(NOT TO BE OPENED BEFORE TIME OR TILL ASKED TO DO SO)

(BPH–EE–2019)

10157

Sr. No._____

Code **A**

SET–"Z"

Time : 1¼ Hours (75 minutes) Total Questions : 130 Max. Marks : 100

Candidate's Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Roll No. _____ (in figure)_____ (in words)

Date of Examination : _____

(Signature of the Invigilator) (Signature of the candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

1. **All questions under Part–A and Part–B are compulsory. Part–C is optional. The candidates may attempt either Optional Part–C (i) OR Optional Part–C(ii). All questions carry equal marks i.e. one mark each.**
2. The candidate MUST return this question book-let and the OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such candidate will not be evaluated.
3. The candidate MUST NOT do any rough work OR writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself.
4. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
5. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
6. **Use only Blue or Black <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.**
7. **There will be no negative marking. Each correct answer will be awarded one full mark Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE QUESTION BOOK-LETS. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER THE START OF EXAMINATION.

Confidential SEAL Confidential

Question No.	Questions
	Part–A (Physics)
1.	The strength of Weak nuclear force relative to Electromagnetic force is of the order of (1) 10^{-13} (2) 10^{-11} (3) 10^{13} (4) 10^{11}
2.	*Parsec* is unit of (1) Mass (2) Length (3) Time (4) Frequency
3.	If radius of earth contracts by 2% of its actual value and mass of earth remains same then the acceleration due to gravity will (1) Decrease by 2% (2) Decrease by 4% (3) Increase by 2% (4) Increase by 4%
4.	The position of an object moving along X-axis is given by $x = A + Bt^2$, where A = 10 m, B = 2.5 ms^{-2}, and t is measured in seconds. The average velocity of this object between t = 1 s and t = 3 s is (1) 10 ms^{-1} (2) 15 ms^{-1} (3) 20 ms^{-1} (4) 25 ms^{-1}
5.	A ball is thrown at a speed 28 ms^{-1} in a direction 30° above the horizontal. The maximum height attained by the ball will be (1) 25 m (2) 20 m (3) 10 m (4) 5 m

Question No.	Questions
6.	A small insect enters the eye of person riding a bike, the person then applies sudden brakes to his bike without rubbing his eye and he found that the small insect got out of his eye. By which law of physics the small insect got out of eye (1) Newton's third law of motion (2) Newton's second law of motion (3) Newton's first law of motion (4) Newton's law of Gravitation
7.	Two bodies with masses m_1 and m_2 ($m_1 > m_2$) are joined by a massless string passing over fixed pulley. The centres of gravity of the two masses are initially at same height. Assume the pulley to be weightless. Then the downward acceleration of mass m_1 is (1) $\frac{m_1}{m_1+m_2}g$ (2) $\frac{m_2}{m_1+m_2}g$ (3) $\frac{m_1-m_2}{m_1+m_2}g$ (4) $\left[\frac{m_1-m_2}{m_1+m_2}\right]^2 g$
8.	A block of mass 1 kg lies on a horizontal surface in a truck. The coefficient of static friction between the block and the surface is 0.6. If the acceleration of truck is 5 ms^{-2}, the frictional force acting on the block is (1) 4 N (2) 5 N (3) 6 N (4) 10 N
9.	Two balls of different mass have same kinetic energy. The ball having greater momentum will be (1) Heavier one (2) Lighter one (3) Both have same (4) Can't say
10.	The moment of inertia of a ring of mass M and radius R about an axis through the diameter in its plane will be (1) 0.5 MR^2 (2) MR^2 (3) 1.5 MR^2 (4) 2 MR^2

Question No.	Questions
11.	A thin uniform circular discuss rolling down an inclined plane of inclination 30° without slipping. Its linear acceleration along the plane is (1) g/4 (2) g/3 (3) g/2 (4) 2g/3
12.	A projectile, fired vertically upwards with a speed v escapes from the earth. If it is to be fired at 45° to the horizontal, what should be its speed so that it escapes from the earth ? (1) v (2) $v/\sqrt{2}$ (3) $\sqrt{2}\,v$ (4) 2v
13.	Which of the following substances has negligible elastic fatigue ? (1) glass (2) copper (3) quartz (4) silver
14.	The modulus of rigidity of water is (1) zero (2) 1 (3) 81 (4) infinite
15.	The surface tension does not depend upon (1) Nature of liquid (2) Temperature (3) Presence of impurity (4) Atmospheric Pressure

Question No.	Questions
16.	A sample of oxygen and a sample of hydrogen have same mass, volume and pressure. The ratio of their absolute temperature is (1) 1/16 (2) 1/4 (3) 4 (4) 16
17.	The internal energy of a gas will increase when it (1) Expands adiabatically (2) Is compressed adiabatically (3) Expands isothermally (4) Is compressed isothermally
18.	If the absolute temperature of a perfect black body be doubled, then the quantity of heat radiated per second increases by (1) Two times (2) Four times (3) Eight times (4) Sixteen times
19.	The time period of a particle undergoing S.H.M. is 16 s. It starts its motion from mean position. After 2 s, its velocity is 0.4 ms^{-1}, the amplitude is (1) 2.88 m (2) 1.44 m (3) 0.72 m (4) 0.36 m
20.	The speed of wave represented by $y = A \sin(\omega - kx)$ is (1) k/ω (2) ω/k (3) ωk (4) $1/\omega k$

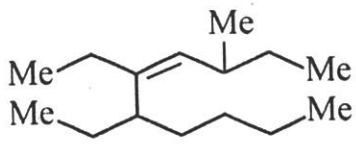
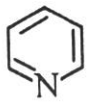
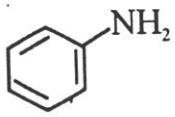
Question No.	Questions
21.	Two iron spheres, A (a solid sphere) and B (a hollow sphere), are charged to same potential. Which of the two hold more energy ? (1) A (2) B (3) Both have same (4) Can't be predicted
22.	Two bulbs A and B of 25 watt and 100 watt, respectively, rated at 220 V, are connected in series with a supply of 440 V. Which bulb will fuse ? (1) A (2) B (3) Both will fuse (4) None will fuse
23.	When a charge particle moves through a magnetic field, it may suffer a change in (1) Energy (2) Mass (3) Speed (4) Velocity
24.	Two electrons are moving parallel to each other in free space, then the force between them will be (1) Attractive (2) Repulsive (3) No force (4) Can't say anything
25.	Current used for electrolysis is (1) D.C. (2) A.C. (3) Both of these (4) None of these

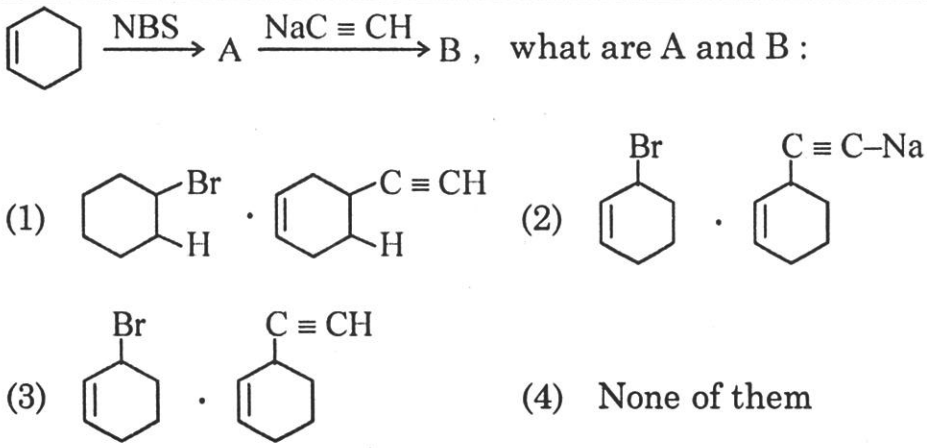
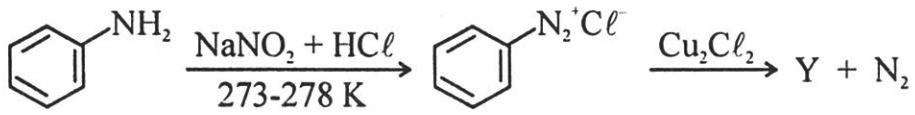
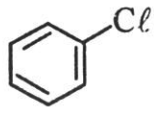
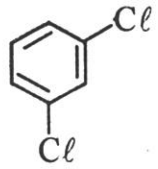
Question No.	Questions
26.	Lenz's law in electromagnetic induction follows law of conservation of (1) Charge (2) Energy (3) Linear momentum (4) Angular momentum
27.	Resistance offered by a Capacitor to D.C. is (1) zero (2) negative (3) positive (4) infinite
28.	Mechanical analogue of inductance is (1) Displacement (2) Velocity (3) Energy (4) Mass
29.	The classification of Electromagnetic spectrum is roughly based upon (1) How the waves are produced (2) How the waves are detected (3) Both (1) and (2) (4) Wavelength of waves
30.	If the atmosphere of earth suddenly disappears then duration of day will (1) Increase by 4 minutes (2) Decrease by 4 minutes (3) No change (4) Can't be predicted

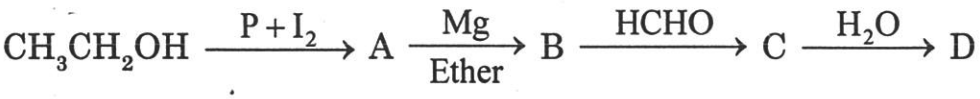
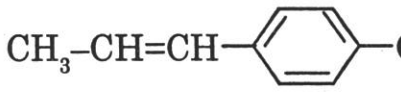
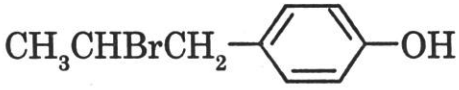
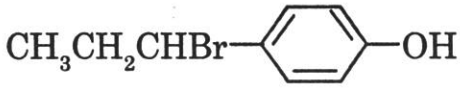
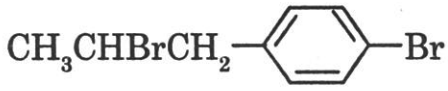
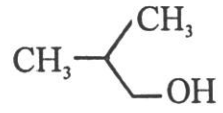
Question No.	Questions
31.	The blue colour of sky is due to (1) Reflection of light (2) Refraction of light (3) Scattering of light (4) Diffraction of light
32.	If two coherent sources of intensity ratio 25:1 interfere, then the ratio of intensity of maxima and minima in the interference pattern will be (1) 3:2 (2) 9:4 (3) 5:1 (4) 25:1
33.	Nuclear force between two nucleons depends on their (1) Mass (2) Charge (3) Spin (4) Both (2) and (3)
34.	Charge on a n-type semiconductor is (1) Zero (2) Negative (3) Positive (4) 10^{-6} coulomb
35.	If a zener diode has 9.1 V break down voltage with a maximum power dissipation of 273 mW, then maximum current that can pass through zener diode is (1) 40 mA (2) 30 mA (3) 20 mA (4) 10 mA

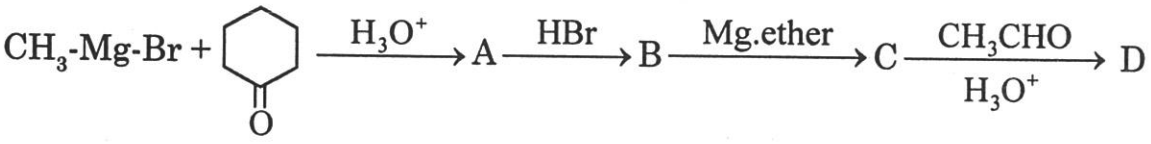
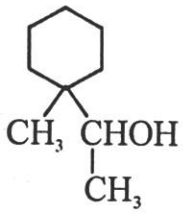
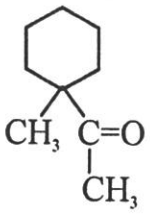
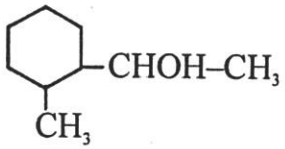
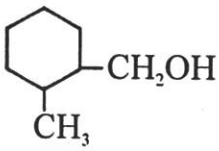
Question No.	Questions
	Part–B (Chemistry)
36.	25 mL of a solution of $Ba(OH)_2$ on titration with 0.1 M solution of $HC\ell$ gave a titre value of 35 mL. The molarity of barium hydroxide solution was (1) 0.07 (2) 0.14 (3) 0.28 (4) 0.35
37.	Identify the least stable among the following : (1) Li^- (2) Be^- (3) B^- (4) C^-
38.	The correct order of size among $C\ell$, $C\ell^+$ and $C\ell^-$ is (1) $C\ell^+ < C\ell^- < C\ell$ (2) $C\ell^+ > C\ell^- > C\ell$ (3) $C\ell^+ < C\ell < C\ell^-$ (4) $C\ell^- < C\ell < C\ell^+$
39.	The geometry of $C\ell O_4^-$ ion is : (1) Pyramidal (2) Tetrahedral (3) Trigonal Planar (4) Trigonal bipyramidal
40.	The number of orbitals in a subshell is equal to (1) $2\ell - 1$ (2) 2ℓ (3) ℓ^2 (4) $2\ell + 1$

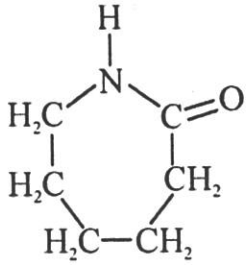
Question No.	Questions
41.	The term that accounts for intramolecular force in van der Waal's equation for non-ideal gas is (1) RT (2) $V - b$ (3) $P + \frac{a}{V^2}$ (4) $(RT)^{-1}$
42.	Which one of the following is not applicable to the phenomena of absorption (1) $\Delta H > 0$ (2) $\Delta G < 0$ (3) $\Delta S < 0$ (4) $\Delta H < 0$
43.	Which one of the following is a positively charged sol (1) Gold sol (2) As_2S_3 sol (3) Methylene blue sol (4) Gelatin
44.	What is the normality of 1 M H_3PO_2 solution ? (1) 0.5 N (2) 1.0 N (3) 2.0 N (4) 3.0 N
45.	A cricket ball 0.5 Kg is moving with a velocity of 100 ms^{-1}. The wavelength associated with its motion is : (1) 1/100 cm (2) 6.6×10^{-34} m (3) 1.32×10^{-35} m (4) 6.6×10^{-28} m

Question No.	Questions
46.	Ortho and para hydrogen differ in (1) atomic number (2) mass number (3) electron spin in two atoms (4) nuclear spin in two atoms
47.	Which of the following carbonates is least stable (1) $MgCO_3$ (2) Na_2CO_3 (3) K_2CO_3 (4) Rb_2CO_3
48.	The IUPAC name of the  Structure is : (1) 2,4,5-triethyl-3-nonene (2) 5,6-diethyl-3-methyl-4-decene (3) 2,4,6-triethyl-3-octene (4) 3-ethyl-5-methyl-3-heptene
49.	The strongest base among the following is : (1)  (2)  (3)  (4) 
50.	The number of σ-and Π-bonds present in pent-4-ene-1-yne is : (1) 10, 3 (2) 4, 9 (3) 3, 10 (4) 9, 4

Question No.	Questions
51.	Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3COCH_3 ? (1) $CH_3CH_2CH=C(CH_3)_2$ (2) $CH_3CH_2CH=CHCH_2CH_3$ (3) $CH_3CH_2CH=CHCH_3$ (4) $CH_3C(CH_3)=CHCH_3$
52.	
53.	Identify the compound Y in the following reaction :  (1)  (2)  (3)  (4) 
54.	Which reagent will you use for the following reaction ? $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2C\ell + CH_3CH_2CHC\ell CH_3$ (1) $C\ell_2$ / UV light (2) $NaC\ell + H_2SO_4$ (3) $C\ell_2$ gas in dark (4) $C\ell_2$ gas in the presence of iron in dark

Question No.	Questions
55.	In the following sequence of reaction :  The compound D is : (1) Butanal (2) n- butyl alcohol (3) n- propyl alcohol (4) Propanal
56.	The reaction of  with HBr gives : (1)  (2)  (3)  (4) 
57.	Among the following the one that gives positive Idoform test upon reaction with I_2 and NaOH is : (1) $CH_3CH_2CH(OH)CH_2CH_3$ (2) $C_6H_5CH_2CH_2OH$ (3)  (4) $PhCHOHCH_3$

Question No.	Questions
58.	In the following sequence of reaction, identify the final product :  (1)  (2)  (3)  (4) 
59.	The correct order of increasing acidic strength is - (1) Phenol < Ethanol < Chloroacetic acid < Acetic acid (2) Ethanol < Phenol < Chloroacetic acid < Acetic acid (3) Ethanol < Phenol < Acetic acid < Chloroacetic acid (4) Chloroacetic acid < Acetic acid < Phenol < Ethanol
60.	Among the following which one does not act as an intermediate in Hofmann rearrangement ? (1) RNCO (2) RCON: (3) RCON:HBr (4) RNC

Question No.	Questions
61.	Electrolytic reduction of nitrobenzene in weakly acidic medium gives : (1) Aniline (2) Nitosobenzene (3) N-phenylhydroxylamine (4) p-hydroxyaniline
62.	The efficiency of fuel cell is given by (1) $\frac{\Delta G}{\Delta S}$ (2) $\frac{\Delta G}{\Delta H}$ (3) $\frac{\Delta S}{\Delta G}$ (4) $\frac{\Delta H}{\Delta G}$
63.	Thymine is : (1) 5-methyluracil (2) 4-methyluracil (3) 3-methyluracil (4) 1-methyluracil
64.	If the rate of the reaction is equal to the rate constant, the order of the reaction is (1) 0 (2) 1 (3) 2 (4) 3
65.	Which of the following polymer can be formed by using the following monomer unit ?  (1) Nylon 6, 6 (2) Nylon 2-nylon 6 (3) Melamine polymer (4) Nylon-6

Question No.	Questions
66.	Which of the following is not a target molecule for drug function in body ? (1) Carbohydrates (2) Lipids (3) Vitamins (4) Proteins
67.	The pollutants released by jet aeroplane in the atmosphere as fluorocarbons are called (1) Photochemical oxidants (2) Photochemical reductants (3) Aerosols (4) Physical pollutants
68.	Which of the following pairs has the same size ? (1) Zn^{2+}, Hf^{4+} (2) Fe^{2+}, Ni^{2+} (3) Zr^{4+}, Ti^{4+} (4) Zr^{4+}, Hf^{4+}
69.	The coordination number and oxidation state number of Cr in $K_3Cr(C_2O_4)_3$ are respectively (1) 3 and + 3 (2) 3 and 0 (3) 6 and + 3 (4) 4 and + 2
70.	Ionic solids, with Schottky defects, contain in their structure (1) Cation vacancies only (2) Cation vacancies and interstitial cations (3) Equal number of cation and anion vacancies (4) Anion vacancies and interstitial anions

Question No.	Questions
	Part–C {Opt. (i)} (Mathematics)
71.	If A and B are any two sets, then $A - B \neq$ (1) $B \cap A'$ (2) $A \cap B'$ (3) $(A' \cup B)'$ (4) None of these
72.	Let R be the relation of the set R of all real numbers defined by aRb iff $\|a - b\| \leq 1$. Then R is (1) reflexive and symmetric (2) symmetric only (3) transitive only (4) anti-symmetric only
73.	If $f(x) = \frac{x-1}{x+1}$, then $f\left(\frac{1}{f(x)}\right)$ equals : (1) 0 (2) 1 (3) x (4) $1/x$
74.	Which of the following is correct ? (1) $\sin 1^\circ > \sin 1$ (2) $\sin 1^\circ < \sin 1$ (3) $\sin 1^\circ = \sin 1$ (4) $\sin 1^\circ = \frac{\pi}{180} \sin 1$.
75.	The cube roots of unity lie on a circle (1) $\|z - 1\| = 1$ (2) $\|z + 1\| = 1$ (3) $\|z\| = 1$ (4) None of these

Question No.	Questions
76.	Area of the triangle formed by 3 complex numbers $1 + i$, $i - 1$, $2i$ in the Argand plane is (1) $\frac{1}{2}$ (2) 1 (3) $\sqrt{2}$ (4) 2
77.	If the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common, then the value of k is : (1) 3 (2) -3 (3) 4 (4) None of these
78.	The solution of the equation $1 + \|x - 1\| \geq 0$ is : (1) $(-\infty, 0)$ (2) $(-2, 0)$ (3) $(0, \infty)$ (4) $(0, 2)$
79.	12 persons are to be arranged to a round table. If two particular persons among them are not to be side by side, the total number of arrangements is : (1) 9 (10 !) (2) 2 (10 !) (3) 2 (11 !) (4) 10 !
80.	The positive integer just greater than $(1 + 0.0001)^{10000}$ is (1) 3 (2) 4 (3) 5 (4) None of these

Question No.	Questions
81.	If H be the HM between a and b, then the value of $\frac{H}{a}+\frac{H}{b}$ is (1) $\frac{ab}{a+b}$ (2) $\frac{a+b}{ab}$ (3) 2 (4) None of these
82.	The straight lines $x + y = 0$, $3x + y - 4 = 0$, $x + 3y - 4 = 0$ form a triangle which is : (1) right angled (2) equilateral (3) isosceles (4) none of these
83.	The circle $x^2 + y^2 + 4x - 7y + 12 = 0$ cuts an intercept on y-axis is of length : (1) 3 (2) 4 (3) 7 (4) 1
84.	The value of $\lim_{x\to\infty}\left(\frac{x+3}{x-1}\right)^{x+3}$ is (1) e (2) e^2 (3) e^3 (4) e^4
85.	If there are 6 girls and 5 boys who sit in a row, then the probability that no two boys sit together is : (1) $\frac{6!\,7!}{2!\,11!}$ (2) $\frac{5!\,7!}{2!\,11!}$ (3) $\frac{6!\,6!}{2!\,11!}$ (4) None of these

Question No.	Questions
86.	The one which is the measure of central tendency is : (1) co-efficient of correlation (2) standard deviation (3) mean deviation (4) mode
87.	If S be a finite set containing n elements. The the total number of binary operations on S is : (1) n^n (2) 2^{n^2} (3) n^2 (4) n^{n^2}
88.	The solution of the equation $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \pi/2$ is : (1) $x = 1$ (2) $x = -1$ (3) $x = 0$ (4) $x = \pi$
89.	If A = [a b], B = [– b – a] and C = $\begin{bmatrix} a \\ -a \end{bmatrix}$, then the correct statement is : (1) $A = -B$ (2) $A + B = A - B$ (3) $AC = BC$ (4) $CA = CB$
90.	The value of λ and μ for which the system of equations $x + y + z = 6$, $x + 2y + 3z = 10$ and $x + 2y + \lambda z = \mu$ have unique solution are : (1) $\lambda \neq 3, \mu \in R$ (2) $\lambda = 3, \mu = 10$ (3) $\lambda \neq 3, \mu = 10$ (4) $\lambda \neq 3, \mu \neq 10$

Question No.	Questions
91.	The largest value of a third order determinant whose elements are 0 or 1 is : (1) 3 (2) 2 (3) 1 (4) 0
92.	The set of all points, where the function $f(x) = \frac{x}{1+\|x\|}$ is differentiable is : (1) $(0, \infty)$ (2) $(-\infty, \infty)$ (3) $(-\infty, 0) \cup (0, \infty)$ (4) None of these
93.	The function f (x) is defined by $f(x) = \begin{cases} \frac{\|x+2\|}{\tan^{-1}(x+2)}, & x \neq -2 \\ 2, & x = -2 \end{cases}$, then f (x) is : (1) continuous at $x = -2$ (2) differentiable at $x = -2$ (3) not continuous at $x = -2$ (4) continuous but not derivable at $x = -2$
94.	If $\int \frac{\cos 4x + 1}{\cot x - \tan x} dx = A \cos 4x + B$, then (1) $A = -1/8$ (2) $A = -1/4$ (3) $A = -1/2$ (4) -1
95.	The area of the figure bounded by $y = \sin x$, $y = \cos x$ in the first quadrant is : (1) $2(\sqrt{2}-1)$ (2) $\sqrt{3}+1$ (3) $2(\sqrt{3}-1)$ (4) None of these

Question No.	Questions
96.	The order of the differential equation whose solution is $y = a \cos x + b \sin x + c\, e^{-x}$ is (1) 2 (2) 1 (3) 3 (4) None of these
97.	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then value of $(\vec{r}.\hat{i})\hat{i} + (\vec{r}.\hat{j})\hat{j} + (\vec{r}.\hat{k})\hat{k}$ is (1) 0 (2) $3\vec{r}$ (3) $8\vec{r}$ (4) $\vec{r}$
98.	The vectors $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $a\hat{i} + b\hat{j} + c\hat{k}$ are perpendicular when : (1) $a = 2, b = 3, c = 4$ (2) $a = 4, b = 4, c = -2$ (3) $a = 5, b = 4, c = 4$ (4) $a = 4, b = 4, c = 5$
99.	A fair coin is tossed 100 times. The probability of getting tails an odd number of times is : (1) $\frac{3}{8}$ (2) $\frac{1}{2}$ (3) $\frac{1}{8}$ (4) None of these
100.	The equation $\lvert\vec{r}\rvert^2 - 2(\vec{r}.\vec{a}) + \lambda = 0$ represents a (1) plane (2) straight line (3) sphere (4) none of these

Question No.	Questions
	Part–C {Opt. (ii)} (Biology)
101.	Genetic engineering is connected with (1) Eugenics (2) Euthenics (3) Euphenics (4) All of these
102.	Some people who have suffered from a disease may not be affected again during their life time ; such immunity is called (1) Natural immunity (2) Acquired immunity (3) Innate immunity (4) Passive immunity
103.	Raw cheese is known as (1) Blue cheese (2) Cottage cheese (3) Swiss cheese (4) None of these
104.	Cell division cannot be stopped in which phase of the cell cycle ? (1) G_1-Phase (2) G_2-Phase (3) S-Phase (4) Prophase
105.	What type of plant is formed when colchicine is used in the process of development of Raphanobrassica ? (1) Autotetraploid (2) Haploid (3) Triploid (4) Allotetraploid

Question No.	Questions
106.	Synapsis occurs between (1) mRNA and ribosomes (2) male and female gametes (3) Two homologous chromosomes (4) Spindle fibers and centromere
107.	A nitrogen fixing microbe associated with *Azolla* in rice fields is (1) Frankia (2) Tolypothrix (3) Spirulina (4) Anabaena
108.	A patient brought to a hospital with myocardial infarction is normally immediately given (1) Cyclosporin-A (2) Statins (3) Penicillin (4) Streptokinase
109.	Rotenone is (1) A bioherbicide (2) A natural insecticide (3) An insect hormone (4) A natural herbicide
110.	Variation in gene frequencies within populations can occur by chance rather than by natural selection. This is referred to as (1) Genetic flow (2) Genetic drift (3) Random mating (4) Genetic load

Question No.	Questions
111. ✓	The tendency of population to remain in genetic equilibrium may be disturbed by (1) Random mating (2) Lack of migration (3) Lack of mutation (4) Lack of random mating
112.	If two pea plants having red (Dominant) colored flowers with unknown genotypes are crossed, 75% of the flowers are red and 25% are white. The genotypic constitution of the parents having red colored flowers will be (1) Both heterozygous (2) One homozygous and other heterozygous (3) Both homozygous (4) Both hemizygous
113.	The deposition of lipids on the wall lining the lumen of large and medium sized arteries is referred to as (1) Osteoarthritis (2) Osteoporosis (3) Stokes-Adams Syndrome (4) Atherosclerosis
114.	Which of the following matches correctly ? (1) Pulmonary artery – Carries deoxygenated blood to the lungs (2) Superior vena cava – Receives deoxygenated blood from the lower body and organs (3) Inferior vena cava – Receives deoxygenated blood from the head and body (4) Hepatic artery – carries deoxygenated blood to the gut

Question No.	Questions
115.	The function of leghemoglobin in the root nodules of legumes is (1) Oxygen removal (2) Inhibition of nitrogenase activity (3) Expression of nif gene (4) Nodule differentiation
116.	GIFT (Gamete intrafallopian transfer) mixes egg and sperm in the _____ (1) Fallopian tube (2) Uterus (3) Vagina (4) Culture medium
117.	An example of merocrine gland is _____ (1) Sebaceous gland (2) Pineal gland (3) Salivary gland (4) Mammary gland
118.	ATPase enzyme needed for muscle contraction is located in _____ (1) Actinin (2) Troponin (3) Myosin (4) Actin
119.	Casparian strips are present in the _____ of the root. (1) Pericycle (2) Cortex (3) Epiblema (4) Endodermis

Question No.	Questions
120.	The inner, darker and harder portion of secondary xylem that cannot conduct water, in an older dicot stem, is called (1) Bast (2) Alburnum (3) Duramen (4) Wood
121.	Seed coat is not thin, membranous in (1) Groundnut (2) Coconut (3) Maize (4) Gram
122.	Lenticels are involved in (1) Transportation (2) Gaseous exchange (3) Food transport (4) Photosynthesis
123.	Insect mouthparts are adapted for different functions in different species. Mouthparts of houseflies are used for (1) Siphoning (2) Piercing and sucking (3) Sponging and lapping (4) Biting and chewing
124.	The first enzyme to be purified and crystalized was (1) Urease (2) Diastase (3) Insulin (4) Zymase

Question No.	Questions
125.	Many enzymes are secreted in inactive form to protect (1) Cell membrane (2) Mitochondria (3) Cell proteins (4) Cell DNA
126.	An action potential in the nerve fiber is produced when positive and negative charges on outside and the inside of the axon membrane are reversed because (1) All potassium ions leave the axon (2) More potassium ions enter the axon as compared to sodium ions leaving it (3) More sodium ions enter the axon as compared to potassium ions leaving it (4) All soidum ions enter the axon
127.	Sequence of taxonomic categories is (1) Divison – Class – Order – Family – Tribe – Genus – Species (2) Class – Phylum – Tribe – Order – Family – Genus – Species (3) Phylum – Order – Class – Tribe – Family – Genus – Species (4) Division – Class – Family – Tribe – Order – Genus – Species
128.	In the five-kingdom system of classification, which single kingdom out of the following can include blue green algae, nitrogen-fixing bacteria and methanogenic archaebacteria ? (1) Protista (2) Fungi (3) Monera (4) Plantae

Question No.	Questions
129.	Methanogens are (1) Obligate anaerobic bacteria (2) Aerobic fungi (3) Aerobic bacteria (4) Obligate anaerobic fungi
130.	Noise is measured using sound meter and the unit is (1) Hertz (2) Decibel (3) Joule (4) Sound

(NOT TO BE OPENED BEFORE TIME OR TILL ASKED TO DO SO)

(BPH–EE–2019)

Code **B**

Sr. No. 10158

SET–"Z"

Time : 1¼ Hours (75 minutes) Total Questions : 130 Max. Marks : 100

Candidate's Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Roll No. _____ (in figure) _____ (in words)

Date of Examination : _____

(Signature of the Invigilator) (Signature of the candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

1. **All questions under Part–A and Part–B are compulsory. Part–C is optional. The candidates may attempt either Optional Part–C (i) OR Optional Part–C(ii). All questions carry equal marks i.e. one mark each.**
2. The candidate MUST return this question book-let and the OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such candidate will not be evaluated.
3. The candidate MUST NOT do any rough work OR writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself.
4. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
5. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
6. **Use only Blue or Black <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.**
7. **There will be no negative marking. Each correct answer will be awarded one full mark Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE QUESTION BOOK-LETS. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER THE START OF EXAMINATION.

Confidential SEAL

Question No.	Questions
	Part–A (Physics)
1.	The blue colour of sky is due to (1) Reflection of light (2) Refraction of light (3) Scattering of light (4) Diffraction of light
2.	If two coherent sources of intensity ratio 25:1 interfere, then the ratio of intensity of maxima and minima in the interference pattern will be (1) 3:2 (2) 9:4 (3) 5:1 (4) 25:1
3.	Nuclear force between two nucleons depends on their (1) Mass (2) Charge (3) Spin (4) Both (2) and (3)
4.	Charge on a n-type semiconductor is (1) Zero (2) Negative (3) Positive (4) 10^{-6} coulomb
5.	If a zener diode has 9.1 V break down voltage with a maximum power dissipation of 273 mW, then maximum current that can pass through zener diode is (1) 40 mA (2) 30 mA (3) 20 mA (4) 10 mA

Question No.	Questions
6.	Lenz's law in electromagnetic induction follows law of conservation of (1) Charge (2) Energy (3) Linear momentum (4) Angular momentum
7.	Resistance offered by a Capacitor to D.C. is (1) zero (2) negative (3) positive (4) infinite
8.	Mechanical analogue of inductance is (1) Displacement (2) Velocity (3) Energy (4) Mass
9.	The classification of Electromagnetic spectrum is roughly based upon (1) How the waves are produced (2) How the waves are detected (3) Both (1) and (2) (4) Wavelength of waves
10.	If the atmosphere of earth suddenly disappears then duration of day will (1) Increase by 4 minutes (2) Decrease by 4 minutes (3) No change (4) Can't be predicted

Question No.	Questions
11.	Two iron spheres, A (a solid sphere) and B (a hollow sphere), are charged to same potential. Which of the two hold more energy ? (1) A (2) B (3) Both have same (4) Can't be predicted
12.	Two bulbs A and B of 25 watt and 100 watt, respectively, rated at 220 V, are connected in series with a supply of 440 V. Which bulb will fuse ? (1) A (2) B (3) Both will fuse (4) None will fuse
13.	When a charge particle moves through a magnetic field, it may suffer a change in (1) Energy (2) Mass (3) Speed (4) Velocity
14.	Two electrons are moving parallel to each other in free space, then the force between them will be (1) Attractive (2) Repulsive (3) No force (4) Can't say anything
15.	Current used for electrolysis is (1) D.C. (2) A.C. (3) Both of these (4) None of these

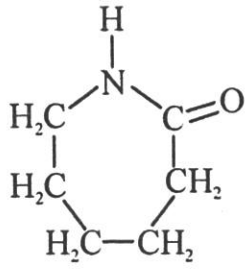
Question No.	Questions
16.	A thin uniform circular discuss rolling down an inclined plane of inclination 30° without slipping. Its linear acceleration along the plane is (1) g/4 (2) g/3 (3) g/2 (4) 2g/3
17.	A projectile, fired vertically upwards with a speed v escapes from the earth. If it is to be fired at 45° to the horizontal, what should be its speed so that it escapes from the earth ? (1) v (2) $v/\sqrt{2}$ (3) $\sqrt{2}\,v$ (4) 2v
18.	Which of the following substances has negligible elastic fatigue ? (1) glass (2) copper (3) quartz (4) silver
19.	The modulus of rigidity of water is (1) zero (2) 1 (3) 81 (4) infinite
20.	The surface tension does not depend upon (1) Nature of liquid (2) Temperature (3) Presence of impurity (4) Atmospheric Pressure

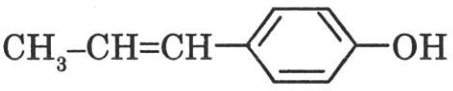
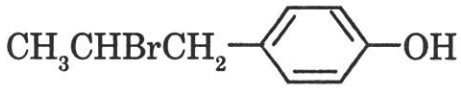
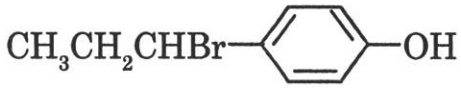
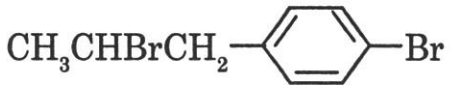
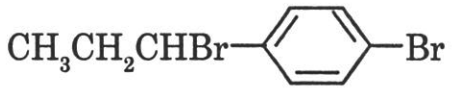
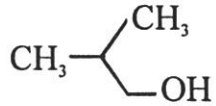
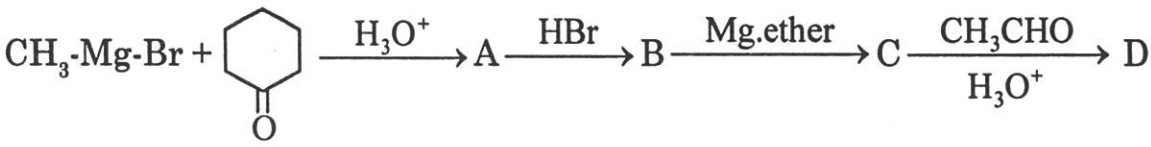
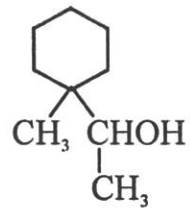
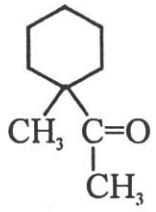
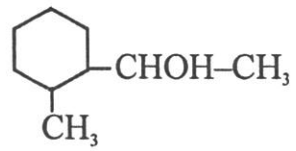
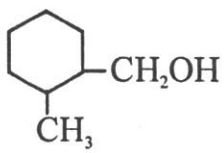
Question No.	Questions
21.	A small insect enters the eye of person riding a bike, the person then applies sudden brakes to his bike without rubbing his eye and he found that the small insect got out of his eye. By which law of physics the small insect got out of eye (1) Newton's third law of motion (2) Newton's second law of motion (3) Newton's first law of motion (4) Newton's law of Gravitation
22.	Two bodies with masses m_1 and m_2 ($m_1 > m_2$) are joined by a massless string passing over fixed pulley. The centres of gravity of the two masses are initially at same height. Assume the pulley to be weightless. Then the downward acceleration of mass m_1 is (1) $\frac{m_1}{m_1+m_2}g$ (2) $\frac{m_2}{m_1+m_2}g$ (3) $\frac{m_1-m_2}{m_1+m_2}g$ (4) $\left[\frac{m_1-m_2}{m_1+m_2}\right]^2 g$
23.	A block of mass 1 kg lies on a horizontal surface in a truck. The coefficient of static friction between the block and the surface is 0.6. If the acceleration of truck is 5 ms^{-2}, the frictional force acting on the block is (1) 4 N (2) 5 N (3) 6 N (4) 10 N
24.	Two balls of different mass have same kinetic energy. The ball having greater momentum will be (1) Heavier one (2) Lighter one (3) Both have same (4) Can't say
25.	The moment of inertia of a ring of mass M and radius R about an axis through the diameter in its plane will be (1) 0.5 MR^2 (2) MR^2 (3) 1.5 MR^2 (4) 2 MR^2

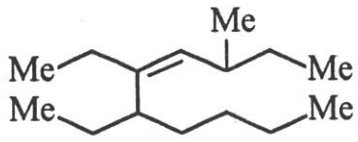
Question No.	Questions
26.	The strength of Weak nuclear force relative to Electromagnetic force is of the order of (1) 10^{-13} (2) 10^{-11} (3) 10^{13} (4) 10^{11}
27.	*Parsec* is unit of (1) Mass (2) Length (3) Time (4) Frequency
28.	If radius of earth contracts by 2% of its actual value and mass of earth remains same then the acceleration due to gravity will (1) Decrease by 2% (2) Decrease by 4% (3) Increase by 2% (4) Increase by 4%
29.	The position of an object moving along X-axis is given by $x = A + Bt^2$, where A = 10 m, B = 2.5 ms^{-2}, and t is measured in seconds. The average velocity of this object between t = 1 s and t = 3 s is (1) 10 ms^{-1} (2) 15 ms^{-1} (3) 20 ms^{-1} (4) 25 ms^{-1}
30.	A ball is thrown at a speed 28 ms^{-1} in a direction 30° above the horizontal. The maximum height attained by the ball will be (1) 25 m (2) 20 m (3) 10 m (4) 5 m

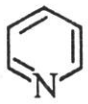
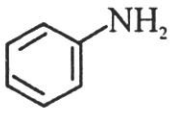
Question No.	Questions
31.	A sample of oxygen and a sample of hydrogen have same mass, volume and pressure. The ratio of their absolute temperature is (1) 1/16 (2) 1/4 (3) 4 (4) 16
32.	The internal energy of a gas will increase when it (1) Expands adiabatically (2) Is compressed adiabatically (3) Expands isothermally (4) Is compressed isothermally
33.	If the absolute temperature of a perfect black body be doubled, then the quantity of heat radiated per second increases by (1) Two times (2) Four times (3) Eight times (4) Sixteen times
34.	The time period of a particle undergoing S.H.M. is 16 s. It starts its motion from mean position. After 2 s, its velocity is 0.4 ms^{-1}, the amplitude is (1) 2.88 m (2) 1.44 m (3) 0.72 m (4) 0.36 m
35.	The speed of wave represented by $y = A \sin(\omega - kx)$ is (1) k/ω (2) ω/k (3) ωk (4) $1/\omega k$

Question No.	Questions
	Part–B (Chemistry)
36.	Which of the following is not a target molecule for drug function in body ? (1) Carbohydrates (2) Lipids (3) Vitamins (4) Proteins
37.	The pollutants released by jet aeroplane in the atmosphere as fluorocarbons are called (1) Photochemical oxidants (2) Photochemical reductants (3) Aerosols (4) Physical pollutants
38.	Which of the following pairs has the same size ? (1) Zn^{2+}, Hf^{4+} (2) Fe^{2+}, Ni^{2+} (3) Zr^{4+}, Ti^{4+} (4) Zr^{4+}, Hf^{4+}
39.	The coordination number and oxidation state number of Cr in $K_3Cr(C_2O_4)_3$ are respectively (1) 3 and + 3 (2) 3 and 0 (3) 6 and + 3 (4) 4 and + 2
40.	Ionic solids, with Schottky defects, contain in their structure (1) Cation vacancies only (2) Cation vacancies and interstitial cations (3) Equal number of cation and anion vacancies (4) Anion vacancies and interstitial anions

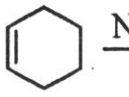
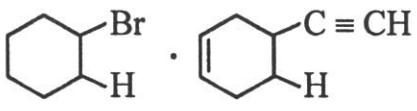
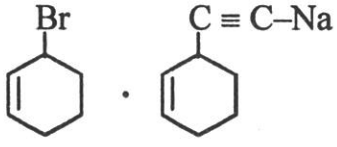
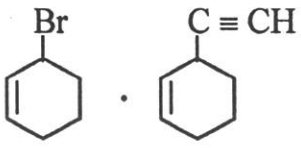
Question No.	Questions
41.	Electrolytic reduction of nitrobenzene in weakly acidic medium gives : (1) Aniline (2) Nitosobenzene (3) N-phenylhydroxylamine (4) p-hydroxyaniline
42.	The efficiency of fuel cell is given by (1) $\frac{\Delta G}{\Delta S}$ (2) $\frac{\Delta G}{\Delta H}$ (3) $\frac{\Delta S}{\Delta G}$ (4) $\frac{\Delta H}{\Delta G}$
43.	Thymine is : (1) 5-methyluracil (2) 4-methyluracil (3) 3-methyluracil (4) 1-methyluracil
44.	If the rate of the reaction is equal to the rate constant, the order of the reaction is (1) 0 (2) 1 (3) 2 (4) 3
45.	Which of the following polymer can be formed by using the following monomer unit ?  (1) Nylon 6, 6 (2) Nylon 2-nylon 6 (3) Melamine polymer (4) Nylon-6

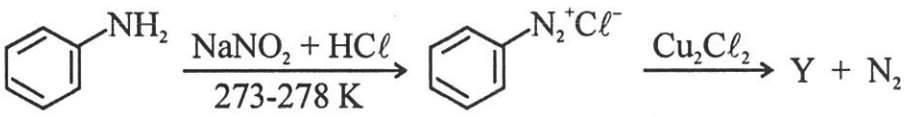
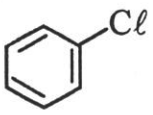
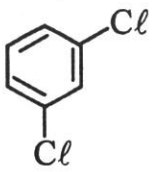
Question No.	Questions
46.	The reaction of  with HBr gives : (1)  (2)  (3)  (4) 
47.	Among the following the one that gives positive Idoform test upon reaction with I_2 and NaOH is : (1) $CH_3CH_2CH(OH)CH_2CH_3$ (2) $C_6H_5CH_2CH_2OH$ (3)  (4) $PhCHOHCH_3$
48.	In the following sequence of reaction, identify the final product :  (1)  (2)  (3)  (4) 

Question No.	Questions
49.	The correct order of increasing acidic strength is - (1) Phenol < Ethanol < Chloroacetic acid < Acetic acid (2) Ethanol < Phenol < Chloroacetic acid < Acetic acid (3) Ethanol < Phenol < Acetic acid < Chloroacetic acid (4) Chloroacetic acid < Acetic acid < Phenol < Ethanol
50.	Among the following which one does not act as an intermediate in Hofmann rearrangement ? (1) RNCO (2) RCON: (3) RCON:HBr (4) RNC
51.	Ortho and para hydrogen differ in (1) atomic number (2) mass number (3) electron spin in two atoms (4) nuclear spin in two atoms
52.	Which of the following carbonates is least stable (1) $MgCO_3$ (2) Na_2CO_3 (3) K_2CO_3 (4) Rb_2CO_3
53.	The IUPAC name of the  Structure is : (1) 2,4,5-triethyl-3-nonene (2) 5,6-diethyl-3-methyl-4-decene (3) 2,4,6-triethyl-3-octene (4) 3-ethyl-5-methyl-3-heptene

Question No.	Questions
54.	The strongest base among the following is : (1)  (2)  (3)  (4) 
55.	The number of σ-and Π-bonds present in pent-4-ene-1-yne is : (1) 10, 3 (2) 4, 9 (3) 3, 10 (4) 9, 4
56.	The term that accounts for intramolecular force in van der Waal's equation for non-ideal gas is (1) RT (2) V – b (3) $P + \frac{a}{V^2}$ (4) $(RT)^{-1}$
57.	Which one of the following is not applicable to the phenomena of absorption (1) $\Delta H > 0$ (2) $\Delta G < 0$ (3) $\Delta S < 0$ (4) $\Delta H < 0$
58.	Which one of the following is a positively charged sol (1) Gold sol (2) As_2S_3 sol (3) Methylene blue sol (4) Gelatin

Question No.	Questions
59.	What is the normality of 1 M H_3PO_2 solution ? (1) 0.5 N (2) 1.0 N (3) 2.0 N (4) 3.0 N
60.	A cricket ball 0.5 Kg is moving with a velocity of 100 ms^{-1}. The wavelength associated with its motion is : (1) 1/100 cm (2) 6.6×10^{-34} m (3) 1.32×10^{-35} m (4) 6.6×10^{-28} m
61.	25 mL of a solution of $Ba(OH)_2$ on titration with 0.1 M solution of $HC\ell$ gave a titre value of 35 mL. The molarity of barium hydroxide solution was (1) 0.07 (2) 0.14 (3) 0.28 (4) 0.35
62.	Identify the least stable among the following : (1) Li^- (2) Be^- (3) B^- (4) C^-
63.	The correct order of size among $C\ell$, $C\ell^+$ and $C\ell^-$ is (1) $C\ell^+ < C\ell^- < C\ell$ (2) $C\ell^+ > C\ell^- > C\ell$ (3) $C\ell^+ < C\ell < C\ell^-$ (4) $C\ell^- < C\ell < C\ell^+$

Question No.	Questions
64.	The geometry of $C\ell O_4^-$ ion is : (1) Pyramidal (2) Tetrahedral (3) Trigonal Planar (4) Trigonal bipyramidal
65.	The number of orbitals in a subshell is equal to (1) $2\ell - 1$ (2) 2ℓ (3) ℓ^2 (4) $2\ell + 1$
66.	Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3COCH_3 ? (1) $CH_3CH_2CH{=}C(CH_3)_2$ (2) $CH_3CH_2CH{=}CHCH_2CH_3$ (3) $CH_3CH_2CH{=}CHCH_3$ (4) $CH_3C(CH_3){=}CHCH_3$
67.	 $\xrightarrow{NBS}$ A $\xrightarrow{NaC \equiv CH}$ B , what are A and B : (1)  (2)  (3)  (4) None of them

Question No.	Questions
68.	Identify the compound Y in the following reaction :  (1)  (2)  (3)  (4) 
69.	Which reagent will you use for the following reaction ? $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2C\ell + CH_3CH_2CHC\ell CH_3$ (1) $C\ell_2$ / UV light (2) $NaC\ell + H_2SO_4$ (3) $C\ell_2$ gas in dark (4) $C\ell_2$ gas in the presence of iron in dark
70.	In the following sequence of reaction : $CH_3CH_2OH \xrightarrow{P+I_2} A \xrightarrow[Ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$ The compound D is : (1) Butanal (2) n- butyl alcohol (3) n- propyl alcohol (4) Propanal

Question No.	Questions
	Part–C {Opt. (i)} (Mathematics)
71.	The order of the differential equation whose solution is $y = a \cos x + b \sin x + c\, e^{-x}$ is (1) 2 (2) 1 (3) 3 (4) None of these
72.	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then value of $(\vec{r}.\hat{i})\hat{i} + (\vec{r}.\hat{j})\hat{j} + (\vec{r}.\hat{k})\hat{k}$ is (1) 0 (2) $3\vec{r}$ (3) $8\vec{r}$ (4) $\vec{r}$
73.	The vectors $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $a\hat{i} + b\hat{j} + c\hat{k}$ are perpendicular when : (1) $a = 2, b = 3, c = 4$ (2) $a = 4, b = 4, c = -2$ (3) $a = 5, b = 4, c = 4$ (4) $a = 4, b = 4, c = 5$
74.	A fair coin is tossed 100 times. The probability of getting tails an odd number of times is : (1) $\frac{3}{8}$ (2) $\frac{1}{2}$ (3) $\frac{1}{8}$ (4) None of these
75.	The equation $\lvert\vec{r}\rvert^2 - 2(\vec{r}.\vec{a}) + \lambda = 0$ represents a (1) plane (2) straight line (3) sphere (4) none of these

Question No.	Questions
76.	The largest value of a third order determinant whose elements are 0 or 1 is : (1) 3 (2) 2 (3) 1 (4) 0
77.	The set of all points, where the function $f(x) = \frac{x}{1+\|x\|}$ is differentiable is : (1) $(0, \infty)$ (2) $(-\infty, \infty)$ (3) $(-\infty, 0) \cup (0, \infty)$ (4) None of these
78.	The function f (x) is defined by $f(x) = \begin{cases} \frac{\|x+2\|}{\tan^{-1}(x+2)}, & x \neq -2 \\ 2, & x = -2 \end{cases}$, then f (x) is : (1) continuous at $x = -2$ (2) differentiable at $x = -2$ (3) not continuous at $x = -2$ (4) continuous but not derivable at $x = -2$
79.	If $\int \frac{\cos 4x + 1}{\cot x - \tan x} dx = A \cos 4x + B$, then (1) $A = -1/8$ (2) $A = -1/4$ (3) $A = -1/2$ (4) -1
80.	The area of the figure bounded by $y = \sin x$, $y = \cos x$ in the first quadrant is : (1) $2(\sqrt{2}-1)$ (2) $\sqrt{3}+1$ (3) $2(\sqrt{3}-1)$ (4) None of these

Question No.	Questions
81.	If A and B are any two sets, then $A - B \neq$ (1) $B \cap A'$ (2) $A \cap B'$ (3) $(A' \cup B)'$ (4) None of these
82.	Let R be the relation of the set R of all real numbers defined by aRb iff $\lvert a - b \rvert \leq 1$. Then R is (1) reflexive and symmetric (2) symmetric only (3) transitive only (4) anti-symmetric only
83.	If $f(x) = \frac{x-1}{x+1}$, then $f\left(\frac{1}{f(x)}\right)$ equals : (1) 0 (2) 1 (3) x (4) $1/x$
84.	Which of the following is correct ? (1) $\sin 1^\circ > \sin 1$ (2) $\sin 1^\circ < \sin 1$ (3) $\sin 1^\circ = \sin 1$ (4) $\sin 1^\circ = \frac{\pi}{180} \sin 1$.
85.	The cube roots of unity lie on a circle (1) $\lvert z - 1 \rvert = 1$ (2) $\lvert z + 1 \rvert = 1$ (3) $\lvert z \rvert = 1$ (4) None of these

Question No.	Questions
86.	If H be the HM between a and b, then the value of $\frac{H}{a}+\frac{H}{b}$ is (1) $\frac{ab}{a+b}$ (2) $\frac{a+b}{ab}$ (3) 2 (4) None of these
87.	The straight lines $x + y = 0$, $3x + y - 4 = 0$, $x + 3y - 4 = 0$ form a triangle which is : (1) right angled (2) equilateral (3) isosceles (4) none of these
88.	The circle $x^2 + y^2 + 4x - 7y + 12 = 0$ cuts an intercept on y-axis is of length : (1) 3 (2) 4 (3) 7 (4) 1
89.	The value of $\lim_{x\to\infty}\left(\frac{x+3}{x-1}\right)^{x+3}$ is (1) e (2) e^2 (3) e^3 (4) e^4
90.	If there are 6 girls and 5 boys who sit in a row, then the probability that no two boys sit together is : (1) $\frac{6!\,7!}{2!\,11!}$ (2) $\frac{5!\,7!}{2!\,11!}$ (3) $\frac{6!\,6!}{2!\,11!}$ (4) None of these

Question No.	Questions
91.	Area of the triangle formed by 3 complex numbers $1 + i$, $i - 1$, $2i$ in the Argand plane is (1) $\frac{1}{2}$ (2) 1 (3) $\sqrt{2}$ (4) 2
92.	If the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common, then the value of k is : (1) 3 (2) -3 (3) 4 (4) None of these
93.	The solution of the equation $1 + \|x - 1\| \geq 0$ is : (1) $(-\infty, 0)$ (2) $(-2, 0)$ (3) $(0, \infty)$ (4) $(0, 2)$
94.	12 persons are to be arranged to a round table. If two particular persons among them are not to be side by side, the total number of arrangements is : (1) 9 (10 !) (2) 2 (10 !) (3) 2 (11 !) (4) 10 !
95.	The positive integer just greater than $(1 + 0.0001)^{10000}$ is (1) 3 (2) 4 (3) 5 (4) None of these

Question No.	Questions
96.	The one which is the measure of central tendency is : (1) co-efficient of correlation (2) standard deviation (3) mean deviation (4) mode
97.	If S be a finite set containing n elements. The the total number of binary operations on S is : (1) n^n (2) 2^{n^2} (3) n^2 (4) n^{n^2}
98.	The solution of the equation $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \pi/2$ is : (1) $x = 1$ (2) $x = -1$ (3) $x = 0$ (4) $x = \pi$
99.	If $A = [a \quad b]$, $B = [-b \quad -a]$ and $C = \begin{bmatrix} a \\ -a \end{bmatrix}$, then the correct statement is : (1) $A = -B$ (2) $A + B = A - B$ (3) $AC = BC$ (4) $CA = CB$
100.	The value of λ and μ for which the system of equations $x + y + z = 6$, $x + 2y + 3z = 10$ and $x + 2y + \lambda z = \mu$ have unique solution are : (1) $\lambda \neq 3, \mu \in R$ (2) $\lambda = 3, \mu = 10$ (3) $\lambda \neq 3, \mu = 10$ (4) $\lambda \neq 3, \mu \neq 10$

Question No.	Questions
	Part–C {Opt. (ii)} (Biology)
101.	An action potential in the nerve fiber is produced when positive and negative charges on outside and the inside of the axon membrane are reversed because (1) All potassium ions leave the axon (2) More potassium ions enter the axon as compared to sodium ions leaving it (3) More sodium ions enter the axon as compared to potassium ions leaving it (4) All soidum ions enter the axon
102.	Sequence of taxonomic categories is (1) Divison – Class – Order – Family – Tribe – Genus – Species (2) Class – Phylum – Tribe – Order – Family – Genus – Species (3) Phylum – Order – Class – Tribe – Family – Genus – Species (4) Division – Class – Family – Tribe – Order – Genus – Species
103.	In the five-kingdom system of classification, which single kingdom out of the following can include blue green algae, nitrogen-fixing bacteria and methanogenic archaebacteria ? (1) Protista (2) Fungi (3) Monera (4) Plantae

Question No.	Questions
104.	Methanogens are (1) Obligate anaerobic bacteria (2) Aerobic fungi (3) Aerobic bacteria (4) Obligate anaerobic fungi
105.	Noise is measured using sound meter and the unit is (1) Hertz (2) Decibel (3) Joule (4) Sound
106.	Seed coat is not thin, membranous in (1) Groundnut (2) Coconut (3) Maize (4) Gram
107.	Lenticels are involved in (1) Transportation (2) Gaseous exchange (3) Food transport (4) Photosynthesis
108.	Insect mouthparts are adapted for different functions in different species. Mouthparts of houseflies are used for (1) Siphoning (2) Piercing and sucking (3) Sponging and lapping (4) Biting and chewing

Question No.	Questions
109.	The first enzyme to be purified and crystalized was (1) Urease (2) Diastase (3) Insulin (4) Zymase
110.	Many enzymes are secreted in inactive form to protect (1) Cell membrane (2) Mitochondria (3) Cell proteins (4) Cell DNA
111.	Genetic engineering is connected with (1) Eugenics (2) Euthenics (3) Euphenics (4) All of these
112.	Some people who have suffered from a disease may not be affected again during their life time ; such immunity is called (1) Natural immunity (2) Acquired immunity (3) Innate immunity (4) Passive immunity
113.	Raw cheese is known as (1) Blue cheese (2) Cottage cheese (3) Swiss cheese (4) None of these

Question No.	Questions
114.	Cell division cannot be stopped in which phase of the cell cycle ? (1) G_1-Phase (2) G_2-Phase (3) S-Phase (4) Prophase
115.	What type of plant is formed when colchicine is used in the process of development of Raphanobrassica ? (1) Autotetraploid (2) Haploid (3) Triploid (4) Allotetraploid
116.	The tendency of population to remain in genetic equilibrium may be disturbed by (1) Random mating (2) Lack of migration (3) Lack of mutation (4) Lack of random mating
117.	If two pea plants having red (Dominant) colored flowers with unknown genotypes are crossed, 75% of the flowers are red and 25% are white. The genotypic constitution of the parents having red colored flowers will be (1) Both heterozygous (2) One homozygous and other heterozygous (3) Both homozygous (4) Both hemizygous
118.	The deposition of lipids on the wall lining the lumen of large and medium sized arteries is referred to as (1) Osteoarthritis (2) Osteoporosis (3) Stokes-Adams Syndrome (4) Atherosclerosis

Question No.	Questions
119.	Which of the following matches correctly ? (1) Pulmonary artery – Carries deoxygenated blood to the lungs (2) Superior vena cava – Receives deoxygenated blood from the lower body and organs (3) Inferior vena cava – Receives deoxygenated blood from the head and body (4) Hepatic artery – carries deoxygenated blood to the gut
120.	The function of leghemoglobin in the root nodules of legumes is (1) Oxygen removal (2) Inhibition of nitrogenase activity (3) Expression of nif gene (4) Nodule differentiation
121.	Synapsis occurs between (1) mRNA and ribosomes (2) male and female gametes (3) Two homologous chromosomes (4) Spindle fibers and centromere
122.	A nitrogen fixing microbe associated with *Azolla* in rice fields is (1) Frankia (2) Tolypothrix (3) Spirulina (4) Anabaena

Question No.	Questions
123.	A patient brought to a hospital with myocardial infarction is normally immediately given (1) Cyclosporin-A (2) Statins (3) Penicillin (4) Streptokinase
124.	Rotenone is (1) A bioherbicide (2) A natural insecticide (3) An insect hormone (4) A natural herbicide
125.	Variation in gene frequencies within populations can occur by chance rather than by natural selection. This is referred to as (1) Genetic flow (2) Genetic drift (3) Random mating (4) Genetic load
126.	GIFT (Gamete intrafallopian transfer) mixes egg and sperm in the _____ (1) Fallopian tube (2) Uterus (3) Vagina (4) Culture medium
127.	An example of merocrine gland is _____ (1) Sebaceous gland (2) Pineal gland (3) Salivary gland (4) Mammary gland

Question No.	Questions
128.	ATPase enzyme needed for muscle contraction is located in _____ (1) Actinin (2) Troponin (3) Myosin (4) Actin
129.	Casparian strips are present in the _____ of the root. (1) Pericycle (2) Cortex (3) Epiblema (4) Endodermis
130.	The inner, darker and harder portion of secondary xylem that cannot conduct water, in an older dicot stem, is called (1) Bast (2) Alburnum (3) Duramen (4) Wood

09/7/19

(NOT TO BE OPENED BEFORE TIME OR TILL ASKED TO DO SO)

(BPH–EE–2019)

10159

Sr. No._____

Code **C**

SET–"Z"

Time : 1¼ Hours (75 minutes) Total Questions : 130 Max. Marks : 100

Candidate's Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Roll No. _____ (in figure)_____ (in words)

Date of Examination : _____

(Signature of the Invigilator) (Signature of the candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

1. **All questions under Part–A and Part–B are compulsory. Part–C is optional. The candidates may attempt either Optional Part–C (i) OR Option Part–C(ii). All questions carry equal marks i.e. one mark each.**
2. The candidate MUST return this question book-let and the OMR Answer-Shee to the Invigilator concerned before leaving the Examination Hall, failing which a cas of use of unfair-means / misbehaviour will be registered against him / her, in addition t lodging of an FIR with the police. Further the answer-sheet of such candidate will nc be evaluated.
3. The candidate MUST NOT do any rough work OR writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself.
4. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
5. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
6. **Use only Blue or Black <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.**
7. **There will be no negative marking. Each correct answer will be awarded one full mark Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE QUESTION BOOK-LETS. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER THE START OF EXAMINATION.

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Question No.	Questions
	Part–A (Physics)
1.	Lenz's law in electromagnetic induction follows law of conservation of (1) Charge (2) Energy (3) Linear momentum (4) Angular momentum
2.	Resistance offered by a Capacitor to D.C. is (1) zero (2) negative (3) positive (4) infinite
3.	Mechanical analogue of inductance is (1) Displacement (2) Velocity (3) Energy (4) Mass
4.	The classification of Electromagnetic spectrum is roughly based upon (1) How the waves are produced (2) How the waves are detected (3) Both (1) and (2) (4) Wavelength of waves
5.	If the atmosphere of earth suddenly disappears then duration of day will (1) Increase by 4 minutes (2) Decrease by 4 minutes (3) No change (4) Can't be predicted

Question No.	Questions
6.	Two iron spheres, A (a solid sphere) and B (a hollow sphere), are charged to same potential. Which of the two hold more energy ? (1) A (2) B (3) Both have same (4) Can't be predicted
7.	Two bulbs A and B of 25 watt and 100 watt, respectively, rated at 220 V, are connected in series with a supply of 440 V. Which bulb will fuse ? (1) A (2) B (3) Both will fuse (4) None will fuse
8.	When a charge particle moves through a magnetic field, it may suffer a change in (1) Energy (2) Mass (3) Speed (4) Velocity
9.	Two electrons are moving parallel to each other in free space, then the force between them will be (1) Attractive (2) Repulsive (3) No force (4) Can't say anything
10.	Current used for electrolysis is (1) D.C. (2) A.C. (3) Both of these (4) None of these

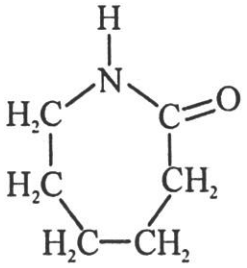
Question No.	Questions
11.	A sample of oxygen and a sample of hydrogen have same mass, volume and pressure. The ratio of their absolute temperature is (1) 1/16 (2) 1/4 (3) 4 (4) 16
12.	The internal energy of a gas will increase when it (1) Expands adiabatically (2) Is compressed adiabatically (3) Expands isothermally (4) Is compressed isothermally
13.	If the absolute temperature of a perfect black body be doubled, then the quantity of heat radiated per second increases by (1) Two times (2) Four times (3) Eight times (4) Sixteen times
14.	The time period of a particle undergoing S.H.M. is 16 s. It starts its motion from mean position. After 2 s, its velocity is 0.4 ms^{-1}, the amplitude is (1) 2.88 m (2) 1.44 m (3) 0.72 m (4) 0.36 m
15.	The speed of wave represented by $y = A \sin(\omega - kx)$ is (1) k/ω (2) ω/k (3) ωk (4) $1/\omega k$

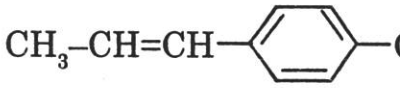
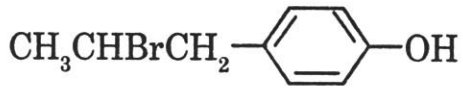
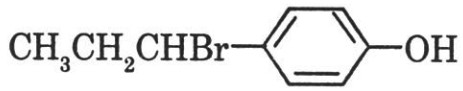
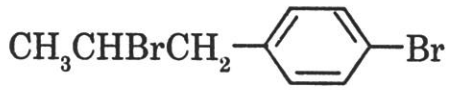
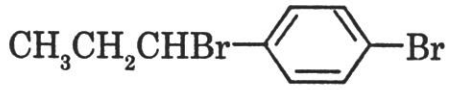
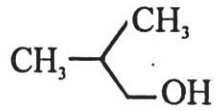
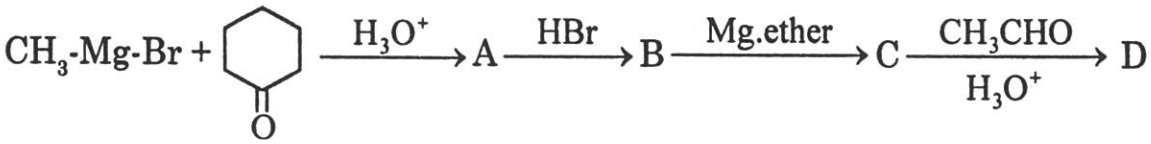
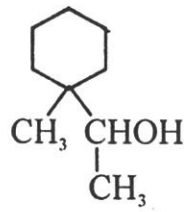
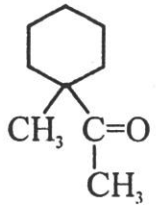
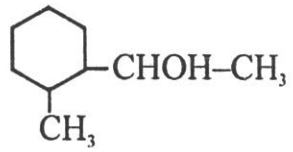
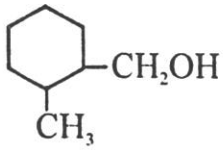
Question No.	Questions
16.	A small insect enters the eye of person riding a bike, the person then applies sudden brakes to his bike without rubbing his eye and he found that the small insect got out of his eye. By which law of physics the small insect got out of eye (1) Newton's third law of motion (2) Newton's second law of motion (3) Newton's first law of motion (4) Newton's law of Gravitation
17.	Two bodies with masses m_1 and m_2 ($m_1 > m_2$) are joined by a massless string passing over fixed pulley. The centres of gravity of the two masses are initially at same height. Assume the pulley to be weightless. Then the downward acceleration of mass m_1 is (1) $\frac{m_1}{m_1+m_2}g$ (2) $\frac{m_2}{m_1+m_2}g$ (3) $\frac{m_1-m_2}{m_1+m_2}g$ (4) $\left[\frac{m_1-m_2}{m_1+m_2}\right]^2 g$
18.	A block of mass 1 kg lies on a horizontal surface in a truck. The coefficient of static friction between the block and the surface is 0.6. If the acceleration of truck is 5 ms^{-2}, the frictional force acting on the block is (1) 4 N (2) 5 N (3) 6 N (4) 10 N
19.	Two balls of different mass have same kinetic energy. The ball having greater momentum will be (1) Heavier one (2) Lighter one (3) Both have same (4) Can't say
20.	The moment of inertia of a ring of mass M and radius R about an axis through the diameter in its plane will be (1) $0.5\,MR^2$ (2) MR^2 (3) $1.5\,MR^2$ (4) $2\,MR^2$

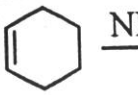
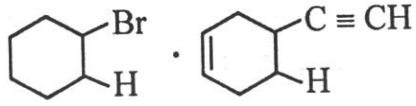
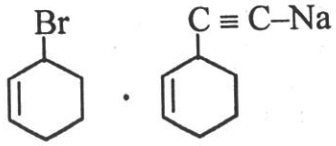
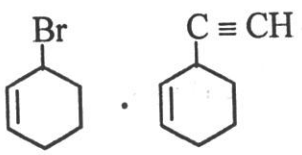
Question No.	Questions
21.	The strength of Weak nuclear force relative to Electromagnetic force is of the order of (1) 10^{-13} (2) 10^{-11} (3) 10^{13} (4) 10^{11}
22.	*Parsec* is unit of (1) Mass (2) Length (3) Time (4) Frequency
23.	If radius of earth contracts by 2% of its actual value and mass of earth remains same then the acceleration due to gravity will (1) Decrease by 2% (2) Decrease by 4% (3) Increase by 2% (4) Increase by 4%
24.	The position of an object moving along X-axis is given by $x = A + Bt^2$, where A = 10 m, B = 2.5 ms^{-2}, and t is measured in seconds. The average velocity of this object between t = 1 s and t = 3 s is (1) 10 ms^{-1} (2) 15 ms^{-1} (3) 20 ms^{-1} (4) 25 ms^{-1}
25.	A ball is thrown at a speed 28 ms^{-1} in a direction 30° above the horizontal. The maximum height attained by the ball will be (1) 25 m (2) 20 m (3) 10 m (4) 5 m

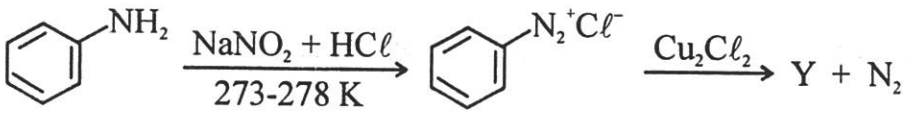
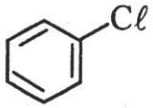
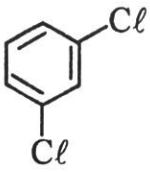
Question No.	Questions
26.	The blue colour of sky is due to (1) Reflection of light (2) Refraction of light (3) Scattering of light (4) Diffraction of light
27.	If two coherent sources of intensity ratio 25:1 interfere, then the ratio of intensity of maxima and minima in the interference pattern will be (1) 3:2 (2) 9:4 (3) 5:1 (4) 25:1
28.	Nuclear force between two nucleons depends on their (1) Mass (2) Charge (3) Spin (4) Both (2) and (3)
29.	Charge on a n-type semiconductor is (1) Zero (2) Negative (3) Positive (4) 10^{-6} coulomb
30.	If a zener diode has 9.1 V break down voltage with a maximum power dissipation of 273 mW, then maximum current that can pass through zener diode is (1) 40 mA (2) 30 mA (3) 20 mA (4) 10 mA

Question No.	Questions
31.	A thin uniform circular discuss rolling down an inclined plane of inclination 30° without slipping. Its linear acceleration along the plane is (1) g/4 (2) g/3 (3) g/2 (4) 2g/3
32.	A projectile, fired vertically upwards with a speed v escapes from the earth. If it is to be fired at 45° to the horizontal, what should be its speed so that it escapes from the earth ? (1) v (2) $v/\sqrt{2}$ (3) $\sqrt{2}\,v$ (4) 2v
33.	Which of the following substances has negligible elastic fatigue ? (1) glass (2) copper (3) quartz (4) silver
34.	The modulus of rigidity of water is (1) zero (2) 1 (3) 81 (4) infinite
35.	The surface tension does not depend upon (1) Nature of liquid (2) Temperature (3) Presence of impurity (4) Atmospheric Pressure

Question No.	Questions
	Part–B (Chemistry)
36.	Electrolytic reduction of nitrobenzene in weakly acidic medium gives : (1) Aniline (2) Nitosobenzene (3) N-phenylhydroxylamine (4) p-hydroxyaniline
37.	The efficiency of fuel cell is given by (1) $\frac{\Delta G}{\Delta S}$ (2) $\frac{\Delta G}{\Delta H}$ (3) $\frac{\Delta S}{\Delta G}$ (4) $\frac{\Delta H}{\Delta G}$
38.	Thymine is : (1) 5-methyluracil (2) 4-methyluracil (3) 3-methyluracil (4) 1-methyluracil
39.	If the rate of the reaction is equal to the rate constant, the order of the reaction is (1) 0 (2) 1 (3) 2 (4) 3
40.	Which of the following polymer can be formed by using the following monomer unit ?  (1) Nylon 6, 6 (2) Nylon 2-nylon 6 (3) Melamine polymer (4) Nylon-6

Question No.	Questions
41.	The reaction of  with HBr gives : (1)  (2)  (3)  (4) 
42.	Among the following the one that gives positive Idoform test upon reaction with I_2 and NaOH is : (1) $CH_3CH_2CH(OH)CH_2CH_3$ (2) $C_6H_5CH_2CH_2OH$ (3)  (4) $PhCHOHCH_3$
43.	In the following sequence of reaction, identify the final product :  (1)  (2)  (3)  (4) 

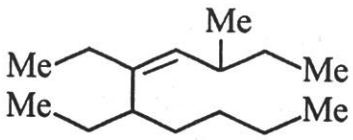
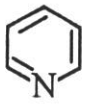
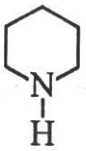
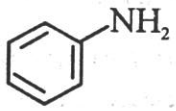
Question No.	Questions
44.	The correct order of increasing acidic strength is - (1) Phenol < Ethanol < Chloroacetic acid < Acetic acid (2) Ethanol < Phenol < Chloroacetic acid < Acetic acid (3) Ethanol < Phenol < Acetic acid < Chloroacetic acid (4) Chloroacetic acid < Acetic acid < Phenol < Ethanol
45.	Among the following which one does not act as an intermediate in Hofmann rearrangement ? (1) RNCO (2) RCON: (3) RCON:HBr (4) RNC
46.	Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3COCH_3 ? (1) $CH_3CH_2CH=C(CH_3)_2$ (2) $CH_3CH_2CH=CHCH_2CH_3$ (3) $CH_3CH_2CH=CHCH_3$ (4) $CH_3C(CH_3)=CHCH_3$
47.	 $\xrightarrow{NBS}$ A $\xrightarrow{NaC \equiv CH}$ B , what are A and B : (1)  (2)  (3)  (4) None of them

Question No.	Questions
48.	Identify the compound Y in the following reaction :  (1)  (2)  (3)  (4) 
49.	Which reagent will you use for the following reaction ? $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2C\ell + CH_3CH_2CHC\ell CH_3$ (1) $C\ell_2$ / UV light (2) $NaC\ell + H_2SO_4$ (3) $C\ell_2$ gas in dark (4) $C\ell_2$ gas in the presence of iron in dark
50.	In the following sequence of reaction : $CH_3CH_2OH \xrightarrow{P+I_2} A \xrightarrow[Ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$ The compound D is : (1) Butanal (2) n- butyl alcohol (3) n- propyl alcohol (4) Propanal

Question No.	Questions
51.	The term that accounts for intramolecular force in van der Waal's equation for non-ideal gas is (1) RT (2) $V - b$ (3) $P + \frac{a}{V^2}$ (4) $(RT)^{-1}$
52.	Which one of the following is not applicable to the phenomena of absorption (1) $\Delta H > 0$ (2) $\Delta G < 0$ (3) $\Delta S < 0$ (4) $\Delta H < 0$
53.	Which one of the following is a positively charged sol (1) Gold sol (2) As_2S_3 sol (3) Methylene blue sol (4) Gelatin
54.	What is the normality of 1 M H_3PO_2 solution ? (1) 0.5 N (2) 1.0 N (3) 2.0 N (4) 3.0 N
55.	A cricket ball 0.5 Kg is moving with a velocity of 100 ms^{-1}. The wavelength associated with its motion is : (1) 1/100 cm (2) 6.6×10^{-34} m (3) 1.32×10^{-35} m (4) 6.6×10^{-28} m

Question No.	Questions
56.	25 mL of a solution of $Ba(OH)_2$ on titration with 0.1 M solution of $HC\ell$ gave a titre value of 35 mL. The molarity of barium hydroxide solution was (1) 0.07 (2) 0.14 (3) 0.28 (4) 0.35
57.	Identify the least stable among the following : (1) Li^- (2) Be^- (3) B^- (4) C^-
58.	The correct order of size among $C\ell$, $C\ell^+$ and $C\ell^-$ is (1) $C\ell^+ < C\ell^- < C\ell$ (2) $C\ell^+ > C\ell^- > C\ell$ (3) $C\ell^+ < C\ell < C\ell^-$ (4) $C\ell^- < C\ell < C\ell^+$
59.	The geometry of $C\ell O_4^-$ ion is : (1) Pyramidal (2) Tetrahedral (3) Trigonal Planar (4) Trigonal bipyramidal
60.	The number of orbitals in a subshell is equal to (1) $2\ell - 1$ (2) 2ℓ (3) ℓ^2 (4) $2\ell + 1$

Question No.	Questions
61.	Which of the following is not a target molecule for drug function in body ? (1) Carbohydrates (2) Lipids (3) Vitamins (4) Proteins
62.	The pollutants released by jet aeroplane in the atmosphere as fluorocarbons are called (1) Photochemical oxidants (2) Photochemical reductants (3) Aerosols (4) Physical pollutants
63.	Which of the following pairs has the same size ? (1) Zn^{2+}, Hf^{4+} (2) Fe^{2+}, Ni^{2+} (3) Zr^{4+}, Ti^{4+} (4) Zr^{4+}, Hf^{4+}
64.	The coordination number and oxidation state number of Cr in $K_3Cr(C_2O_4)_3$ are respectively (1) 3 and + 3 (2) 3 and 0 (3) 6 and + 3 (4) 4 and + 2
65.	Ionic solids, with Schottky defects, contain in their structure (1) Cation vacancies only (2) Cation vacancies and interstitial cations (3) Equal number of cation and anion vacancies (4) Anion vacancies and interstitial anions

Question No.	Questions
66.	Ortho and para hydrogen differ in (1) atomic number (2) mass number (3) electron spin in two atoms (4) nuclear spin in two atoms
67.	Which of the following carbonates is least stable (1) $MgCO_3$ (2) Na_2CO_3 (3) K_2CO_3 (4) Rb_2CO_3
68.	The IUPAC name of the  Structure is : (1) 2,4,5-triethyl-3-nonene (2) 5,6-diethyl-3-methyl-4-decene (3) 2,4,6-triethyl-3-octene (4) 3-ethyl-5-methyl-3-heptene
69.	The strongest base among the following is : (1)  (2)  (3)  (4) 
70.	The number of σ-and Π-bonds present in pent-4-ene-1-yne is : (1) 10, 3 (2) 4, 9 (3) 3, 10 (4) 9, 4

Question No.	Questions
	Part–C {Opt. (i)} (Mathematics)
71.	The largest value of a third order determinant whose elements are 0 or 1 is : (1) 3 (2) 2 (3) 1 (4) 0
72.	The set of all points, where the function $f(x) = \frac{x}{1+\|x\|}$ is differentiable is : (1) $(0, \infty)$ (2) $(-\infty, \infty)$ (3) $(-\infty, 0) \cup (0, \infty)$ (4) None of these
73.	The function f (x) is defined by $f(x) = \begin{cases} \frac{\|x+2\|}{\tan^{-1}(x+2)}, & x \neq -2 \\ 2, & x = -2 \end{cases}$, then f (x) is : (1) continuous at $x = -2$ (2) differentiable at $x = -2$ (3) not continuous at $x = -2$ (4) continuous but not derivable at $x = -2$
74.	If $\int \frac{\cos 4x + 1}{\cot x - \tan x} dx = A \cos 4x + B$, then (1) $A = -1/8$ (2) $A = -1/4$ (3) $A = -1/2$ (4) -1

Question No.	Questions
75.	The area of the figure bounded by $y = \sin x$, $y = \cos x$ in the first quadrant is : (1) $2(\sqrt{2}-1)$ (2) $\sqrt{3}+1$ (3) $2(\sqrt{3}-1)$ (4) None of these
76.	The one which is the measure of central tendency is : (1) co-efficient of correlation (2) standard deviation (3) mean deviation (4) mode
77.	If S be a finite set containing n elements. The the total number of binary operations on S is : (1) n^n (2) 2^{n^2} (3) n^2 (4) n^{n^2}
78.	The solution of the equation $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \pi/2$ is : (1) $x = 1$ (2) $x = -1$ (3) $x = 0$ (4) $x = \pi$
79.	If $A = [a \quad b]$, $B = [-b \quad -a]$ and $C = \begin{bmatrix} a \\ -a \end{bmatrix}$, then the correct statement is : (1) $A = -B$ (2) $A + B = A - B$ (3) $AC = BC$ (4) $CA = CB$

Question No.	Questions
80.	The value of λ and μ for which the system of equations $x + y + z = 6$, $x + 2y + 3z = 10$ and $x + 2y + \lambda z = \mu$ have unique solution are : (1) $\lambda \neq 3, \mu \in R$ (2) $\lambda = 3, \mu = 10$ (3) $\lambda \neq 3, \mu = 10$ (4) $\lambda \neq 3, \mu \neq 10$
81.	Area of the triangle formed by 3 complex numbers $1 + i$, $i - 1$, $2i$ in the Argand plane is (1) $\frac{1}{2}$ (2) 1 (3) $\sqrt{2}$ (4) 2
82.	If the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common, then the value of k is : (1) 3 (2) -3 (3) 4 (4) None of these
83.	The solution of the equation $1 + \lvert x - 1 \rvert \geq 0$ is : (1) $(-\infty, 0)$ (2) $(-2, 0)$ (3) $(0, \infty)$ (4) $(0, 2)$
84.	12 persons are to be arranged to a round table. If two particular persons among them are not to be side by side, the total number of arrangements is : (1) 9 (10 !) (2) 2 (10 !) (3) 2 (11 !) (4) 10 !
85.	The positive integer just greater than $(1 + 0.0001)^{10000}$ is (1) 3 (2) 4 (3) 5 (4) None of these

Question No.	Questions
86.	If A and B are any two sets, then $A - B \neq$ (1) $B \cap A'$ (2) $A \cap B'$ (3) $(A' \cup B)'$ (4) None of these
87.	Let R be the relation of the set R of all real numbers defined by aRb iff $\lvert a - b \rvert \leq 1$. Then R is (1) reflexive and symmetric (2) symmetric only (3) transitive only (4) anti-symmetric only
88.	If $f(x) = \frac{x-1}{x+1}$, then $f\left(\frac{1}{f(x)}\right)$ equals : (1) 0 (2) 1 (3) x (4) $1/x$
89.	Which of the following is correct ? (1) $\sin 1^\circ > \sin 1$ (2) $\sin 1^\circ < \sin 1$ (3) $\sin 1^\circ = \sin 1$ (4) $\sin 1^\circ = \frac{\pi}{180} \sin 1$.
90.	The cube roots of unity lie on a circle (1) $\lvert z - 1 \rvert = 1$ (2) $\lvert z + 1 \rvert = 1$ (3) $\lvert z \rvert = 1$ (4) None of these

Question No.	Questions
91.	The order of the differential equation whose solution is $y = a\cos x + b\sin x + c\,e^{-x}$ is (1) 2 (2) 1 (3) 3 (4) None of these
92.	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then value of $(\vec{r}.\hat{i})\hat{i} + (\vec{r}.\hat{j})\hat{j} + (\vec{r}.\hat{k})\hat{k}$ is (1) 0 (2) $3\vec{r}$ (3) $8\vec{r}$ (4) $\vec{r}$
93.	The vectors $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $a\hat{i} + b\hat{j} + c\hat{k}$ are perpendicular when : (1) $a = 2, b = 3, c = 4$ (2) $a = 4, b = 4, c = -2$ (3) $a = 5, b = 4, c = 4$ (4) $a = 4, b = 4, c = 5$
94.	A fair coin is tossed 100 times. The probability of getting tails an odd number of times is : (1) $3/8$ (2) $1/2$ (3) $1/8$ (4) None of these
95.	The equation $\lvert\vec{r}\rvert^2 - 2(\vec{r}.\vec{a}) + \lambda = 0$ represents a (1) plane (2) straight line (3) sphere (4) none of these

Question No.	Questions
96.	If H be the HM between a and b, then the value of $\frac{H}{a}+\frac{H}{b}$ is (1) $\frac{ab}{a+b}$ (2) $\frac{a+b}{ab}$ (3) 2 (4) None of these
97.	The straight lines $x + y = 0$, $3x + y - 4 = 0$, $x + 3y - 4 = 0$ form a triangle which is : (1) right angled (2) equilateral (3) isosceles (4) none of these
98.	The circle $x^2 + y^2 + 4x - 7y + 12 = 0$ cuts an intercept on y-axis is of length : (1) 3 (2) 4 (3) 7 (4) 1
99.	The value of $\lim_{x\to\infty}\left(\frac{x+3}{x-1}\right)^{x+3}$ is (1) e (2) e^2 (3) e^3 (4) e^4
100.	If there are 6 girls and 5 boys who sit in a row, then the probability that no two boys sit together is : (1) $\frac{6!\,7!}{2!\,11!}$ (2) $\frac{5!\,7!}{2!\,11!}$ (3) $\frac{6!\,6!}{2!\,11!}$ (4) None of these

Question No.	Questions
	Part–C {Opt. (ii)} (Biology)
101.	Seed coat is not thin, membranous in (1) Groundnut (2) Coconut (3) Maize (4) Gram
102.	Lenticels are involved in (1) Transportation (2) Gaseous exchange (3) Food transport (4) Photosynthesis
103.	Insect mouthparts are adapted for different functions in different species. Mouthparts of houseflies are used for (1) Siphoning (2) Piercing and sucking (3) Sponging and lapping (4) Biting and chewing
104.	The first enzyme to be purified and crystalized was (1) Urease (2) Diastase (3) Insulin (4) Zymase
105.	Many enzymes are secreted in inactive form to protect (1) Cell membrane (2) Mitochondria (3) Cell proteins (4) Cell DNA

Question No.	Questions
106.	GIFT (Gamete intrafallopian transfer) mixes egg and sperm in the _____ (1) Fallopian tube (2) Uterus (3) Vagina (4) Culture medium
107.	An example of merocrine gland is _____ (1) Sebaceous gland (2) Pineal gland (3) Salivary gland (4) Mammary gland
108.	ATPase enzyme needed for muscle contraction is located in _____ (1) Actinin (2) Troponin (3) Myosin (4) Actin
109.	Casparian strips are present in the _____ of the root. (1) Pericycle (2) Cortex (3) Epiblema (4) Endodermis
110.	The inner, darker and harder portion of secondary xylem that cannot conduct water, in an older dicot stem, is called (1) Bast (2) Alburnum (3) Duramen (4) Wood

Question No.	Questions
111.	Synapsis occurs between (1) mRNA and ribosomes (2) male and female gametes (3) Two homologous chromosomes (4) Spindle fibers and centromere
112.	A nitrogen fixing microbe associated with *Azolla* in rice fields is (1) Frankia (2) Tolypothrix (3) Spirulina (4) Anabaena
113.	A patient brought to a hospital with myocardial infarction is normally immediately given (1) Cyclosporin-A (2) Statins (3) Penicillin (4) Streptokinase
114.	Rotenone is (1) A bioherbicide (2) A natural insecticide (3) An insect hormone (4) A natural herbicide
115.	Variation in gene frequencies within populations can occur by chance rather than by natural selection. This is referred to as (1) Genetic flow (2) Genetic drift (3) Random mating (4) Genetic load

Question No.	Questions
116.	Genetic engineering is connected with (1) Eugenics (2) Euthenics (3) Euphenics (4) All of these
117.	Some people who have suffered from a disease may not be affected again during their life time ; such immunity is called (1) Natural immunity (2) Acquired immunity (3) Innate immunity (4) Passive immunity
118.	Raw cheese is known as (1) Blue cheese (2) Cottage cheese (3) Swiss cheese (4) None of these
119.	Cell division cannot be stopped in which phase of the cell cycle ? (1) G_1-Phase (2) G_2-Phase (3) S-Phase (4) Prophase
120.	What type of plant is formed when colchicine is used in the process of development of Raphanobrassica ? (1) Autotetraploid (2) Haploid (3) Triploid (4) Allotetraploid

Question No.	Questions
121.	An action potential in the nerve fiber is produced when positive and negative charges on outside and the inside of the axon membrane are reversed because (1) All potassium ions leave the axon (2) More potassium ions enter the axon as compared to sodium ions leaving it (3) More sodium ions enter the axon as compared to potassium ions leaving it (4) All soidum ions enter the axon
122.	Sequence of taxonomic categories is (1) Divison – Class – Order – Family – Tribe – Genus – Species (2) Class – Phylum – Tribe – Order – Family – Genus – Species (3) Phylum – Order – Class – Tribe – Family – Genus – Species (4) Division – Class – Family – Tribe – Order – Genus – Species
123.	In the five-kingdom system of classification, which single kingdom out of the following can include blue green algae, nitrogen-fixing bacteria and methanogenic archaebacteria ? (1) Protista (2) Fungi (3) Monera (4) Plantae
124.	Methanogens are (1) Obligate anaerobic bacteria (2) Aerobic fungi (3) Aerobic bacteria (4) Obligate anaerobic fungi

Question No.	Questions
125.	Noise is measured using sound meter and the unit is (1) Hertz (2) Decibel (3) Joule (4) Sound
126.	The tendency of population to remain in genetic equilibrium may be disturbed by (1) Random mating (2) Lack of migration (3) Lack of mutation (4) Lack of random mating
127.	If two pea plants having red (Dominant) colored flowers with unknown genotypes are crossed, 75% of the flowers are red and 25% are white. The genotypic constitution of the parents having red colored flowers will be (1) Both heterozygous (2) One homozygous and other heterozygous (3) Both homozygous (4) Both hemizygous
128.	The deposition of lipids on the wall lining the lumen of large and medium sized arteries is referred to as (1) Osteoarthritis (2) Osteoporosis (3) Stokes-Adams Syndrome (4) Atherosclerosis

Question No.	Questions
129.	Which of the following matches correctly ? (1) Pulmonary artery – Carries deoxygenated blood to the lungs (2) Superior vena cava – Receives deoxygenated blood from the lower body and organs (3) Inferior vena cava – Receives deoxygenated blood from the head and body (4) Hepatic artery – carries deoxygenated blood to the gut
130.	The function of leghemoglobin in the root nodules of legumes is (1) Oxygen removal (2) Inhibition of nitrogenase activity (3) Expression of nif gene (4) Nodule differentiation

(NOT TO BE OPENED BEFORE TIME OR TILL ASKED TO DO SO)

(BPH–EE–2019)

Code D

Sr. No. 10160

SET–"Z"

Time : 1¼ Hours (75 minutes) Total Questions : 130 Max. Marks : 100

Candidate's Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Roll No. _____ (in figure) _____ (in words)

Date of Examination : _____

(Signature of the Invigilator) (Signature of the candidate)

CANDIDATES MUST READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER & FOLLOW THEM.

1. **All questions under Part–A and Part–B are compulsory. Part–C is optional. The candidates may attempt either Optional Part–C (i) OR Optional Part–C(ii). All questions carry equal marks i.e. one mark each.**
2. The candidate MUST return this question book-let and the OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such candidate will not be evaluated.
3. The candidate MUST NOT do any rough work OR writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself.
4. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
5. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
6. **Use only Blue or Black BALL POINT PEN of good quality in the OMR Answer-Sheet.**
7. **There will be no negative marking. Each correct answer will be awarded one full mark Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE QUESTION BOOK-LETS. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER THE START OF EXAMINATION.

SEAL Confidential Confidential Confidential

Question No.	Questions
	Part–A (Physics)
1.	Two iron spheres, A (a solid sphere) and B (a hollow sphere), are charged to same potential. Which of the two hold more energy ? (1) A (2) B (3) Both have same (4) Can't be predicted
2.	Two bulbs A and B of 25 watt and 100 watt, respectively, rated at 220 V, are connected in series with a supply of 440 V. Which bulb will fuse ? (1) A (2) B (3) Both will fuse (4) None will fuse
3.	When a charge particle moves through a magnetic field, it may suffer a change in (1) Energy (2) Mass (3) Speed (4) Velocity
4.	Two electrons are moving parallel to each other in free space, then the force between them will be (1) Attractive (2) Repulsive (3) No force (4) Can't say anything
5.	Current used for electrolysis is (1) D.C. (2) A.C. (3) Both of these (4) None of these

Question No.	Questions
6.	A sample of oxygen and a sample of hydrogen have same mass, volume and pressure. The ratio of their absolute temperature is (1) 1/16 (2) 1/4 (3) 4 (4) 16
7.	The internal energy of a gas will increase when it (1) Expands adiabatically (2) Is compressed adiabatically (3) Expands isothermally (4) Is compressed isothermally
8.	If the absolute temperature of a perfect black body be doubled, then the quantity of heat radiated per second increases by (1) Two times (2) Four times (3) Eight times (4) Sixteen times
9.	The time period of a particle undergoing S.H.M. is 16 s. It starts its motion from mean position. After 2 s, its velocity is 0.4 ms^{-1}, the amplitude is (1) 2.88 m (2) 1.44 m (3) 0.72 m (4) 0.36 m
10.	The speed of wave represented by $y = A \sin(\omega - kx)$ is (1) k/ω (2) ω/k (3) ωk (4) $1/\omega k$

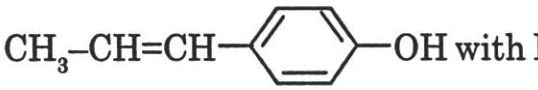
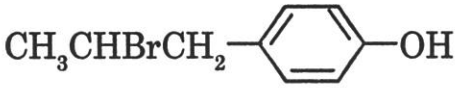
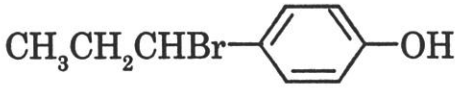
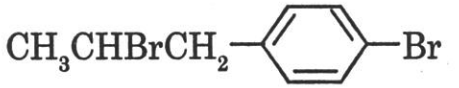
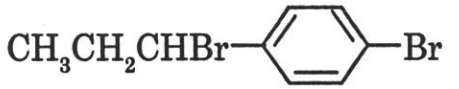
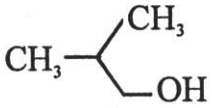
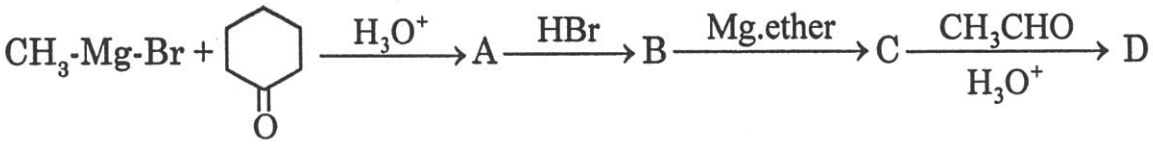
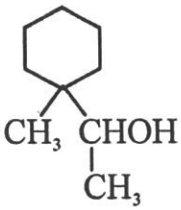
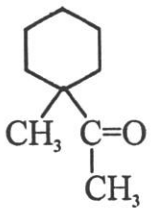
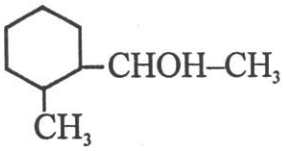
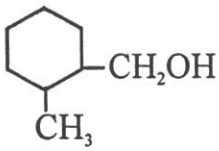
Question No.	Questions
11.	A small insect enters the eye of person riding a bike, the person then applies sudden brakes to his bike without rubbing his eye and he found that the small insect got out of his eye. By which law of physics the small insect got out of eye (1) Newton's third law of motion (2) Newton's second law of motion (3) Newton's first law of motion (4) Newton's law of Gravitation
12.	Two bodies with masses m_1 and m_2 ($m_1 > m_2$) are joined by a massless string passing over fixed pulley. The centres of gravity of the two masses are initially at same height. Assume the pulley to be weightless. Then the downward acceleration of mass m_1 is (1) $\frac{m_1}{m_1+m_2}g$ (2) $\frac{m_2}{m_1+m_2}g$ (3) $\frac{m_1-m_2}{m_1+m_2}g$ (4) $\left[\frac{m_1-m_2}{m_1+m_2}\right]^2 g$
13.	A block of mass 1 kg lies on a horizontal surface in a truck. The coefficient of static friction between the block and the surface is 0.6. If the acceleration of truck is 5 ms^{-2}, the frictional force acting on the block is (1) 4 N (2) 5 N (3) 6 N (4) 10 N
14.	Two balls of different mass have same kinetic energy. The ball having greater momentum will be (1) Heavier one (2) Lighter one (3) Both have same (4) Can't say
15.	The moment of inertia of a ring of mass M and radius R about an axis through the diameter in its plane will be (1) $0.5\,MR^2$ (2) MR^2 (3) $1.5\,MR^2$ (4) $2\,MR^2$

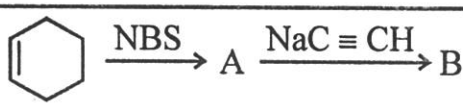
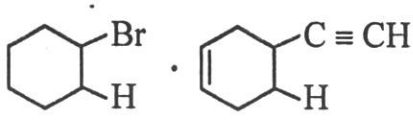
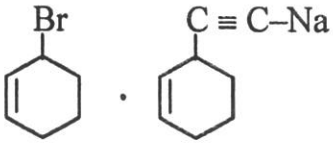
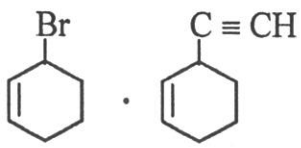
Question No.	Questions
16.	The blue colour of sky is due to (1) Reflection of light (2) Refraction of light (3) Scattering of light (4) Diffraction of light
17.	If two coherent sources of intensity ratio 25:1 interfere, then the ratio of intensity of maxima and minima in the interference pattern will be (1) 3:2 (2) 9:4 (3) 5:1 (4) 25:1
18.	Nuclear force between two nucleons depends on their (1) Mass (2) Charge (3) Spin (4) Both (2) and (3)
19.	Charge on a n-type semiconductor is (1) Zero (2) Negative (3) Positive (4) 10^{-6} coulomb
20.	If a zener diode has 9.1 V break down voltage with a maximum power dissipation of 273 mW, then maximum current that can pass through zener diode is (1) 40 mA (2) 30 mA (3) 20 mA (4) 10 mA

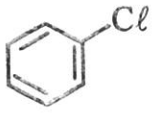
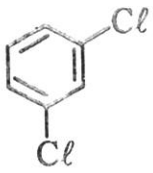
Question No.	Questions
21.	Lenz's law in electromagnetic induction follows law of conservation of (1) Charge (2) Energy (3) Linear momentum (4) Angular momentum
22.	Resistance offered by a Capacitor to D.C. is (1) zero (2) negative (3) positive (4) infinite
23.	Mechanical analogue of inductance is (1) Displacement (2) Velocity (3) Energy (4) Mass
24.	The classification of Electromagnetic spectrum is roughly based upon (1) How the waves are produced (2) How the waves are detected (3) Both (1) and (2) (4) Wavelength of waves
25.	If the atmosphere of earth suddenly disappears then duration of day will (1) Increase by 4 minutes (2) Decrease by 4 minutes (3) No change (4) Can't be predicted

Question No.	Questions
26.	A thin uniform circular discuss rolling down an inclined plane of inclination 30° without slipping. Its linear acceleration along the plane is (1) g/4 (2) g/3 (3) g/2 (4) 2g/3
27.	A projectile, fired vertically upwards with a speed v escapes from the earth. If it is to be fired at 45° to the horizontal, what should be its speed so that it escapes from the earth ? (1) v (2) $v/\sqrt{2}$ (3) $\sqrt{2}\,v$ (4) 2v
28.	Which of the following substances has negligible elastic fatigue ? (1) glass (2) copper (3) quartz (4) silver
29.	The modulus of rigidity of water is (1) zero (2) 1 (3) 81 (4) infinite
30.	The surface tension does not depend upon (1) Nature of liquid (2) Temperature (3) Presence of impurity (4) Atmospheric Pressure

Question No.	Questions
31.	The strength of Weak nuclear force relative to Electromagnetic force is of the order of (1) 10^{-13} (2) 10^{-11} (3) 10^{13} (4) 10^{11}
32.	*Parsec* is unit of (1) Mass (2) Length (3) Time (4) Frequency
33.	If radius of earth contracts by 2% of its actual value and mass of earth remains same then the acceleration due to gravity will (1) Decrease by 2% (2) Decrease by 4% (3) Increase by 2% (4) Increase by 4%
34.	The position of an object moving along X-axis is given by $x = A + Bt^2$, where A = 10 m, B = 2.5 ms^{-2}, and t is measured in seconds. The average velocity of this object between t = 1 s and t = 3 s is (1) 10 ms^{-1} (2) 15 ms^{-1} (3) 20 ms^{-1} (4) 25 ms^{-1}
35.	A ball is thrown at a speed 28 ms^{-1} in a direction 30° above the horizontal. The maximum height attained by the ball will be (1) 25 m (2) 20 m (3) 10 m (4) 5 m

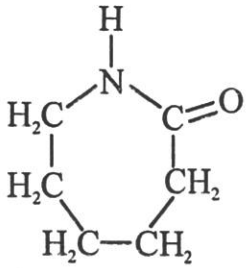
Question No.	Questions
	Part–B (Chemistry)
36.	The reaction of  with HBr gives : (1)  (2)  (3)  (4) 
37.	Among the following the one that gives positive Idoform test upon reaction with I_2 and NaOH is : (1) $CH_3CH_2CH(OH)CH_2CH_3$ (2) $C_6H_5CH_2CH_2OH$ (3)  (4) $PhCHOHCH_3$
38.	In the following sequence of reaction, identify the final product :  (1)  (2)  (3)  (4) 

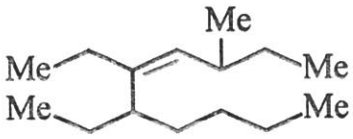
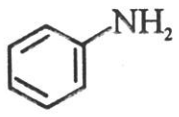
Question No.	Questions
39.	The correct order of increasing acidic strength is - (1) Phenol < Ethanol < Chloroacetic acid < Acetic acid (2) Ethanol < Phenol < Chloroacetic acid < Acetic acid (3) Ethanol < Phenol < Acetic acid < Chloroacetic acid (4) Chloroacetic acid < Acetic acid < Phenol < Ethanol
40.	Among the following which one does not act as an intermediate in Hofmann rearrangement ? (1) RNCO (2) RCON: (3) RCON:HBr (4) RNC
41.	Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3COCH_3 ? (1) $CH_3CH_2CH{=}C(CH_3)_2$ (2) $CH_3CH_2CH{=}CHCH_2CH_3$ (3) $CH_3CH_2CH{=}CHCH_3$ (4) $CH_3C(CH_3){=}CHCH_3$
42.	 what are A and B : (1)  (2)  (3)  (4) None of them

Question No.	Questions
43.	Identify the compound Y in the following reaction :  (1)  (2)  (3)  (4) 
44.	Which reagent will you use for the following reaction ? $CH_3CH_2CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_2C\ell + CH_3CH_2CHC\ell CH_3$ (1) $C\ell_2$ / UV light (2) $NaC\ell + H_2SO_4$ (3) $C\ell_2$ gas in dark (4) $C\ell_2$ gas in the presence of iron in dark
45.	In the following sequence of reaction : $CH_3CH_2OH \xrightarrow{P+I_2} A \xrightarrow[Ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$ The compound D is : (1) Butanal (2) n- butyl alcohol (3) n- propyl alcohol (4) Propanal

Question No.	Questions
46.	The term that accounts for intramolecular force in van der Waal's equation for non-ideal gas is (1) RT (2) $V - b$ (3) $P + \frac{a}{V^2}$ (4) $(RT)^{-1}$
47.	Which one of the following is not applicable to the phenomena of absorption (1) $\Delta H > 0$ (2) $\Delta G < 0$ (3) $\Delta S < 0$ (4) $\Delta H < 0$
48.	Which one of the following is a positively charged sol (1) Gold sol (2) As_2S_3 sol (3) Methylene blue sol (4) Gelatin
49.	What is the normality of 1 M H_3PO_2 solution ? (1) 0.5 N (2) 1.0 N (3) 2.0 N (4) 3.0 N
50.	A cricket ball 0.5 Kg is moving with a velocity of 100 ms^{-1}. The wavelength associated with its motion is : (1) 1/100 cm (2) 6.6×10^{-34} m (3) 1.32×10^{-35} m (4) 6.6×10^{-28} m

Question No.	Questions
51.	Which of the following is not a target molecule for drug function in body ? (1) Carbohydrates (2) Lipids (3) Vitamins (4) Proteins
52.	The pollutants released by jet aeroplane in the atmosphere as fluorocarbons are called (1) Photochemical oxidants (2) Photochemical reductants (3) Aerosols (4) Physical pollutants
53.	Which of the following pairs has the same size ? (1) Zn^{2+}, Hf^{4+} (2) Fe^{2+}, Ni^{2+} (3) Zr^{4+}, Ti^{4+} (4) Zr^{4+}, Hf^{4+}
54.	The coordination number and oxidation state number of Cr in $K_3Cr(C_2O_4)_3$ are respectively (1) 3 and + 3 (2) 3 and 0 (3) 6 and + 3 (4) 4 and + 2
55.	Ionic solids, with Schottky defects, contain in their structure (1) Cation vacancies only (2) Cation vacancies and interstitial cations (3) Equal number of cation and anion vacancies (4) Anion vacancies and interstitial anions

Question No.	Questions
56.	Electrolytic reduction of nitrobenzene in weakly acidic medium gives : (1) Aniline (2) Nitosobenzene (3) N-phenylhydroxylamine (4) p-hydroxyaniline
57.	The efficiency of fuel cell is given by (1) $\frac{\Delta G}{\Delta S}$ (2) $\frac{\Delta G}{\Delta H}$ (3) $\frac{\Delta S}{\Delta G}$ (4) $\frac{\Delta H}{\Delta G}$
58.	Thymine is : (1) 5-methyluracil (2) 4-methyluracil (3) 3-methyluracil (4) 1-methyluracil
59.	If the rate of the reaction is equal to the rate constant, the order of the reaction is (1) 0 (2) 1 (3) 2 (4) 3
60.	Which of the following polymer can be formed by using the following monomer unit ?  (1) Nylon 6, 6 (2) Nylon 2-nylon 6 (3) Melamine polymer (4) Nylon-6

Question No.	Questions
61.	Ortho and para hydrogen differ in (1) atomic number (2) mass number (3) electron spin in two atoms (4) nuclear spin in two atoms
62.	Which of the following carbonates is least stable (1) $MgCO_3$ (2) Na_2CO_3 (3) K_2CO_3 (4) Rb_2CO_3
63.	The IUPAC name of the  Structure is : (1) 2,4,5-triethyl-3-nonene (2) 5,6-diethyl-3-methyl-4-decene (3) 2,4,6-triethyl-3-octene (4) 3-ethyl-5-methyl-3-heptene
64.	The strongest base among the following is : (1)  (2)  (3)  (4) 
65.	The number of σ-and Π-bonds present in pent-4-ene-1-yne is : (1) 10, 3 (2) 4, 9 (3) 3, 10 (4) 9, 4

Question No.	Questions
66.	25 mL of a solution of $Ba(OH)_2$ on titration with 0.1 M solution of $HC\ell$ gave a titre value of 35 mL. The molarity of barium hydroxide solution was (1) 0.07 (2) 0.14 (3) 0.28 (4) 0.35
67.	Identify the least stable among the following : (1) Li^- (2) Be^- (3) B^- (4) C^-
68.	The correct order of size among $C\ell$, $C\ell^+$ and $C\ell^-$ is (1) $C\ell^+ < C\ell^- < C\ell$ (2) $C\ell^+ > C\ell^- > C\ell$ (3) $C\ell^+ < C\ell < C\ell^-$ (4) $C\ell^- < C\ell < C\ell^+$
69.	The geometry of $C\ell O_4^-$ ion is : (1) Pyramidal (2) Tetrahedral (3) Trigonal Planar (4) Trigonal bipyramidal
70.	The number of orbitals in a subshell is equal to (1) $2\ell - 1$ (2) 2ℓ (3) ℓ^2 (4) $2\ell + 1$

Question No.	Questions
	Part–C {Opt. (i)} (Mathematics)
71.	The one which is the measure of central tendency is : (1) co-efficient of correlation (2) standard deviation (3) mean deviation (4) mode
72.	If S be a finite set containing n elements. The the total number of binary operations on S is : (1) n^n (2) 2^{n^2} (3) n^2 (4) n^{n^2}
73.	The solution of the equation $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \pi/2$ is : (1) $x = 1$ (2) $x = -1$ (3) $x = 0$ (4) $x = \pi$
74.	If $A = [a \quad b]$, $B = [-b \quad -a]$ and $C = \begin{bmatrix} a \\ -a \end{bmatrix}$, then the correct statement is : (1) $A = -B$ (2) $A + B = A - B$ (3) $AC = BC$ (4) $CA = CB$
75.	The value of λ and μ for which the system of equations $x + y + z = 6$, $x + 2y + 3z = 10$ and $x + 2y + \lambda z = \mu$ have unique solution are : (1) $\lambda \neq 3, \mu \in R$ (2) $\lambda = 3, \mu = 10$ (3) $\lambda \neq 3, \mu = 10$ (4) $\lambda \neq 3, \mu \neq 10$

Question No.	Questions
76.	If H be the HM between a and b, then the value of $\frac{H}{a}+\frac{H}{b}$ is (1) $\frac{ab}{a+b}$ (2) $\frac{a+b}{ab}$ (3) 2 (4) None of these
77.	The straight lines $x + y = 0$, $3x + y - 4 = 0$, $x + 3y - 4 = 0$ form a triangle which is : (1) right angled (2) equilateral (3) isosceles (4) none of these
78.	The circle $x^2 + y^2 + 4x - 7y + 12 = 0$ cuts an intercept on y-axis is of length : (1) 3 (2) 4 (3) 7 (4) 1
79.	The value of $\lim_{x\to\infty}\left(\frac{x+3}{x-1}\right)^{x+3}$ is (1) e (2) e^2 (3) e^3 (4) e^4
80.	If there are 6 girls and 5 boys who sit in a row, then the probability that no two boys sit together is : (1) $\frac{6!\,7!}{2!\,11!}$ (2) $\frac{5!\,7!}{2!\,11!}$ (3) $\frac{6!\,6!}{2!\,11!}$ (4) None of these

Question No.	Questions
81.	The order of the differential equation whose solution is $y = a\cos x + b\sin x + c\,e^{-x}$ is (1) 2 (2) 1 (3) 3 (4) None of these
82.	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then value of $(\vec{r}.\hat{i})\hat{i} + (\vec{r}.\hat{j})\hat{j} + (\vec{r}.\hat{k})\hat{k}$ is (1) 0 (2) $3\vec{r}$ (3) $8\vec{r}$ (4) $\vec{r}$
83.	The vectors $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $a\hat{i} + b\hat{j} + c\hat{k}$ are perpendicular when : (1) $a = 2, b = 3, c = 4$ (2) $a = 4, b = 4, c = -2$ (3) $a = 5, b = 4, c = 4$ (4) $a = 4, b = 4, c = 5$
84.	A fair coin is tossed 100 times. The probability of getting tails an odd number of times is : (1) $\frac{3}{8}$ (2) $\frac{1}{2}$ (3) $\frac{1}{8}$ (4) None of these
85.	The equation $\lvert\vec{r}\rvert^2 - 2(\vec{r}.\vec{a}) + \lambda = 0$ represents a (1) plane (2) straight line (3) sphere (4) none of these

Question No.	Questions
86.	Area of the triangle formed by 3 complex numbers $1 + i$, $i - 1$, $2i$ in the Argand plane is (1) $\frac{1}{2}$ (2) 1 (3) $\sqrt{2}$ (4) 2
87.	If the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common, then the value of k is : (1) 3 (2) -3 (3) 4 (4) None of these
88.	The solution of the equation $1 + \|x - 1\| \geq 0$ is : (1) $(-\infty, 0)$ (2) $(-2, 0)$ (3) $(0, \infty)$ (4) $(0, 2)$
89.	12 persons are to be arranged to a round table. If two particular persons among them are not to be side by side, the total number of arrangements is : (1) 9 (10 !) (2) 2 (10 !) (3) 2 (11 !) (4) 10 !
90.	The positive integer just greater than $(1 + 0.0001)^{10000}$ is (1) 3 (2) 4 (3) 5 (4) None of these

Question No.	Questions
91.	If A and B are any two sets, then $A - B \neq$ (1) $B \cap A'$ (2) $A \cap B'$ (3) $(A' \cup B)'$ (4) None of these
92.	Let R be the relation of the set R of all real numbers defined by aRb iff $\lvert a - b \rvert \leq 1$. Then R is (1) reflexive and symmetric (2) symmetric only (3) transitive only (4) anti-symmetric only
93.	If $f(x) = \frac{x-1}{x+1}$, then $f\left(\frac{1}{f(x)}\right)$ equals : (1) 0 (2) 1 (3) x (4) $1/x$
94.	Which of the following is correct ? (1) $\sin 1^\circ > \sin 1$ (2) $\sin 1^\circ < \sin 1$ (3) $\sin 1^\circ = \sin 1$ (4) $\sin 1^\circ = \frac{\pi}{180} \sin 1$.
95.	The cube roots of unity lie on a circle (1) $\lvert z - 1 \rvert = 1$ (2) $\lvert z + 1 \rvert = 1$ (3) $\lvert z \rvert = 1$ (4) None of these

Question No.	Questions
96.	The largest value of a third order determinant whose elements are 0 or 1 is : (1) 3 (2) 2 (3) 1 (4) 0
97.	The set of all points, where the function $f(x) = \frac{x}{1+\|x\|}$ is differentiable is : (1) $(0, \infty)$ (2) $(-\infty, \infty)$ (3) $(-\infty, 0) \cup (0, \infty)$ (4) None of these
98.	The function f (x) is defined by $f(x) = \begin{cases} \frac{\|x+2\|}{\tan^{-1}(x+2)}, & x \neq -2 \\ 2, & x = -2 \end{cases}$, then f (x) is : (1) continuous at $x = -2$ (2) differentiable at $x = -2$ (3) not continuous at $x = -2$ (4) continuous but not derivable at $x = -2$
99.	If $\int \frac{\cos 4x + 1}{\cot x - \tan x} dx = A \cos 4x + B$, then (1) $A = -1/8$ (2) $A = -1/4$ (3) $A = -1/2$ (4) -1
100.	The area of the figure bounded by $y = \sin x$, $y = \cos x$ in the first quadrant is : (1) $2(\sqrt{2}-1)$ (2) $\sqrt{3}+1$ (3) $2(\sqrt{3}-1)$ (4) None of these

Question No.	Questions
	Part–C {Opt. (ii)} (Biology)
101.	GIFT (Gamete intrafallopian transfer) mixes egg and sperm in the _____ (1) Fallopian tube (2) Uterus (3) Vagina (4) Culture medium
102.	An example of merocrine gland is _____ (1) Sebaceous gland (2) Pineal gland (3) Salivary gland (4) Mammary gland
103.	ATPase enzyme needed for muscle contraction is located in _____ (1) Actinin (2) Troponin (3) Myosin (4) Actin
104.	Casparian strips are present in the _____ of the root. (1) Pericycle (2) Cortex (3) Epiblema (4) Endodermis
105.	The inner, darker and harder portion of secondary xylem that cannot conduct water, in an older dicot stem, is called (1) Bast (2) Alburnum (3) Duramen (4) Wood

Question No.	Questions
106.	The tendency of population to remain in genetic equilibrium may be disturbed by (1) Random mating (2) Lack of migration (3) Lack of mutation (4) Lack of random mating
107.	If two pea plants having red (Dominant) colored flowers with unknown genotypes are crossed, 75% of the flowers are red and 25% are white. The genotypic constitution of the parents having red colored flowers will be (1) Both heterozygous (2) One homozygous and other heterozygous (3) Both homozygous (4) Both hemizygous
108.	The deposition of lipids on the wall lining the lumen of large and medium sized arteries is referred to as (1) Osteoarthritis (2) Osteoporosis (3) Stokes-Adams Syndrome (4) Atherosclerosis
109.	Which of the following matches correctly ? (1) Pulmonary artery – Carries deoxygenated blood to the lungs (2) Superior vena cava – Receives deoxygenated blood from the lower body and organs (3) Inferior vena cava – Receives deoxygenated blood from the head and body (4) Hepatic artery – carries deoxygenated blood to the gut

Question No.	Questions
110.	The function of leghemoglobin in the root nodules of legumes is (1) Oxygen removal (2) Inhibition of nitrogenase activity (3) Expression of nif gene (4) Nodule differentiation
111.	An action potential in the nerve fiber is produced when positive and negative charges on outside and the inside of the axon membrane are reversed because (1) All potassium ions leave the axon (2) More potassium ions enter the axon as compared to sodium ions leaving it (3) More sodium ions enter the axon as compared to potassium ions leaving it (4) All soidum ions enter the axon
112.	Sequence of taxonomic categories is (1) Divison – Class – Order – Family – Tribe – Genus – Species (2) Class – Phylum – Tribe – Order – Family – Genus – Species (3) Phylum – Order – Class – Tribe – Family – Genus – Species (4) Division – Class – Family – Tribe – Order – Genus – Species

Question No.	Questions
113.	In the five-kingdom system of classification, which single kingdom out of the following can include blue green algae, nitrogen-fixing bacteria and methanogenic archaebacteria ? (1) Protista (2) Fungi (3) Monera (4) Plantae
114.	Methanogens are (1) Obligate anaerobic bacteria (2) Aerobic fungi (3) Aerobic bacteria (4) Obligate anaerobic fungi
115.	Noise is measured using sound meter and the unit is (1) Hertz (2) Decibel (3) Joule (4) Sound
116.	Synapsis occurs between (1) mRNA and ribosomes (2) male and female gametes (3) Two homologous chromosomes (4) Spindle fibers and centromere

Question No.	Questions
117.	A nitrogen fixing microbe associated with *Azolla* in rice fields is (1) Frankia (2) Tolypothrix (3) Spirulina (4) Anabaena
118.	A patient brought to a hospital with myocardial infarction is normally immediately given (1) Cyclosporin-A (2) Statins (3) Penicillin (4) Streptokinase
119.	Rotenone is (1) A bioherbicide (2) A natural insecticide (3) An insect hormone (4) A natural herbicide
120.	Variation in gene frequencies within populations can occur by chance rather than by natural selection. This is referred to as (1) Genetic flow (2) Genetic drift (3) Random mating (4) Genetic load
121.	Genetic engineering is connected with (1) Eugenics (2) Euthenics (3) Euphenics (4) All of these

Question No.	Questions
122.	Some people who have suffered from a disease may not be affected again during their life time ; such immunity is called (1) Natural immunity (2) Acquired immunity (3) Innate immunity (4) Passive immunity
123.	Raw cheese is known as (1) Blue cheese (2) Cottage cheese (3) Swiss cheese (4) None of these
124.	Cell division cannot be stopped in which phase of the cell cycle ? (1) G_1-Phase (2) G_2-Phase (3) S-Phase (4) Prophase
125.	What type of plant is formed when colchicine is used in the process of development of Raphanobrassica ? (1) Autotetraploid (2) Haploid (3) Triploid (4) Allotetraploid
126.	Seed coat is not thin, membranous in (1) Groundnut (2) Coconut (3) Maize (4) Gram

Question No.	Questions
127.	Lenticels are involved in (1) Transportation (2) Gaseous exchange (3) Food transport (4) Photosynthesis
128.	Insect mouthparts are adapted for different functions in different species. Mouthparts of houseflies are used for (1) Siphoning (2) Piercing and sucking (3) Sponging and lapping (4) Biting and chewing
129.	The first enzyme to be purified and crystalized was (1) Urease (2) Diastase (3) Insulin (4) Zymase
130.	Many enzymes are secreted in inactive form to protect (1) Cell membrane (2) Mitochondria (3) Cell proteins (4) Cell DNA

Answer key of B Pharma (Non- Centralized				
Question No.	A	B	C	D
1	2	3	2	3
2	2	2	4	1
3	4	3	4	4
4	1	1	3	2
5	3	2	2	1
6	3	2	3	4
7	3	4	1	2
8	2	4	4	4
9	1	3	2	2
10	1	2	1	2
11	3	3	4	3
12	1	1	2	3
13	3	4	4	2
14	1	2	2	1
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18	4	3	2	3
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21	3	3	2	2
22	1	3	2	4
23	4	2	4	4
24	2	1	1	3
25	1	1	3	2
26	2	2	3	3
27	4	2	2	1
28	4	4	3	3
29	3	1	1	1
30	2	3	2	4
31	3	4	3	2
32	2	2	1	2
33	3	4	3	4
34	1	2	1	1
35	2	2	4	3
36	1	3	3	2
37	2	3	2	4
38	3	4	1	1
39	2	3	1	3
40	4	3	4	4
41	3	3	2	1
42	1	2	4	3
43	3	1	1	1

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09/7/19

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(Aman Nanda)

44	2	1	3	1
45	3	4	4	3
46	4	2	1	3
47	1	4	3	1
48	2	1	1	3
49	3	3	1	2
50	1	4	3	3
51	1	4	3	3
52	3	1	1	3
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123	3	4	3	2
124	1	2	1	3
125	3	2	2	4
126	3	1	4	2
127	1	3	1	2
128	3	3	4	3
129	1	4	1	1
130	2	3	1	3

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