001

Booklet No.: 20199

Invigilators Signature _____ **Candidate Signatli1 9**

Roli No.

Time ; 1% Hours

(2.30 PM to 4.00 PM)

Total Score : 360

INSTRUCTIONS TO THE CANDIDATES

Read the following carefully:

1. **Answers are to be put in the OMR Sheet and not on the question paper.**
2. **Do not write anything on the question paper.**
3. **Read directions carefully.**
4. **Answer the questions as quickly and carefully as you can.**
5. **Do not spend too much time to answer the question which you find difficult.**
6. **Go through the entire test and then return to the question you have failed to answer.**
7. **Do not ask any question once the examination has started.**
8. **When you have finished answering, hand over the Booklet and Answer Sheet to the Invigilator.**
9. **For each incorrect answer one mark shall be deducted from the total score.**
10. **Candidate should sign on both OMR sheet and question booklet immediately.**

Q 1, Match the items in column I with the column 2 and choose the correct option

Column I		Column 2
a	Binary fission	1. Algae
b.	Zoospore	2. Amoeba
c.	Conidia	3, Hydra
d.	Budding	4. Penipillium
	Gem mules	5, Sponge

[A] a-1, b-4, c-5, d-3, e-2
[B] a-2, b- 1, c-4,d-3, e-5
[C] a-1, b-2, c-3, d-2, e-5
[0] a-2, b-1, c-3, d-5, e-2

Q2. A haploid plant produces male or female gametes by
[A] Binary fission [B] Mitosis
[C] Meiosis [D] Amitosis

Q3 A cross between two tall plants resulted in off spring having few dwarf plants. What would be the genotypes of both the parents?
[A] TT and Tt [B] It and Tt
[C] TT and TT [D] It and tt

Q4. The correct sequence of spermatogenetic stages leading to the formation of sperms in a mature human testes is :
[A] Spermatocyte ->Spermatogonia -> Spermatid -> Sperms
[B] Spermatogonia -> Spermatocyte -> Spermatid -> Sperms
[C] Spermatid -> Spermatocyte ->Spermatogonia -> Sperms
[D] Spermatogonia -> Spermatid -> Spermatocyte -> Sperms

Q5. The method of directly injecting a sperm Into ovum in assisted reproductive technology is called
[A] GIFT [B] ZIFT
[C] ICSI [D] None of these

Q6. The net electric charge on DNAand histones is :
[A] Bothpositive
[B] Bothnegative
[C] Negative and positive, respectively
[D] Zero

Q7. In E. coli, the lac operon gets switched on when :
[A] Lactose is present and it binds to the repressor
[B] Repressor binds to operator
[C] RNA polymerase binds to the operator
[ID] Lactose is present and it binds to RNA polymerase

Q8. The sporozoites that cause infection when a female anopheles mosquito bites a human being are produced and developed in

[A] Liver of human [B] Stomach of mosquito
[C] Salivary glands of mosquitc! [D] Intestine of human

Q9, Fungi used as bio control agent for plant pathogen is :

[A] Claviceps [B] Neu rospora
[C] Microsporum [0] Trichoderma

010. Which of the following glands is large sized at birth but reduces in Size with aging?

[A] Pineal [B] Pituitary
[C] Thymus [Di Thyroid

Peyer's patches produce:

[A] Trypsin [B] Mucus
[C] Leucocytes [D] Lymphocytes

Q12. Himgiri developed by hybridisation and selection for disease resistance against rust pathogens is a variety of :

[A] Chilli [B] Maize
[C] Sugarcane [D] Wheat

Q13. Recombinants are separated from non recombinants by insertional in activation of DNAas they produce

[A] BLUE colour colonies [B] Black colour colonies
[C] Colourless colonies [D] none of these

014. The most accepted line of descent in human evolution is :

[A] Australopithecus ->ramapithecus -> homo sapiens -> homo habilis
[B] Homo erectus -> homo habilis -> Australopithecus -> homo sapiens
[C] Ramapithecus -> homo habilis -> homo erectus -> homo sapiens
[0] Australopithecus ->ramapithecus -> homo erectus -> homo habilis

Q15. Which one of the following is a living fossil?

[A] Saccharomyces [B] Spirogyra
[C] Cycas [D] Moss

Q16. In the presence of high concentration of oxygen, RuBP CARBOXYLASE CONVERT **RuBP** to

[A] Malic acid and PEP [B] PGA AND PEP
[C] PGA AND MALIC ACID [ID] PGA AND Phosphoglycolate

Ci! I atc-h following and choose the correct option:

a.	Family	I)	tuberosum
b.	V.ingdoni	ii)	polirnoniales
c.	Order	iii)	**solanum**
d.	Species	iv)	**plantae**
e	Genus	v)	**solanaceae**

Options:

[A] **i-d, ii-c, iv-b,** v-a
[B] **i-e, ii-d,** iv-a, v-c
[C] **i-d, ii-e, iii-b, iv-a,** v-c
[D] **i-e, ii-c, v-b**

Q18. Bioluminescence is found in

[A] Chlorella [B] Ctenoplana
[C] Hirudinaria [D] Chlamydomonas

Q19. Vascular plants lacking seeds are

[A] Algae [B] Bryophytes
[C] Pteridophytes [D] Gymnosperm

Q20. Young one of cockroach is called

[A] Maggot [B] Caterpillar
[C] Nymph [D] Fingerling

Q21. A plant having butterfly — shaped flowers with one standard, two wings-like petals and two keel-like petals belong to

[A] Fabaceae [B] Asteraceae
[C] Malvaceae [D] Solanaceae

Q22. Jute fibres are anatomically

[A] Xylem fibres [B] Phloem fibres
[C] Sclereids [D] Trichomes

Q23. Which one of the following types of cell is involved in making of the inner walls of large blood vessels?

[A] Cuboidal epithelium [B] Columnar epithelium
[C] Squamous epithelium [D] Stratified epithelium

Q24. Cilia and Flagella are composed of

[A] Microtubules [B] Microfilaments
[C] Micro fibrils [D] Microvilli

025. Common rnonosaccharide present in nucleus is

[A] Those [B] Tetrose
[C] Pentose [EY; Hexose

'26. In which stage are the chromosomes arranged in equatorial plate.

[A] Metaphase [B] Telophase
[C] Anaphase [D] Prophase

027. Number ofATP molecules produced by one NADH

[A] 3 [B] 4
[C] 5 [D] 6

Q28. Hormone that help in secretion of HCI in stomach is

[A] Renin [B] Gastrin
[C] Secretin [D] Somatostatin

Q29. One molecule of haemoglobin carries molecules of oxygen

[A] One [B] Two
[C] Three [D] Four

030. An area in the brain which is associated with strong emotion is

[A] Cerebral cortex [B] Cerebellum
[C] Limbic system [D] Medulla oblongata

Q31. A 50,000 W radio station transmits waves of wavelength 4 m. Which of the following is the best estimate of the number of photons it emits per second?

[A] 10^{8} [B] 10^{22}
[C] $10^{3^{\circ}}$ [D] $10^{4^{\circ}}$

032. A scientist in the Space Station experiences "weightlessness" because

[A] there is no gravitational force from the Earth acting on her.
[B] the gravitational pull of the Moon has canceled the pull of the Earth on her.
[C] she is in free fall along with the Space Station and its contents.
[D] at an orbit of 500 km above the Earth, the gravitational force of the Earth on her is 2% less than on its surface.

Q33. Consider an object that has a mass, m, and a weight, W, at the surface of the moon. If we assume the moon has a nearly uniform density, which of the following would be closest to the object's mass and weight at a distance halfway between Moon's center and its surface?

[A] ½m8,%W [B] Ihm&Y4W
[C] irn&IW [D] 1m8, ½ W

Q34. If the unit for force is F, the unit for velocity v and the unit for time t, then the unit for momentum is

[Al Ft [BI Ftv
[G] Ft^2v [D1 Riv

Q35. Two pucks moving on a frictionless air table are about to collide, The 1.5 kg puck is moving directly east at 2.0 m/s. The 4.0 kg puck is moving directly north at 1.0 m/s. What is the total kinetic energy of the two-puck system before the collision?

[A] 3.61J [B] 5.0
[C] 7.0J [D] 10 J

Q36. Two fire trucks have sirens that emit waves of the same frequency. As the fire trucks approach a person, the person hears a higher frequency from truck X than from truck Y. Which of the following statements about truck X can be correctly inferred from this information?

I. It is traveling faster than truck Y.
II. It is closer to the person than truck Y.
III. It is slowing down and truck Y is speeding up.

[A] I only [B] III only
[C] I and II only [D] II and III only

Q37. Of the following, which represents the larger charge?

[A] $1x10^{12}$ e [B] $1 x10^{-4}$ C
[C] 1 pC [D] 1 nC

Q38. A cricket ball is thrown with a spinning motion. Its total kinetic energy is a function of

[A] its linear velocity only
[B] its angular velocity only
[C] both its linear and angular velocities
[D] the induced torque

Q39. Acircular hole is cut in a sheet of copper. When the sheet is heated, the area of the hole

[A] remains constant
[B] decreases
[C] increases
[0] decreases only if the hole was located at the exact center of the sheet

Q40. In orderfor a Carnot engine to operate at 100% efficiency, the exhaust temperature is

[A] 0 K [B] 100 K
[C] infinite [D] equal to the input temperature

Decreasing the potential difference across the two plates of a parallel capacitor causes what effect?

[ik] the capacitance increases

[B] the capacitance decreases

[C] charge on the plates increases

[D] charge on the plates decreases

0,4[9], Which of the following characteristics of electrons determines the current conductor?

[A] Drift velocity alone.

[B] Thermal velocity alone.

[C] Both drift velocity and thermal velocity.

[D] Neither drift nor thermal velocity.

043. Biot-Savart law indicates that the moving electrons (velocity v) produce a magnetic field B such that

[A] 131v.

[B] B ilv.

[C] it obeys inverse cube law.

[D] it is along the line joining the electron and point of observation.

Q44. A wire current is running through a wire from right to left. The wire is placed in a magnetic field that is running from left to right. What is the direction of the force on the wire?

[A] The force is pushing the wire downwards.

[B] The force is pushing the wire to the right.

[C] The force is pushing the wire to the left.

[D] Either the answer cannot be determined from situation.

Q45. When a voltage measuring device is connected to AC mains, the meter shows the steady input voltage of 220V. This means

[A] input voltage cannot beAC voltage, but a DC voltage.

[B] maximum input voltage is 220V.

[C] the meter reads not V but $\langle V^2 \rangle$ and is calibrated to read $^{1<}$ $V^2>$.

[D] the pointer of the meter is stuck by some mechanical defect.

Q46. The focal ratio of a lens or mirror is the ratio of its

[A] Diameter to thickness [B] Focal length to diameter .

[C] magnification to diameter pj focal length to thickness

Q47. You stand in front of a mirror, How tall does the mirror have to be so that you can see yourself entirely?

[A] any size will do
[B] less than your half height but more than one fourth of your height
[C] half of your height
[D] one fourth of your height

48. Which type of radiation goes farther in matter before losing all of its energy

[A] alpha radiation [B] beta radiation
[C] gamma radiation [D] all about the same distance

49. The blue color of our sky is due to

[A] scattering of light
[B] water vapor in the atmosphere
[C] optical activity
[D] diffraction as light filters through the atmosphere

Q50. A photon is associated with a wavelength of 6400 A. What is its energy?

[A] 3.4 eV [B] 2.9 eV
[C] 2.3 eV [D] 1.9 eV

Q51. One nucleus of radioactive disintegration per second is defined as the

[A] curie [B] roentgen
[C] gray [D] becquerel

Q52. The conduction band of a semiconductor is

[A] The range of electron energies enough to free an electron from binding with its atom
[B] Generally located on the top of the crystal
[C] Generally located on the bottom of the crystal
[D] Same as Valance energy gap

Q53. Ethyl alcohol has about one-half the specific heat of water. Assume equal amounts of energy are transferred by heat into equal-mass liquid samples of alcohol and water in separate insulated containers. The water rises in temperature by 20°C. How much will the alcohol rise in temperature?

[A] It will rise by 10°C.
[B] It will rise by 25°C.
[C] It will rise by 40°C.
[D] It depends on the rate of energy transfer

Q54. The velocity of a mass attached to a :spring is given by v = (3crri/s) sin(wt where w 3.0 radis. What is the corresponding expression for x?

[A] x cm) sin(wt 4- Tr/2) [B] x = (9 cm) cos(cot + Tr/2)
[C] x = -(1 cm) cos(wt Trii2) [0] x = -(1 cm) cos(i.ot Tr/2)

A hunter in a forest walks 800 m west. He then turns south and walks 400 m beforE- 1.1rning west again and walking a final 300 m. At the end of the walk, what is the magnitude of the hunter's displacement from the beginning?

[A] 640.5 rn [B] 890.5 m
[C] 1170.5 [D] 1500 m

056. A 50-kg student stands on a scale in an elevator. At the instant the elevator has a downward acceleration of 1.0 m/s^2 and an upward velocity of 3.0 mls, the scale reads approximately

[A] 350 N [B] 450 N
[C] 500 N [D] 550 N

Q57. A simple pendulum has a period of 2 s for small amplitude oscillations. The length of the pendulum is most nearly

[A] 1/4 m [B] 1/2 m
[C] 1 m [D] 2 m

Q58. As a solid block sinks deeper and deeper into water of constant density, what happens to the buoyant force on it?

[A] It remains constant
[B] It increases.
[C] It decreases.
[D] It may increase or decrease, depending on the shape of the block.

Q59. If an ideal Carnot engine takes in 500 kJ of heat at 1500 K and expels 300 kJ of heat to the low temperature reservoir during each cycle, which of the following would be closest to the temperature of the low temperature reservoir?

[A] 500K [B] 900K
[C] 200K [D] 700K

Q60. Which air temperature feels coldest?

[A] -40 °C [B] -40 °F
[C] 233 K [D] All three are equal.

Q61. Acidified water is electrolysed by 1 A current for 16 minutes and 5 seconds using inert electrodes. The volume of gases liberated at STP will be

[A] 168 ml [B] 336 ml
[C] 112 ml [D] 224 ml

062. The colour of potassium dichromate changes from red orange to lemon yellow on treatment with aqueous KOH because

[A] Reduction of Cr(VI) to Cr(ill)
[B] Conversion of dichromate ion to chromate ion
[C] Formation of chromium hydroxide
[D] Both (a) and (b)

Q63. Which molecule f on out of the following does not contain unpaired electrons ?

[A] N_2^+ [C] O_2
[C] 02^{2-} [D]

Q64. In which of the following pairs, both species have similar geometry?

[A] CH_4 , BF_3 [B] NH_3 , BH,
[C] CO_2 , H_2O [D] PCI_5 , I Cl,

065. H_2S in the presence of HCI precipitate group II but not group IV because

[A] HCI activates H_2S
[B] HCI increases concentration of CI^-
[C] HCI decreases concentration of S^2
[D] HCI lowers the solubility of H_2S in solution

Q66. Which of the following will give cinnamic acid ?

[A] $C_6H_5CHO + (CH_3C0)_20 / CH_3COONa$

[B] $C_6H_5CHO + CH_3CH\ 0 / OH^\circ$

[C] $C_6H_5CHO + C_2H_5CHO$ / pyridine

[D] All of these

Q67. Acidified $KMnO_4$ oxidizes oxalic acid to CO_2 . What is the volume of 10^{-4} M $KMnO_4$ required to completely oxidize 0.5 litre of 10^{-2} M oxalic acid in acid medium ?

[A] 125 L [B] 1250 L
[C] 200 L [D] 20 L

068. What in the pH of a solution obtained by mixing 10 ml of 0.1 M HCI and 40 ml of 0.2 M H_2SO_4 ?

[A] 0.74 [B] 7.4
[C] 4.68 [D] 0.468

Q6'9. During preparation of ice-creams, gelatine is added in ice- creams. What could be the role of gelatin in the process ?

[A] ice-creams are emulsions which get stabiiised by gelatin which acts as an emulfying agent.

[B] Gelatine is added to the ice-cream to make it sweet.

[C] Gelatine acts as coagulating agent and helps the ice-cream to become solid.

[D] Gelatine is adsorbed on milk particles which are later converted to solids.

Q70. A first order reaction is 20% complete in 10 minutes. What is the specific rate constant for the reaction ?

[A] $0.0970\ min^{-1}$ [B] $0.009\ min^{-1}$

[C] $0.0223\ min$ [D] $2.223\ min^{-1}$

Q71. in a crystalline solid , anions B are arranged in a cubic close packing. Cations A are equally distributed between octahedral and tetrahedral voids if all the octahedral voids are occupied , what is the formula of the solid?

[A] AB, [B] A_2B

[C] A_3B [D] none of these

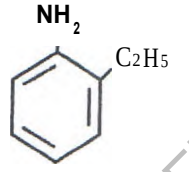
072. RNA and DNA are chiral molecules. Their chirality is due **to**

[A] chiral bases **[B] chiral phosphate ester units**

[C] D-sugar component **[D] L-sugar component**

Q73. An organic compound A has molecular formula $C_8H_{11}N$ and is optically active. The compound A dissolves in dil. HCl and gives effervescence of nitrogen gas with HNO_2. Suggest a structural formula of compound A.

[A]



[B] $C_6H_5NH(C_2H_5)$

[C] $C_6H_5CH(CH_3)(NH_2)$ [D] $C_6H_5(CH_2)_2NH_2$

Q74. The pH at the equivalence point of a titration may differ from 7.0 because of

[A] The self ionisation of water

[B] Hydrolysis of the salt formed

[C] The indicator used

[D] The concentration of the standard solution

075. Fluorine is not tested by Beilstein ' s test because

[A] It doesn't react with copper

[B] copper fluoride is not volatile

[C] F_2 is evolved as a gas

[D] The statement is wrong as it is well tested by Beilstein's test.

075 NaCI type crystal (with coordination no. 6:6 can be converted into CsCl type crystal (with coordination no. 8:8) by applying

[A] high temperature [B] high pressure
[C] both (a) and (b) [D] low temperature and low pressure

77. The oxidation states of suiphur in Caross and marshal!' s acid are

[A] +6,-!-6 [B] +4,+6
[C] +6,-6 [D] +6, +4

78. Siderite and sphalerite are the ore of the metals

[A] Al and Zn [B] Fe and Cu
[C] Cu and Zn [D] Fe and Zn

79. Polymerisation of caprolactum yields

[A] terylene [B] nylon-6
[C] nylon-6,6 [D] polyethene

80. Which of the following will not undergo cannizaro's reaction on heating with an alkali solution?

[A] CCl_3CHO [B] $(CH_3)_3CCHO$
[C] HCHO [D] C_6H_5CHO

Q81. The product of oxymercuration of but-1-yne with $HgSO_4$ and H_2SO_4 will be :

[A] Butanone [B] Butanal
[C] Propanal and Methanal [D] Propanoic acid and methanoic acid

Q82. Ammonia is used in detection of Cu' ion because

[A] aq. Solution of NH_3 reacts with Cu" ion to form deep blue coloured complex
[B] NH_3 reacts with Cu^{2}+ ion to give blue precipitate of CuO
[C] aq. solution of NH_3 reacts with Cu^{2}+ ion to form white complex
[D] NH_3 reacts with Cu^{2}+ ion to give green precipitate

A·I

Q83. m-chlorobenzaldehyde on reaction with conc. KOH at room temperature gives :

[A] Potassium m- chlorobenzoate and m-hydroxybenzaldehyde.
[B] m_ Hydroxybenzaldehyde and m-chlorobenzyl alcohol.
[C] m-chlorobenzyl alcohol and m-hydroxybenzyl alcohol.
[D] Potassium m- chlorobenzoate and m- chlorobenzyl alcohol

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Q84. Phenyl methyl ether reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol because

[A] I ion prefers to combine with the smaller group in order to minimise steric hindrance

[B] I ion is not reactive towards benzene

[C] phenol is formed as a result of hydrolysis of iodobenzene

[D] methyl alcohol formed during reaction reacts with I^- to form methyl iodide

085. What is the test to differentiate between pentan-2-one and pentan-3- one?

[A] Iodoform test [B] Benedict's test

[C] Fehling's test [D] Aldol condensation test

Q86. Arrange the following compounds in increasing order of basicity:

CH_3NH_2 ; $(CH_3)_2NH$; NH_3 ; C_6H_5N1H2

[A] $C_6H_5NH_2 < NH_3 < (CH_3)_2NH < CH,NH,$

[B] $CH_3NH_2 < (CH_3)_2NH < NH, < C_6H_5NH_2$

[C] $C_6H_5NH_2 < NH_3 < CH,NH, < (CH3)2NH$

[ID] $(CH_3)_2NH < CH,NH, < NH_3 < C_6H_5NH_2$

087. Which of the following is wrong ?

[A] cathode rays have constant e/m ratio

[B] elm ratio of anode rays is not constant

[C] e/m ratio of protons is not constant

[D] e/m ratio offl— particles is constant

088. Order of esterification of alcohols is

[A] $3^\circ > 2^\circ >$ [B] $2^\circ > 3^\circ > 1^\circ$

[C] $1^\circ > 2^\circ > 3^\circ$ [D] none of these

Q89. Composition of Ziegler— Natta catalyst is

[A] $(Et_3)_3Al.TiCl_2$ [B] $(Me),Al.TiCl,$

[C] $(Et),Al.TiCl,$ [D] $(Et)_3ALPtC1_4$

Q90. Which of the following antibiotics is bactericidal ?

[A] erythyromycin [B] tetracycline

[C] penicillin [ID] chloramphenicol