13 (B) $\sqrt{13}$ (C) 5 (D) $\sqrt{5}$
- (38) For non-null vectors \vec{x} and \vec{y} which one is not possible ?
 (A) $|\vec{x} \cdot \vec{y}| = |\vec{x}| |\vec{y}|$ (B) $|\vec{x} + \vec{y}| = |\vec{x}| + |\vec{y}|$
 (C) $|\vec{x} + \vec{y}| < |\vec{x}| + |\vec{y}|$ (D) $|\vec{x} + \vec{y}| > |\vec{x}| + |\vec{y}|$
- (39) If vectors $\vec{a} = x\hat{i} + 2\hat{j} + z\hat{k}$ and $\vec{b} = 2\hat{i} + y\hat{j} + \hat{k}$ are equal, then $x + y - z =$ _____
 (A) 5 (B) 4 (C) 3 (D) 0
- (40) For non-null vectors \vec{a} and \vec{b} if $|\vec{a} + \vec{b}| = |\vec{a}|$ then vectors $2\vec{a} + \vec{b}$ and \vec{b} are _____
 (A) Paralled (B) Perpendicular (C) Collinear (D) Equal
- (41) If inner products of vector \vec{a} with vectors $2\hat{i} + 7\hat{j}$ and $\hat{i} + \hat{j} + \hat{k}$ are -1, 6 and 5 respectively, then $\vec{a} =$ _____
 (A) $3\hat{i} + 2\hat{k}$ (B) $3\hat{i} + \hat{j} + 2\hat{k}$ (C) $\hat{i} + 3\hat{j} + 2\hat{k}$ (D) $\hat{i} + \hat{j} + \hat{k}$
- (42) The co-ordinates of foot of perpendicular from origin to the plane $2x - 3y + 4z - 6 = 0$ are _____
 (A) $\left(\frac{12}{29}, \frac{-18}{29}, \frac{24}{29}\right)$ (B) $\left(\frac{12}{\sqrt{29}}, \frac{-18}{\sqrt{29}}, \frac{24}{\sqrt{29}}\right)$
 (C) $\left(\frac{6}{\sqrt{29}}, \frac{-9}{\sqrt{29}}, \frac{12}{\sqrt{29}}\right)$ (D) $\left(\frac{6}{29}, \frac{-9}{29}, \frac{12}{29}\right)$
- (43) If lines $\frac{x+3}{a} = \frac{y-1}{5} = \frac{z+3}{4}$ and $\frac{x+1}{1} = \frac{4-y}{-1} = \frac{z-5}{2}$ are perpendicular, then $a =$ _____
 (A) 13 (B) -13 (C) 3 (D) -3
- (44) Distance between the two planes : $2x + 3y + 4z - 4 = 0$ and $4x + 6y + 8z - 12 = 0$ is _____
 (A) 2 units (B) 4 units (C) 8 units (D) $\frac{2}{\sqrt{29}}$ units
- (45) Objective function of an LP problem is _____.
 (A) a constant (B) a function to be optimized (C) an inequality (D) a quadratic equation.
- (46) In solving the LP problems : "Maximize $Z = 8000x + 12000y$ subject to
 $9x + 12y \leq 180$, $3x + 4y \leq 60$, $x + 3y \leq 30$, $x \geq 0$ and $y \geq 0$ " which one (point) is not a point of feasible region ?
 (A) (20, 0) (B) (12, 6) (C) (12, 0) (D) (0, 15)



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- (47) In solving the LP problems : “Minimize $Z=6x + 10y$ subject to $x \geq 6, y \geq 2, 2x + y \geq 10, x \geq 0, y \geq 0$ redundant constraints are _____ .
- (A) $x \geq 6, y \geq 2$ (B) $2x + y \geq 10, x \geq 0, y \geq 0$ (C) $x \geq 6$ (D) $x \geq 6, y \geq 0$
- (48) A family has two children. What is the probability that both the children are boys given that at least one of them is a boy ?
- (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{2}{3}$ (D) $\frac{1}{2}$
- (49) If E and F are independent events and $P(E) \neq 0, P(F) \neq 0$, then _____ is false.
- (A) $P(E/F) = P(E)$ (B) $P(F^1 / E) = 1 - P(F/E)$
(C) $P(E^1 / F^1) = 1 - P(E)$ (D) $P(E^1 / F^1) = 1 - P(E/F)$
- (50) If four letters are inserted randomly in four covers, what is the probability that exactly three letters are in proper cover ?
- (A) 0 (B) $\frac{1}{24}$ (C) $\frac{1}{3}$ (D) $\frac{1}{4}$



Time : 2 Hours

PART-B

Maximum Marks : 50

- Instructions :**
- (1) Write in a clear legible hand writing.
 - (2) There are three sections A, B, and C in Part-B.
 - (3) All the questions are compulsory and general options are given in each section.
 - (4) The numbers at the right side represent the marks of the sections.
 - (5) Start new section on new page.
 - (6) Maintain Sequence of questions in the section.
 - (7) Use of simple calculator and log table is allowed, if required.
 - (8) Use the graph paper in the questions of linear programming, if required.

Section-A

- **Answer any 8 questions from given following questions no. 1 to 12. [16]**
(Each carry 2 marks)

- (1) Prove that $\frac{9\pi}{8} - \frac{9}{4} \sin^{-1} \frac{1}{3} = \frac{9}{4} \sin^{-1} \frac{2\sqrt{2}}{3}$
- (2) Prove that $\tan^{-1} \sqrt{x} = \frac{1}{2} \cos^{-1} \left(\frac{1-x}{1+x} \right)$, where $x \in [0, 1]$
- (3) Differentiate $\sqrt{\frac{(x-3)(x^2+4)}{3x^2+4x+5}}$ w. r. t. x
- (4) Find $\int \frac{(x+1)(x+\log x)^2}{x} dx$
- (5) Find the area bounded by the curve $y = 4x^2$ and lines $y = 1, y = 4$
- (6) Find the area lying in the first quadrant and bounded by the circle $x^2 + y^2 = 4$ and lines $x = 0, x = 2$
- (7) Find the equation of a curve passing through the point $(-2, 3)$, given that the slope of the tangent to the curve at any point (x, y) is $\frac{2x}{y}$
- (8) If a unit vector \vec{a} makes angle $\frac{\pi}{3}$ with \hat{i} , $\frac{\pi}{4}$ with \hat{j} and acute angle Θ with \hat{k} , then find Θ and hence the components of \vec{a} .
- (9) Determine whether the lines $\frac{x}{2} = \frac{y}{2} = \frac{z}{1}$ and $\frac{x-5}{4} = \frac{y-2}{1} = \frac{z-8}{8}$ are coplanar or not ?
- (10) Find the shortest distance between the lines whose vector equations are $\vec{r} = (1-t)\hat{i} + (t-2)\hat{j} + (3-2t)\hat{k}$ and $\vec{r} = (s+1)\hat{i} + (2s-1)\hat{j} - (2s+1)\hat{k}$
- (11) Three cards are drawn successively without replacement from a pack of 52 well shuffled cards. What is the probability that first two cards are kings and the third card drawn is an ace ?
- (12) Evaluate $P(A \cup B)$, if $2P(A) = P(B) = \frac{5}{13}$ and $P(A/B) = \frac{2}{5}$



Section-B

- **Answer any 6 questions from given following question no. 12 to 21. [18]**
(Each carry 3 marks)

- (13) Show that the function $f: \mathbb{R}^* \rightarrow \mathbb{R}^*$, defined by $f(x) = \frac{1}{x}$ is one-one and onto, where \mathbb{R}^* is the set of all non-zero real numbers. Is the result true, if the domain \mathbb{R}^* is replaced by \mathbb{N} with Co-domain being same as \mathbb{R}^* ?
- (14) Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$. Find a matrix D such that $CD - AB = O$ where O is 2×2 zero matrix.
- (15) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, show that $A^2 - 5A + 7I = O$. Hence find A^{-1} .
- (16) If $y = (\tan x)^2$, show that $(x^2 + 1)^2 y_2 + 2x(x^2 + 1) y_1 = 2$.
- (17) Find the intervals in which the function f given by $f(x) = 2x^3 - 3x^2 - 36x + 7$ is (a) strictly increasing (b) strictly decreasing.
- (18) If $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j}$ are such that, $\vec{a} + \lambda\vec{b}$ is perpendicular to \vec{c} , then find the value of λ .
- (19) Find the vector equation of the line passing through the point (1, 2, -4) and perpendicular to the two lines : $\frac{x-8}{3} = \frac{y+19}{-16} = \frac{z-10}{7}$ and $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$
- (20) Solve the following linear programming problem graphically,
Minimize and Maximize $z = 9x + 3y$
Subject to the constraints : $x + 3y \leq 60$, $x + y \geq 10$, $x \leq y$, $x \geq 0$, $y \geq 0$.
- (21) Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that
(i) both balls are red.
(ii) First ball is black and second is red.

Section-C

- **Answer any 4 questions from given following question no. 22 to 27. [16]**
(Each carry 4 marks)

- (22) Express the matrix $B = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrix.



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(23) Show that

$$\Delta = \begin{vmatrix} (y+z)^2 & xy & zx \\ xy & (x+z)^2 & yz \\ xz & yz & (x+y)^2 \end{vmatrix} = 2xyz(x+y+z)^3$$

(24) Find $\frac{dy}{dx}$, if $y^x + x^y = a^b$.

(25) A rectangular sheet of tin 45 cm by 24 cm is to be made into a box without top, by cutting off square from each corner and folding up the flaps. What should be the side of the square to be cut off so that the volume of the box is maximum?

(26) Evaluate $\int_0^{\pi} \frac{xdx}{a^2 \cos^2 x + b^2 \sin^2 x}$

(27) Solve the differential equation.

$$\frac{dy}{dx} + \frac{y(x+y)}{x^2} = 0$$

...



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For Academic year 2020-21 STD.-12 (SCIENCE STREAM) CHEMISTRY (052) ANNUAL EXAM

TIME : 3 Hours

SCHEME OF QUESTION PAPER

Total Marks - 100

NOTE : This blueprint is for the guidance of students, Teachers, Examiners, Moderators etc. The moderators, Teachers and experts in higher secondary of the respective subject may do essential changes keeping the objectives in mind.

Weightage as per objective :

Objectives	Knowledge (K)	Understanding (U)	Application (A)	Higher order thinking skill		Total Marks
				Synthesis Analysis	Inference Evaluative	
Part-A Mark	05	13	17	08	07	50
Part-B Mark	05	15	15	08	07	50
Total Mark (%)	10	28	32	16	14	100

Weightage as per type of question : PART-A

No.	Type of Question	No. of Question	Total Marks
1.	Multiple choice questions (MCQs)	50	50

Weightage as per type of question : PART-B

No.	Type of Question	No. of Question		Total Marks
1.	Short Answer Type (SA-I)	08	12	16
2.	Short Answer Type (SA-II)	06	09	18
3.	Long Answer Type (LA)	04	06	16
	Total	18	27	50

Weightage as per Chapter :

No.	Name of Chapter	Chapterwise Weightage			Unitwise Weightage
		PART-A	PART-B		
	PART - I	Mark	General Optional	Total Marks with Option	
1.	The Solid State	4	3	5	Unit-1 36
2.	Solutions	5	4	4	
3.	Electrochemistry	4	5	5	
4.	General Principles and Processes of Isolation of Elements	2	2	4	
5.	The p-Block Elements	3	4	6	
6.	Haloalkanes and Haloarenes	4	5	5	Unit-2 26
7.	Alcohols, Phenols and Ethers	4	3	7	
	PART - II				
1.	Chemical Kinetics	3	2	6	Unit-3 38
2.	Surface Chemistry	4	2	5	
3.	The d-and f-Block Elements	2	3	5	
4.	Coordination Compounds (Complex salts)	3	7	7	
5.	Aldehydes, Ketones and Caboxylic Acids	4	4	7	
6.	Amines (N-containing compounds)	4	2	5	
7.	Biomolecules	4	4	4	
8.	Polymers	-	-	-	
9.	Chemistry in Everyday Life	-	-	-	
Total Marks		50	50	75	100

Note : Chapter weightage may be change for different question paper. But unit weightage can not be change.



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For Academic year 2020-21 STD.-12 (SCIENCE STREAM) CHEMISTRY (052) ANNUAL EXAM

TIME : 3 Hours

SCHEME OF QUESTION PAPER

Total Marks - 100

No. Of Question	Information of Section and Question	Marks
1 to 50	PART - A Multiple choice type 50 questions of 1 mark each	50
1 to 12	PART - B	16
	SECTION - A	
	Short Answer Type Questions (SA-I) Write any 8 out of 12 questions (Each of 2 marks)	
13 to 21	SECTION - B	18
	Short Answer Type Questions (SA-II) Write any 6 out of 9 questions (Each of 3 marks)	
22 to 27	SECTION - C	16
	Long Answer type questions (LA) Write any 4 out of 6 questions (Each of 4 marks)	
	Total Marks	100

- Note :**
- Time first one hour for Part-A
 - Time remaining two hours for Part-B
 - Questions from cancelled syllabus/topics not to be asked for the year 2020-21.



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For Academic year 2020-21
STD.-12 (SCIENCE STREAM) CHEMISTRY (052)
ANNUAL EXAM

Time : 3 Hour

SCHEME OF QUESTION PAPER

Total Marks : 100

Time : 1 Hour

PART - A

Total Marks : 50

- Instructions:** (1) There are 50 objective type (M.C.Q.) questions in Part-A and all questions are compulsory.
(2) The questions are serially numbered form 1 to 50 and each carries 1 mark.
(3) Read each question carefully, select proper option and answer in the OMR Sheet.
(4) The OMR Sheet is given for answering the questions. The answer of each question is represented by (A) O, (B) O, (C) O, (D) O. Darken the circle ● of the correct answer with ball-pen.
(5) Rough work is to be done in the space provided for this purpose in the Test Booklet only.
(6) Set No. of question paper printed on the upper-most right side of the question paper is to be written in the column provided in the OMR Sheet.
(7) Use of simple calculator and log table is allowed if required.
(8) Notations used in this question paper have proper meaning.

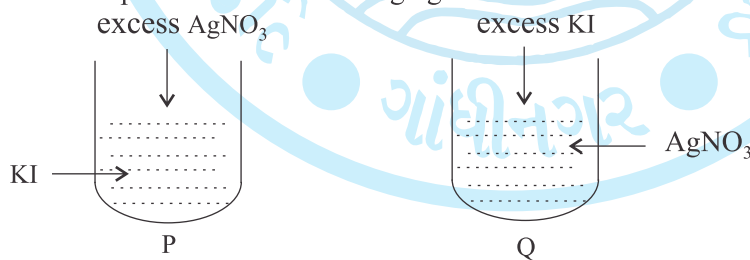
● Select proper choice from the given multiple choices. Each of one mark.

- (1) An Ionic Solid A^+B^- Crystallise like rock salt if all atoms along one body diagonal are removed then what is the formula of substance ?
(A) $A_{12}B_{15}$ (B) $A_{12}B_{17}$ (C) $A_{13}B_{15}$ (D) $A_{13}B_{14}$
- (2) Which of the following defect is not exhibited by NaCl ?
(A) Schottky defect (B) F Center (C) Impurity defect (D) Frenkel defect
- (3) In which of the following compounds crystal have axial distance relation is different from others ?
(A) KNO_3 (B) HgS (C) $K_2Cr_2O_7$ (D) $S_8(m)$
- (4) In Which pair both compounds are amorphous solids.
(A) Teflon and Naphthalene (B) Iodine and quartz
(C) Polyurethane and fiber glass (C) Dry ice and Ammonium sulphate
- (5) What will be osmotic pressure (bar) of 3 % W/V aqueous solution of urea (molar mass 60 g mol^{-1}) at 300 K ?
(A) 1.23 (B) 24.6 (C) 0.082 (D) 12.3
- (6) Which of the following solution has highest freezing point under identical conditions ?
(A) 0.05 m Urea (B) 0.02 m Urea (C) 0.1 m Urea (D) 0.2 m Urea
- (7) What will be the molefraction of I_2 in 0.2 m I_2 nonaqueous solution in benzene ?
(A) 0.015 (B) 0.20 (C) 0.85 (D) 0.025
- (8) Which value changes with change in temperature for solution having nonvolatile solute ?
(A) % w/w (B) Molality (C) Molarity (D) Molefraction
- (9) The % w/w of solvent in 40 % w/w NaOH solution is
(A) 60 % (B) 66.6 % (C) 40 % (D) 44.8 %
- (10) How many Faradays are needed to reduce 10 mole of $Cr_2O_7^{2-}$ to Cr^{3+}
(A) 60 (B) 30 (C) 10 (D) 5
- (11) The Saturated solution of which salt can be filled in salt bridge ?
(A) KNO_2 (B) $AgNO_3$ (C) $LiNO_3$ (D) KNO_3



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- (12) The value of E° cell of following cell reaction will be expressed as.
 $2\text{Ag} + \text{Cu}^{2+} \rightarrow 2\text{Ag}^{1+} + \text{Cu}$
 $E^\circ \text{Ag}^+/\text{Ag} = x \text{ V}$ and $E^\circ \text{Cu}^{2+}/\text{Cu} = y \text{ V}$
 (A) $y - x$ (B) $y - 2x$ (C) $2x - y$ (D) $x - y$
- (13) In which metal vessel a CuSO_4 be filled ?
 $E^\circ \text{Cu}/\text{Cu}^{2+} = -0.34 \text{ V}$, $E^\circ \text{Ag}/\text{Ag}^+ = -0.80 \text{ V}$, $E^\circ \text{Zn}^{2+}/\text{Zn} = -0.76 \text{ V}$,
 $E^\circ \text{Ni}^{2+}/\text{Ni} = -0.25 \text{ V}$, $E^\circ \text{Fe}^{2+}/\text{Fe} = -0.44 \text{ V}$
 (A) Ag (B) Zn (C) Fe (D) Ni
- (14) For a molecularity of reaction, the acceptable value is :
 (A) 0 (B) -2 (C) 1.5 (D) 2
- (15) If the value of rate constant of certain reaction is $1.75 \times 10^{-2} \text{ mol}^{-2} \text{ L S}^{-1}$ then, its order of reaction will be :
 (A) Zero (B) First (C) Second (D) Third
- (16) The rate of a gaseous reaction is expressed as : $\text{Rate} = K[\text{A}]^2[\text{B}]^0$. If this is a gaseous reaction and its volume is suddenly doubled at constant temperature, then its rate will change as.
 (A) Decreases four times (B) Increases two times
 (C) Increases eight times (D) Decreases two times
- (17) Which of the following is an example of adsorption ?
 (A) NH_3 gas in contact with water (B) Piece of cotton cloth in contact with water
 (C) Anhy CaCl_2 in contact with water (D) Silica gel in contact with water vapours
- (18) Under similar conditions, which gas will be adsorbed maximum on activated charcoal ?
 (A) CO_2 (B) NH_3 (C) HCL (D) H_2
- (19) Chese is a type of colloided solution.
 (A) Solid - Liquid (B) Liquid - Solid (C) Solid - Solid (D) Liquid - Liquid
- (20) Select correct option based on following figure.


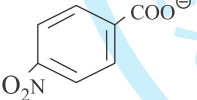
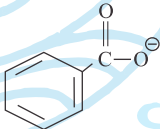


If the colloidal particles of AgI will be obtained, Then.....

- (A) In vessel-P, charge on colloid is +ve (B) In vessel-Q, charge on colloid is -ve
 (C) In vessel-P, charge on colloid is -ve (D) Both (A) and (B)
- (21) In metallurgy of extraction of Ag and Au by using NaCN, the oxidizing agent used is :
 (A) Air (O_2) (B) KNO_3 (C) Zn (D) H_2O_2
- (22) Which of the following metal can be refined by liquation method ?
 (A) Sn (B) Zn (C) Zr (D) Ni
- (23) The correct order of b. Pt. of hydrides is :
 (A) $\text{PH}_3 < \text{AsH}_3 < \text{NH}_3 < \text{PH}_3$ (B) $\text{H}_2\text{O} < \text{H}_2\text{Se} < \text{H}_2\text{S} < \text{H}_2\text{Te}$
 (C) $\text{HF} > \text{HI} > \text{HBr} > \text{HCL}$ (D) $\text{HF} > \text{H}_2\text{O} > \text{NH}_3 > \text{PH}_3$



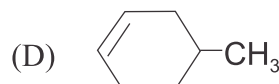
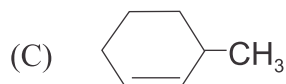
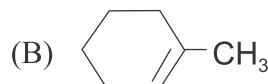
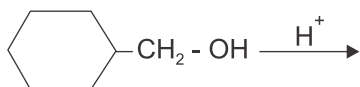
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- (24) Which halide can undergo hydrolysis with water ?
(A) NF_3 (B) SF_6 (C) PF_3 (D) IF_3
- (25) Geometrical shape of XeO_3 is :
(A) Trigonal Pyramidal (B) Planar Triangular
(C) Square Pyramid (D) Tetrahedral
- (26) The correct order of paramagnetic moment is :
(A) $Cr^{3+} < Mn^{3+} < Fe^{3+}$ (B) $Cu^{2+} > Zn^{2+} > Co^{2+}$
(C) $Ti^{2+} < V^{2+} < Co^{2+}$ (D) $Cr^{2+} < Cr^{3+} < Cr^{4+}$
- (27) Which element is not considered as transitional element ?
(A) Fe (B) Cu (C) Zn (D) Sc
- (28) The correct hybridisation of transition metal ion / atom in given complexes is :
(A) $K_4[Ni(CN)_4] \rightarrow sp^3$ (B) $[Ni(NH_3)_6]^{2+} \rightarrow d^2 sp^3$
(C) $[Fe(CO)_5] \rightarrow sp^3 d$ (D) $[Fe(CN)_6]^{4-} \rightarrow sp^3 d^2$
- (29) is a chelating ligand
(A) O^{2-} (B) N^{3-} (C) OX^{2-} (D) CH_3COO^-
- (30) Which compound shows facial isomerism ?
(A) $[Co(NH_3)_6]^{3+}$ (B) $[Co(NH_3)_2Cl_4]^{1-}$
(C) $[Co(NH_3)_4Cl_2]^+$ (D) $[Co(NH_3)_3Cl_3]$
- (31) The maximum stabilization energy is associated with :
(A)  (B) $CH_2=CH-CH_2^-$
(C)  (D) 
- (32) Which of the following cannot act as an electrophile ?
(A) $^+CH_3$ (B) $^+NO_2$ (C) BF_3 (D) CH_3C^+O
- (33) The most stable product obtained in following reaction is :
$$CH_3 - \underset{\substack{| \\ CH_3}}{CH} - CH = CH_2 \xrightarrow{HBr} (?)$$

(A) $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - \underset{\substack{| \\ Br}}{CH} - CH_3$ (C) $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - CH_2 - \underset{\substack{| \\ Br}}{CH_2}$
(B) $CH_3 - \underset{\substack{| \\ CH_3}}{\overset{\substack{Br \\ |}}{C}} - CH_2 - CH_3$ (D) $CH_3 - \underset{\substack{| \\ CH_2Br}}{\overset{\substack{H \\ |}}{C}} - CH_2 - CH_3$
- (34) Which compound does not show optical activity ?
(A) Picric acid (B) Cumene (C) Aspirin (D) Given all



(35) The most stable product of dehydration of:



(36) The number of possible aromatic ethers of compound C₈H₁₀O is :

(A) 4

(B) 5

(C) 6

(D) 3

(37) is an example of allylic alcohol.

(A) prop-2-en-1-ol

(B) ethenol

(C) But-2-en-2-ol

(D) But-3-en-1-ol

(38) Which statement is correct regarding the end product obtained in Reimer-Tiemann reaction ?

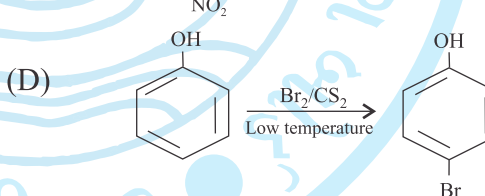
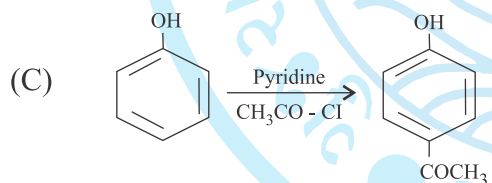
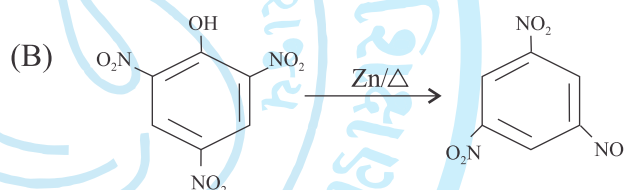
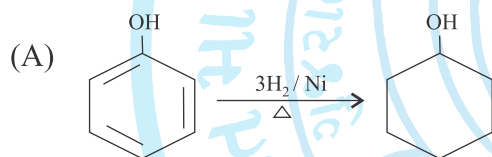
(A) It's IUPAC name is 2-hydroxy phenyl carbaldehyde.

(B) The product obtained when it is heated with Zn dust does not respond towards fehling test.

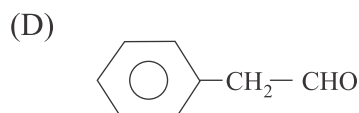
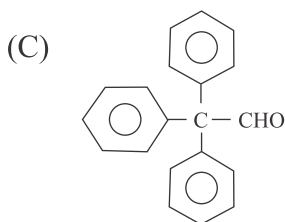
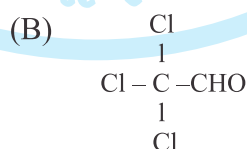
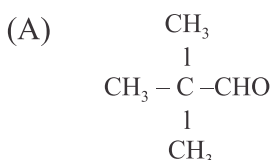
(C) It's reduction by H₂/Pd gives catchol

(D) Its principal functional group is – OH

(39) In which reaction, product is mentioned incorrectly ?



(40) Which compound does not give Cannizzaro reaction ?



(41) Which acid has highest value of PKa ?

(A) CH₃COOH

(B) C₆H₅COOH

(C) HCOOH

(D) ClCH₂COOH



ગુજરાત માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણ બોર્ડ, ગાંધીનગર

- (42) The number of σ and π bonds in isophthalaldehyde molecule respectively are.
(A) 10, 3 (B) 15, 4 (C) 10, 5 (D) 16, 5
- (43) Which compound responds towards carbylamine test ?
(A) p - methyl benzylamine (B) N - methyl - O - methyl ethanamine
(C) N - ethyl - N - methyl ethanamine (D) N, N - dimethyl benzenamine
- (44) Find product "Y" in given reaction.
$$\text{CH}_3\text{CONH}_2 \xrightarrow{\text{Br}_2/\text{KOH}} \text{X} \xrightarrow[\Delta]{\text{CHCl}_3/\text{KOH}} \text{Y}$$

(A) $\text{CH}_3\text{CH}_2\text{CN}$ (B) CH_3CN (C) CH_3NC (D) $\text{CH}_3\text{CH}_2\text{NC}$
- (45) Which of the following amine compound does not give acylation reaction.
(A) $\text{C}_6\text{H}_5\text{NH}_2$ (B) $\text{C}_6\text{H}_5\text{NHCH}_3$ (C) $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2$ (D) $\text{C}_2\text{H}_5\text{NHCH}_3$
- (46) $\text{C}_4\text{H}_{11}\text{N} + \text{HNO}_2 \rightarrow \text{C}_4\text{H}_{10}\text{O}$ (1° alcohol) then the compound $\text{C}_4\text{H}_{10}\text{N}$ will give reaction.
(A) Diazotisation (B) Hoffman (C) Ammonolysis (D) Isocyanide
- (47) Number of chiral -C- atoms in glucose molecule is : _____
(A) 4 (B) 5 (C) 3 (D) 6
- (48) Which amino acid does not have primary amine group ?
(A) Proline (B) Glycine (C) Alanine (D) Glutamic acid
- (49) Which hetero cyclic base is absent in DNA ?
(A) Adanine (B) Guanine (C) Uracil (D) Thymine
- (50) Glucose does not react with.....
(A) HCN (B) NaHSO_3 (C) NH_4OH (D) $\text{C}_6\text{H}_5\text{NHNH}_2$



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Time : 2 hours

PART - B

Total Marks :50

- Instruction :** (1) Write in a clear legible handwriting.
 (2) There are total three sections in A, B and C in Part-B.
 (3) All the section are compulsory and general options are given in each section.
 (4) The numbers at right side represent the marks of the question.
 (5) Start new section on new page.
 (6) Maintain sequence of questions in the section.
 (7) Use of simple calculator and log table is allowed if required.

Section - A

- **Write answer of any 8 questions out 12. (Each of 2 marks)** [16]
- (1) State two difference of points between metallic and ionic crystalline solid.
- (2) Write the equation of reaction at electrodes during electrolysis of aq. CuCl_2 between Pt electrodes.
- (3) Explain pseudo first order reaction with one illustration.
- (4) Give four characteristics of lyophilic colloid.
- (5) Explain method of vapour phase refining of Ni metal with equation.
- (6) Draw the geometrical structures of pyrophosphoric acid and peroxodisulphic acid.
- (7) Give reason : aq. solution of CuSO_4 is coloured. While aq. solution of ZnSO_4 is colourless.
- (8) Describe the method used for concentration of sulphur containing ores.
- (9) Give equation of reaction of preparation of benzyl alcohol from toluene in two steps.
- (10) Prove the presence of -CHO group in glucose molecule by giving equation.
- (11) Explain : Carbylamine reaction with one illustration.
- (12) State the structures of two different dipeptides obtained from glycine and alanine.

Section - B

- **Write answers of any 6 questions of bearing the number 13 to 21. (Each of 3 marks)** [18]
 - (13) Derive the value of packing efficiency of BCC in three dimension.
 - (14) Calculate cell potential at 298 K of following cell. (Cell reaction is necessary)
- $$\text{Pt} | \text{Br}_2(l) | \text{Br}^-(0.01 \text{ M}) || \text{H}^+(0.03 \text{ M}) | \text{H}_{2(g)} | \text{Pt} \quad E^\circ \text{Br}_2 / \text{Br}^- = 1.09 \text{ V.}$$
- 1 bar
- (15) Give the six points of comparison between physical and chemical adsorption.
 - (16) Write balanced chemical equations for the followings.
 - (I) Preparation of Potassium manganate
 - (ii) Effect of heat on potassium permanganate
 - (iii) Reaction of potassium permanganate with I_2 in alkaline medium.
 - (17) Explain giving reason : $[\text{Cr}(\text{NH}_3)_6]^{3+}$ is paramagnetic where as $[\text{Ni}(\text{CN})_4]^{4-}$ is diamagnetic.
 - (18) Write chemical reaction of ethyl chloride with following reagents.
 - (I) KCN
 - (ii) AgCN
 - (iii) KNO_2
 - (19) Give the equations of preparation of ethanal from given compounds.
 - (I) Propene
 - (ii) Ethan nitrile
 - (iii) Methyl ethanoate



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(20) Give IUPAC name of following compounds.



(21) Write only the reaction of HI with give compound



Section - C

- Write answers of any 4 questions as asked from question number 22 to 27. [16]
(Each of 4 marks)

(22) The vapour pressures of chloroform $CHCl_3$ (119.5 g mol^{-1}) and dichloromethane CH_2Cl_2 (85 g mol^{-1}) at 298 K are 200 mm Hg and 415 mm Hg respectively. Calculate the vapour pressure of resulting solution by mixing 25.5 g of $CHCl_3$ and 40 g of CH_2Cl_2 at 298 K.

(23) The following data were obtained for first order reaction of thermal decomposition of $N_2O_5(g)$ at constant volume: $N_2O_5(g) \rightarrow N_2O_4(g) + \frac{1}{2} O_2(g)$

Sr.No.	Time/S	Total pressure (atm)
1.	0	0.50
2.	100	0.51

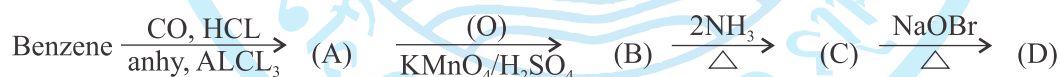
Calculate the rate constant.

(24) (I) Explain : why electron gain enthalpy of chlorine is more than that of fluorine ?
(ii) Why are pentahalides more co valent than that of trihalides of group-15 elements.

(25) Answer the following regarding $(NH_4)_2 [Pt(NH_2)_2(ON)_2]$ complex salt.

- (I) Give IUPAC name of this complex. (ii) Write the co-ordination number of metal
(iii) State number of optical isomers. (iv) State geometrical shape of complex ion

(26) Write only structures of products A, B, C and D formed in following sequential reaction.



(27) (I) Write equation of reaction of production of phenol from cumene.

(ii) Write the equation of reaction to prepare

- (a) Propan-1-ol from formaldehyde
(b) Propan-2-ol from acetaldehyde