



Neet
ENTRANCE EXAM - NEET-UG

Time Allowed: 3 hours

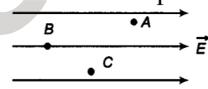
Maximum Marks : 720

General Instructions:

- The test is of 3 hours and it contains 180 questions.
- For each correct response, the candidate will get 4 marks.
- For each incorrect response, one mark will be deducted from the total scores.
- The maximum marks are 720.

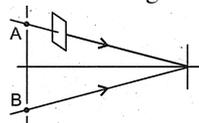
PHYSICS

- 1) If the surface tension of a liquid is measured to be 0.06 N/m and the absolute error is 0.0015 N/m. The percentage error in the measurement of surface tension is: [4]
 - a) 1.5%
 - b) 2.5%
 - c) 3.5%
 - d) 4.5%
- 2) The dimensions of emf in MKS is: [4]
 - a) $[ML^2T^{-2}Q^{-2}]$
 - b) $[ML^2T^{-2}Q^{-1}]$
 - c) $[ML^{-1}T^{-2}Q^{-2}]$
 - d) $[MLT^{-2}Q^{-1}]$
- 3) If E and G respectively denote energy and gravitational constant, then $\frac{E}{G}$ has the dimensions of: [4]
 - a) $[M^2][L^{-1}][T^0]$
 - b) $[M][L^0][T^0]$
 - c) $[M^2][L^{-2}][T^{-1}]$
 - d) $[M][L^{-1}][T^{-1}]$
- 4) A man throws some balls with the same velocity vertically upwards, one after the other, at an interval of 2 seconds. What should be the speed of the throw, so that more than two balls are in the sky at any time? (Given $g = 9.8 \text{ m/s}^2$) [4]
 - a) Equal to 9.8 m/s
 - b) Equal to 19.6 m/s
 - c) More than 19.6 m/s
 - d) Less than 19.6 m/s
- 5) A body starts from rest. What is the ratio of the distance travelled by the body during the 4th and 3rd second. [4]
 - a) $\frac{5}{7}$
 - b) $\frac{7}{11}$
 - c) $\frac{3}{5}$
 - d) $\frac{7}{11}$
- 6) A projectile has initially the same horizontal velocity as it would acquire if it had moved from rest with a uniform acceleration of 3 ms^{-2} for 0.5 minutes. If the maximum height reached by it is 80 m, then the angle of projection is: (Take $g = 10 \text{ m s}^{-2}$) [4]
 - a) $\tan^{-1}(3)$
 - b) $\tan^{-1}(\frac{3}{2})$
 - c) $\tan^{-1}(\frac{4}{9})$
 - d) $\sin^{-1}(\frac{4}{9})$
- 7) If the magnitude of sum of two vectors is equal to the magnitude of the difference of the two vectors, the angle between these vectors is: [4]
 - a) 45°
 - b) 180°
 - c) 0°
 - d) 90°
- 8) A spring balance and a physical balance are kept in a lift. In these balances equal masses are placed. If now the lift starts moving upwards with constant acceleration, then: [4]
 - a) The reading of spring balance will remain unchanged and physical balance will remain in equilibrium.
 - b) The reading of spring balance will increase and the physical balance will remain in equilibrium.
 - c) The reading of spring balance will increase and the equilibrium position of the physical balance will disturb.
 - d) The reading of spring balance will decrease and physical balance will remain in equilibrium.
- 9) A body of mass m falls from a height h and collides with another body of same mass. After collision the two bodies combine and move through distance till they come to rest. Find the work done against the resistive force. [4]
 - a) $\frac{1}{2} mg(h + 2d)$
 - b) $\frac{1}{2} mg(h + 4d)$
 - c) $\frac{1}{2} mg(h - 2d)$
 - d) $\frac{1}{2} mg(h - d)$
- 10) A ball moving with velocity 2 m/s collides head - on with another stationary ball of double the mass. If the coefficient of restitution is 0.5, then their velocities (in m/s) after collision will be: [4]
 - a) 0, 1
 - b) 1, 1
 - c) 1, 0.5
 - d) 0, 2
- 11) A disc of radius 2 m and mass 100 kg rolls on a horizontal floor. Its centre of mass has speed of 20 cm/s. How much work is needed to stop it? [4]
 - a) 1 J
 - b) 2 J
 - c) 3 J
 - d) 30 kJ
- 12) Two rotating bodies A and B of masses m and 2m with moments of inertia I_A and I_B ($I_B > I_A$) have equal kinetic energy of rotation. If L_A and L_B be their angular momenta respectively, then: [4]
 - a) $L_B > L_A$
 - b) $L_A = 2L_B$
 - c) $L_A = \frac{L_B}{2}$
 - d) $L_A > L_B$
- 13) A ballet dancer, dancing on a smooth floor is spinning about a vertical axis with her arms folded with an angular velocity of 20 rad/s. When she stretches her arms fully, the spinning speed decreases to 10 rad/sec. If I is the initial moment of inertia of the dancer, the new moment of inertia is: [4]
 - a) 2I
 - b) 3I
 - c) I/3
 - d) I/2
- 14) When a mass is rotating in a plane about a fixed point, its angular momentum is directed along: [4]
 - a) The tangent to the orbit

- b) A line perpendicular to the plane of rotation
 c) The radius
 d) The line making an angle of 45° to the plane of rotation
- 15) At what height over the earth's pole, the free fall acceleration decreases by one percent? (Assume the radius of earth to be 6400 km): [4]
 a) 1.253 km b) 80 km
 c) 32 km d) 64 km
- 16) If the radius of the earth decreases by 10%, the mass remaining unchanged, what will happen to the acceleration due to gravity? [4]
 a) Increases by 19%
 b) Decreases by more than 19%
 c) Decreases by 19%
 d) Increases by more than 19%
- 17) There is a hole in the bottom of tank having water. If total pressure at bottom is 3 atm ($1 \text{ atm} = 10^5 \text{ N/m}^2$) then the velocity of water flowing from hole is: [4]
 a) $\sqrt{600} \text{ m/s}$ b) $\sqrt{60} \text{ m/s}$
 c) $\sqrt{400} \text{ m/s}$ d) $\sqrt{40} \text{ m/s}$
- 18) Two identical bodies are made of a material for which the heat capacity increases with temperature. One of these is at 100°C , while the other one is at 0°C . If the two bodies are brought into contact, then assuming no heat loss, the final common temperature is: [4]
 a) 0°C b) $> 50^\circ\text{C}$ but $< 100^\circ\text{C}$
 c) $> 100^\circ\text{C}$ d) 50°C
- 19) A black body is at a temperature of 500 K. It emits energy at a rate which is proportional to: [4]
 a) $(500)^2$ b) $(500)^3$
 c) $(500)^4$ d) 500
- 20) An ideal monoatomic gas at 27°C is compressed adiabatically to $\frac{8}{27}$ times of its present volume. The increase in temperature of the gas is: [4]
 a) 375°C b) 175°C
 c) 402°C d) 475°C
- 21) If d is the average diameter of the molecule, then the mean free path of the molecules between two successive collisions is proportional to: [4]
 a) D^2 b) $\frac{1}{d^2}$
 c) $\frac{1}{d}$ d) D
- 22) The displacement of a particle between maximum potential energy position and maximum kinetic energy position in simple harmonic motion is: [4]
 a) $\pm 2a$ b) $\pm a$
 c) $\pm \frac{a}{2}$ d) ± 1
- 23) The function $\sin^2(\omega t)$ Represents: [4]
 a) A simple harmonic motion with a period $\frac{2\pi}{\omega}$
 b) A periodic, but not simple harmonic motion with a period $\frac{2\pi}{\omega}$
 c) A periodic, but not simple harmonic motion with a period $\frac{\pi}{\omega}$
 d) A simple harmonic motion with a period $\frac{\pi}{\omega}$
- 24) An organ pipe closed at one end has fundamental frequency of 1500 Hz. The maximum number of overtones generated by this pipe which a normal person can hear is [4]
 a) 9 b) 13
 c) 14 d) 6
- 25) The two nearest harmonics of a tube closed at one end and open at other end are 220 Hz and 260 Hz. What is the fundamental frequency of the system? [4]
 a) 10 Hz b) 30 Hz
 c) 20 Hz d) 40 Hz
- 26) An electron is moving round the nucleus of a hydrogen atom in a circular orbit of radius r . The coulomb force \vec{F} between the two is: [4]
 a) $K \frac{e^2}{r^3} \vec{r}$
 b) $-K \frac{e^2}{r^3} \vec{r}$
 c) $K \frac{e^2}{r^2} \hat{r}$
 d) $-K \frac{e^2}{r^3} \hat{r}$
- 27) Two equal and opposite charges are placed at a certain distance. The force between them is F . If 25% of one charge is transferred to other, then the force between them is: [4]
 a) $\frac{15F}{16}$ b) $\frac{9F}{16}$
 c) $\frac{4F}{5}$ d) F
- 28) A slab of material of dielectric constant K has the same area as the plates of a parallel plate capacitor but has a thickness $(\frac{3}{4})d$, where d is the separation of the plates. The ratio of the capacitance C (in the presence of the dielectric) to the capacitance C_0 (in the absence of the dielectric) is: [4]
 a) $\frac{4}{3}K$ b) $\frac{4K}{K+3}$
 c) $\frac{3K}{K+4}$ d) $\frac{3K}{4}$
- 29) A, B and C are three points in a uniform electric field. The electric potential is:

 [4]
 a) Same at all the three points A, B and C
 b) Maximum at C
 c) Maximum at A
 d) Maximum at B
- 30) Forty electric bulbs are connected in series across 220 V supply. After one bulb is fused the remaining 39 are connected again in series across the same potential the illumination will be: [4]
 a) More with 39 bulbs than with 40 bulbs
 b) In ratio $40^2 : 39^2$
 c) More with 40 bulbs than with 39 bulbs
 d) Equal in both cases
- 31) A current of 5 amp is flowing in a wire of length 1.5m. A force of 7.5 N acts on it when it is placed in a uniform magnetic field of 2 tesla and the direction of the current is: [4]
 a) 45° b) 90°
 c) 30° d) 60°
- 32) Two small bar magnets are placed in a line with like poles facing each other at a certain distance d apart. If the length of each magnet is negligible as compared to d , the force between them will be inversely proportional to: [4]
 a) D^2 b) $\frac{1}{d^2}$
 c) D^4 d) D
- 33) A long magnetic needle of length $2L$, magnetic moment M and pole strength m units is broken into two pieces at the middle. The magnetic moment and pole strength of each piece will be : [4]

- a) $\frac{M}{2}, \frac{m}{2}$ b) M, m
c) $M, \frac{m}{2}$ d) $\frac{M}{2}, m$
- 34) A long solenoid has 500 turns. When a current of 2 ampere is passed through it, the resulting magnetic flux linked with each turn of the solenoid is 4×10^{-3} wb. The self - inductance of the solenoid is: [4]
a) 1.0 henry b) 2.5 henry
c) 2.0 henry d) 4.0 henry
- 35) A metal disc of radius R rotates with an angular velocity ω about an axis perpendicular to its plane passing through its centre in a magnetic field of induction B acting perpendicular to the plane of the disc. The induced emf between the rim and the axis of the disc is: [4]
a) $- \frac{B\pi R^2}{2}$
b) $-\frac{BR^2\omega}{2}$
c) $- \frac{B\pi R^2\omega}{2}$
d) $-\frac{2B\pi^2 R^2}{\omega}$
- 36) Eddy currents are favourable in which of the following electrical instruments? [4]
a) Transformer b) AC generator
c) Induction furnace d) Electric motor
- 37) An alternating voltage is represented as: $E = 20 \sin 300t$. The average value of voltage over one cycle will be: [4]
a) Zero
b) $\frac{20}{\sqrt{2}}$ volt
c) 10 volt
d) $20\sqrt{2}$ volt
- 38) A voltage source $V = V_0 \sin (\omega t + \phi)$ is applied to a circuit containing a resistance R capacitance C and inductance in series. The current will be maximum when: [4]
a) $\omega^2 = RLC$
b) $\omega^2 = LC$
c) $R = L = C$
d) $\omega L = \frac{1}{\omega C}$
- 39) X - rays are used in determining the molecular structure of crystalline solids because its: [4]
a) Energy is high
b) It can penetrate the material
c) Its wavelength is comparable to interatomic distance
d) Its frequency is low
- 40) A ray of light travelling in a transparent medium of refractive index μ , falls on a surface separating the medium from air at an angle of incidence of 45° . For which of the following value of μ the ray can undergo total internal reflection? [4]
a) $\mu = 1.40$ b) $\mu = 1.33$
c) $\mu = 1.50$ d) $\mu = 1.25$
- 41) A diverging meniscus lens of 1.5 refractive index has concave surfaces of radii 3 and 4 cm. The position of the image, if an object is placed 12 cm in front of the lens, is: [4]
a) 7 cm b) - 8 cm
c) 9 cm d) 10 cm
- 42) In Young's experiment monochromatic light is used to illuminate the two slits A and B. Interference fringes are observed on a screen placed in front of the slits. Now, if a thin glass plate is placed normally in the path of the

beam coming from the slit A, then:



[4]

- a) The fringe width will increase
b) The fringes will disappear
c) The fringe width will decrease
d) There will be no change in fringe width but fringe pattern shifts
- 43) The number of photons of wavelength 660 nm emitted per second by an electric bulb of 60 W is: (Take $h = 6.6 \times 10^{-34}$ J - s) [4]
a) 3×10^{20} b) 2×10^{20}
c) 1.5×10^{20} d) 2×10^{-20}
- 44) Wavelength of spectral line emitted is inversely proportional to: [4]
a) Velocity b) Radius
c) Quantum number d) Energy
- 45) The mass defect for the nucleus of helium is 0.0303 a.m.u. What is the binding energy per nucleon for helium in MeV: [4]
a) 28 b) 7
c) 4 d) 1

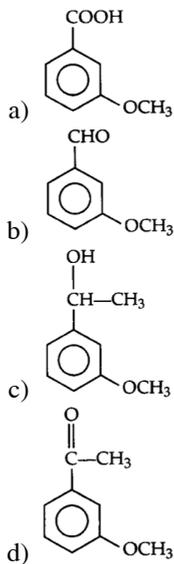
CHEMISTRY

- 46) If 30 mL of H_2 and 20 mL of O_2 reacts to form water, what is left at the end of reaction? [4]
a) 5 mL O_2 b) 10 mL H_2
c) 10 mL N_2 d) 5 mL H_2
- 47) An ion which has 18 electrons in the outermost shell is: [4]
a) K^+ b) Cs^+
c) Th^{4+} d) Cu^+
- 48) 4d, 5p, 5f and 6p orbitals are arranged in the order of decreasing energy. The correct option is: [4]
a) $5f > 6p > 5p > 4d$ b) $6p > 5f > 5p > 4d$
c) $6p > 5f > 4d > 5p$ d) $5f > 6p > 4d > 5p$
- 49) The first ionisation potential of Na is 5.1 eV. The value of electron gain enthalpy of Na^+ would be: [4]
a) - 5.1 eV b) - 2.55 eV
c) - 10.2 eV d) 2.55 eV
- 50) The table shown below gives the bond dissociation energies (E_{diss}) for single covalent bonds of carbon (C) atoms with element A, B, C and D. Which element has the smallest atoms?

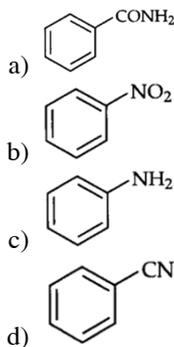
Bond	E_{diss} (KJ mol ⁻¹)
C - A	240
C - B	328
C - C	276
C - D	485

[4]

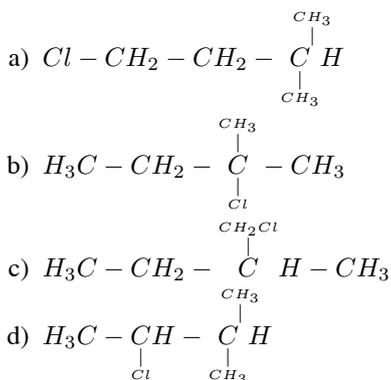
- a) A b) D
c) B d) C
- 51) Which one shows maximum hydrogen bonding? [4]



- 85) A given nitrogen - containing aromatic compound **A** reacts with Sn/HCl, followed by HNO₂ to give an unstable compound **B**. **B**, on treatment with phenol, forms a beautiful coloured compound **C** with the molecular formula C₁₂H₁₀N₂O. The structure of compound **A** is: [4]



- 86) Which one of the following does not exhibit the phenomenon of mutarotation? [4]
- a) (+) Sucrose b) (+) Lactose
c) (+) Maltose d) (-) Fructose
- 87) Which of the following is an amine hormone? [4]
- a) Thyroxine b) Oxytocin
c) Insulin d) Progesterone
- 88) The central dogma of molecular genetics states that the genetic information flows from: [4]
- a) DNA → Carbohydrates → Proteins
b) DNA → RNA → Proteins
c) Amino acids → Proteins → DNA
d) DNA → RNA → Carbohydrates
- 89) An alkene **A** on reaction with O₃ and Zn - H₂O gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene **A** gives **B** as the major product. The structure of product **B** is: [4]



- 90) Reaction of with RMgX leads to the formation of [4]
- a) RCH₂CH₂OH
b) $\overset{R}{\underset{R}{C}}HCH_2OH$
c) RCHOHR
d) RCHOHCH₃

BOTANY

- 91) Which one of the following animals is correctly matched with its particular named taxonomic category? [4]
- a) Housefly - Musca, order
b) Humans - Primate, family
c) Cuttlefish - Mollusca, class
d) Tiger - Tigris, species
- 92) Which one of the following is wrong for fungi? [4]
- a) All fungi possess a purely cellulosic cell wall
b) They are heterotrophic
c) They are both unicellular and multicellular
d) They are eukaryotic
- 93) Which of the following statements is correct?
- Some of the organisms can fix atmospheric nitrogen in specialized cells called sheath cells.
 - Fusion of two cells is called Karyogamy.
 - Fusion of protoplasts between two motile or non-motile gametes is called plasmogamy.
 - Organisms that depend on living plants are called saprophytes.
- [4]
- a) Statement (a) is correct.
b) Statement (c) is correct.
c) Statement (b) is correct.
d) Statement (d) is correct.
- 94) Which one single organism or the pair of organisms is correctly assigned to its or their named taxonomic group? [4]
- a) Nostoc and Anabaena are examples of protista.
b) Lichen is a composite organism formed from the symbiotic association of an algae and a protozoan.
c) Paramecium and Plasmodium belong to the same kingdom as that of Penicillium.
d) Yeast used in making bread and beer is a fungus.
- 95) In angiosperm functional megaspore develops into: [4]
- a) Pollen sac b) Embryo sac
c) Ovule d) Endosperm
- 96) Attractants and reward are required for: [4]
- a) Cleistogamy b) Hydrophily
c) Entomophily d) Anemophily
- 97) Select the correct statement: [4]
- a) Sequoia is one of the tallest trees
b) Gymnosperms are both homosporous and heterosporous
c) Salvinia, Ginkgo and Pinus all are gymnosperms
d) The leaves of gymnosperms are not well adapted to extremes of climate
- 98) After karyogamy followed by meiosis, spores are produced exogenously in: [4]
- a) Alternaria b) Neurospora
c) Agaricus d) Saccharomyces

- 99) Conifers are adapted to tolerate extreme environmental conditions because of: [4]
 a) Superficial stomata b) Broad hardy leaves
 c) Presence of vessels d) Thick cuticle
- 100) Male gametophyte with least number of cells is present in: [4]
 a) Pteris b) Pinus
 c) Funaria d) Lilium
- 101) The body of the ovule is fused within the funicle at: [4]
 a) Hilum b) Chalaza
 c) Micropyle d) Nucellus
- 102) Which one of the following statements is not true? [4]
 a) Pollen grains are rich in nutrients, and they are used in the form of tablets and syrups.
 b) Honey is made by bees by digesting pollen collected from flowers.
 c) The flowers pollinated by flies and bats secrete foul odour to attract them.
 d) Pollen grains of some plants cause severe allergies and bronchial afflictions in some people.
- 103) Sweet potato is modified: [4]
 a) Stem b) Tap root
 c) Rhizome d) Adventitious root
- 104) Placentation in tomato and lemon is: [4]
 a) Parietal b) Free - central
 c) Marginal d) Axile
- 105) Ray florets have: [4]
 a) Superior ovary b) Inferior ovary
 c) Hypogynous ovary d) Half inferior ovary
- 106) Transmission tissue is characteristic feature of: [4]
 a) Dry stigma b) Wet stigma
 c) Solid style d) Hollow style
- 107) Cortex is the region found between: [4]
 a) Endodermis and pith
 b) Epidermis and stele
 c) Pericycle and endodermis
 d) Endodermis and vascular bundle
- 108) In a cross between a male and female, both heterozygous for sickle cell anemia gene, what percentage of the progeny will be diseased? [4]
 a) 75% b) 50%
 c) 100% d) 25%
- 109) Which is the most common mechanism of genetic variation in the population of a sexually - reproducing organism? [4]
 a) Genetic drift
 b) Recombination
 c) Transduction
 d) Chromosomal aberrations
- 110) What map unit (Centimorgan) is adopted in the construction of genetic maps? [4]
 a) A unit of distance between genes on chromosomes, representing 1% cross over.
 b) A unit of distance between two expressed genes, representing 100% cross over.
 c) A unit of distance between two expressed genes, representing 10% cross over.
 d) A unit of distance between genes on chromosomes, representing 50% cross over.
- 111) AGGTATCGCAT is a sequence from the coding strand of a gene, what will be the corresponding sequence of the transcribed mRNA? [4]
 a) UCCAUGCGUA b) ACCUAUGCGAU
 c) AGGUAUCGCAU d) UGGTUTCGCAT
- 112) Which of the following rRNAs acts as structural RNA as well as ribozyme in bacteria? [4]
 a) 18 S rRNA b) 23 S rRNA
 c) 5 S rRNA d) 5.8 S rRNA
- 113) A single strand of nucleic acid tagged with a radioactive molecule is called: [4]
 a) Plasmid b) Probe
 c) Vector d) Selectable marker
- 114) DNA replication in bacteria occurs: [4]
 a) Just before transcription
 b) Within nucleolus
 c) Prior to fission
 d) During s - phase
- 115) Microtubules are the constituents of: [4]
 a) Centrioles, spindle fibres and chromatin
 b) Cilia, flagella and peroxisomes
 c) Centrosome, nucleosome and centrioles
 d) Spindle fibers, centrioles and cilia
- 116) Which of the following are not membrane - bound? [4]
 a) Ribosomes b) Vacuoles
 c) Lysosomes d) Mesosomes
- 117) Which of the following statements is not correct? [4]
 a) Lysosomes have numerous hydrolytic enzymes.
 b) Lysosomes are membrane bound structures.
 c) The hydrolytic enzymes of lysosomes are active under acidic pH.
 d) Lysosomes are formed by the process of packaging in the endoplasmic reticulum.
- 118) Widal Test is carried out to test: [4]
 a) Malaria b) Diabetes mellitus
 c) HIV/AIDS d) Typhoid fever
- 119) Motile zygote of Plasmodium occurs in: [4]
 a) Salivary glands of Anopheles
 b) Human RBCs
 c) Human liver
 d) Gut of female Anophele
- 120) Which of the following elements helps in maintaining the structure of ribosomes? [4]
 a) Magnesium b) Copper
 c) Molybdenum d) Zinc
- 121) Attachment of spindle fibers to kinetochores of chromosomes becomes evident in: [4]
 a) Telophase b) Anaphase
 c) Prophase d) Metaphase
- 122) Amensalism can be represented as: [4]
 a) Species A (+); Species B (0)
 b) Species A (+); Species B (+)
 c) Species A (-); Species B (0)
 d) Species A (-); Species B (-)
- 123) Of the total incident solar radiation the proportion of PAR is: [4]
 a) About 70% b) Less than 50%
 c) More than 80% d) About 60%

- 124) Which one of the following is an example of carrying out biological control of pests/diseases using microbes? [4]
- Lady bird beetle against aphids in mustard
 - Bt - cotton to increase cotton yield
 - Trichoderma sp. against certain plant pathogens
 - Nucleopolyhedrovirus against white rust in Brassica
- 125) World Summit on Sustainable Development of 2002 was held in: [4]
- South Africa
 - Argentina
 - Brazil
 - Sweden
- 126) All of the following are included in Ex - situ conservation except: [4]
- Botanical gardens
 - Seed banks
 - Sacred groves
 - Wild life safari park
- 127) The organisation which publishes the Red List of species is: [4]
- WWF
 - ICFRE
 - UNEP
 - IUCN

- 128) Match the stages of meiosis in Column - I to their characteristic features in Column - II and select the correct option using the codes given below:

Column - I	Column - II
(a) Pachytene	(i) Pairing of homologous chromosomes
(b) Metaphase - I	(ii) Termination of chiasmata
(c) Diakinesis	(iii) Crossing over takes place
(d) Zygotene	(iv) Chromosomes align at the equatorial plate

Codes: [4]

- A - (ii), b - (iv), c - (iii), d - (i)
 - A - (iv), b - (iii), c - (ii), d - (i)
 - A - (i), b - (iv), c - (ii), d - (iii)
 - A - (iii), b - (iv), c - (ii), d - (i)
- 129) Dissolution of the synaptonemal complex occurs during: [4]
- Leptotene
 - Diplotene
 - Pachytene
 - Zygotene
- 130) The C_4 plants are photosynthetically more efficient than C_3 plants because: [4]
- CO_2 generated during photorespiration is trapped and recycled through PEP carboxylase
 - The CO_2 efflux is not prevented
 - They have more chloroplasts
 - The CO_2 compensation point is more
- 131) The essential element required for water splitting in photosynthesis leading to oxygen evolution is [4]
- Mn
 - K
 - Mg
 - Mo

- 132) A plant in your garden avoids photorespiratory losses, has improved water use efficiency shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilisation. In which of the following physiological groups would you assign this plant? [4]
- CAM
 - Nitrogen fixer
 - C_4
 - C_3
- 133) Oxidative phosphorylation is: [4]
- Formation of ATP by transfer of phosphate group from a substrate to ADP
 - Addition of phosphate group to ATP
 - Oxidation of phosphate group in ATP
 - Formation of ATP by energy released from electrons removed during substrate oxidation
- 134) The typical growth curve in plants is: [4]
- Stair - steps shaped
 - Parabolic
 - Linear
 - Sigmoid
- 135) Through their effect on plant growth regulators, what do the temperature and light control in the plants? [4]
- Foot elongation
 - Closure of stomata
 - Apical dominance
 - Flowering

ZOOLOGY

- 136) Which one of the following pairs of animals are similar to each other pertaining to the feature stated against them? [4]
- Ascaris and Ancylostoma - Metameric segmentation
 - Pteropus and Ornithorhynchus - Viviparity
 - Garden lizard and Crocodile - Three - chambered - heart
 - Sea horse and Flying fish - Cold - blooded (poikilothermal)
- 137) Match the name of the animal (Column I) with one characteristic (Column II) and the phylum/class (Column III) to which it belongs.

Column I	Column II	Column III
(a) Ichthyophis	Terrestrial	Reptile
(b) Limulus	Body covered by chitinous exoskeleton	Pisces
(c) Adamsia	Radially symmetrical	Porifera
(d) Petromyzon	Ectoparasite	Cyclostomata

[4]

- Column I** - Limulus, **Column II** - Body covered by chitinous exoskeleton, **Column III** - Pisces
 - Column I** - Adamsia, **Column II** - Radially symmetrical, **Column III** - Porifera
 - Column I** - Petromyzon, **Column II** - Ectoparasite, **Column III** - Cyclostomata
 - Column I** - Ichthyophis, **Column II** - Terrestrial, **Column III** - Reptile
- 138) Match the following columns and select the correct option.

Column - I	Column - II
(a) 6 - 15 pairs of gill slits	(i) Trygon
(b) Heterocercal caudal fin	(ii) Cyclostomes
(c) Air Bladder	(iii) Chondrichthyes
(d) Poison sting	(iv) Osteichthyes

[4]

- a) (a) - (i), (b) - (iv), (c) - (iii), (d) - (ii)
 b) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i)
 c) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
 d) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)

139) Match List - I with List - II

List - I	List - II
(a) Physalia	(i) Pearl oyster
(b) Limulus	(ii) Portuguese Man of War
(c) Ancylostoma	(iii) Living fossil
(d) Pinctada	(iv) Hookworm

Choose the correct answer from the options given below:

[4]

- a) (a) - (i), (b) - (iv), (c) - (iii), (d) - (ii)
 b) (a) - (iv), (b) - (i), (c) - (iv), (d) - (i)
 c) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
 d) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

140) Select the incorrectly matched pair from following:

- Chondrocytes - Smooth muscle cells
- Neurons - Nerve cells
- Fibroblast - Areolar tissue
- Osteocytes - Bone cells

[4]

- a) Option (d) is incorrectly matched pair
 b) Option (b) is incorrectly matched pair
 c) Option (a) is incorrectly matched pair
 d) Option (c) is incorrectly matched pair

141) Which of the following characteristics is incorrect with respect to cockroach? [4]

- a) A ring of gastric caeca is present at the junction of midgut and hind gut.
 b) Hypopharynx lies within the cavity enclosed by the mouth parts
 c) In females, 7th - 9th sterna together form a genital pouch
 d) 10th abdominal segment in both sexes, bears a pair of anal cerci.

142) The body cells in cockroach discharge their nitrogenous waste in the haemolymph mainly in the form of: [4]

- a) Calcium carbonate b) Potassium urate
 c) Ammonia d) Urea

143) Name the chronic respiratory disorder caused mainly by cigarette smoking. [4]

- a) Emphysema
 b) Respiratory acidosis

- c) Respiratory alkalosis
 d) Asthma

144) Lungs do not collapse between breaths and some air always remains in the lungs which can never be expelled because: [4]

- a) Pressure in the lungs is higher than the atmospheric pressure
 b) There is a negative pressure in the lungs
 c) There is a positive intra pleural pressure
 d) There is a negative intra pleural pressure pulling at the lung walls

145) Approximately 73% percent of carbon - dioxide absorbed by transported to the lungs: [4]

- a) By binding to RBC
 b) In the form of dissolved gas molecules
 c) As bicarbonate ions
 d) As carbamino - haemoglobin

146) Figure shows schematic plan of blood circulation in humans with labels A to D. Identify the label and give its function/s.



[4]

- a) B - Pulmonary artery - takes blood from heart to lungs, $P_{O_2} = 90$ mm Hg
 b) D - Dorsal aorta - takes blood from heart to body parts, $P_{O_2} = 95$ mm Hg
 c) A - Pulmonary vein - takes impure blood from body parts, $P_{O_2} = 60$ mm Hg
 d) C - Vena Cava - takes blood from body parts to right auricle, $P_{CO_2} = 45$ mm Hg

147) Select the correct events that occur during inspiration.

- Contraction of diaphragm
- Contraction of external intercostal muscles
- Pulmonary volume decreases
- Intra pulmonary pressure increases

[4]

- a) Option (i)
 b) Option (iii) and (iv)
 c) Option (i), (ii) and (iv)
 d) Option (i) and (ii)

148) Which of the following depicts the correct pathway of transport of sperms? [4]

- a) Rete testis → Efferent ductules → Epididymis → Vas deferens
 b) Efferent ductules → Rete testis → Vas deferens → Epididymis
 c) Rete testis → Vas deferens → Efferent ductules → Epididymis
 d) Rete testis → Epididymis → Efferent ductules → Vas deferens

149) Which of the following statements is false in respect of viability of mammalian sperm? [4]

- a) Sperm is viable for only up to 24 hours
 b) Viability of sperm is determined by its motility
 c) Sperms must be concentrated in a thick suspension

- d) Survival of sperm depends on the pH of the medium and is more active in alkaline medium

150) In human adult females, oxytocin: [4]

- Stimulates pituitary to secrete vasopressin
- Causes strong uterine contractions during parturition
- Is secreted by embryo.
- Stimulates the growth of mammary glands

151) The test - tube baby programme employs which one of the following techniques? [4]

- Intra Cytoplasmic Spenn Injection (ICSI)
- Intra Uterine Insemination (IUI)
- Zygote Intra Fallopian Transfer (ZIFT)
- Gamete Intra Fallopian Transfer (GIFT)

152) The technique called gamete intra fallopian transfer (GIFT) is recommended for those females: [4]

- Who cannot provide suitable environment for fertilisation
- Who cannot produce an ovum
- Who cannot retain the foetus inside the uterus
- Whose cervical canal is too narrow to allow passage for the sperms

153) Tubectomy is a method of sterilization in which: [4]

- Uterus is removed surgically
- Small part of the fallopian tube is removed or tied up
- Small part of vas deferens is removed or tied up
- Ovaries are removed surgically

154) Which one of the following are analogous structures? [4]

- Gills of Prawn and Lungs of Man
- Flippers of Dolphin and Legs of Horse
- Wings of Bat and Wings of Pigeon
- Thoms of Bougainvillea and Tendrils of Cucurbita

155) According to Darwin, the organic evolution is due to: [4]

- Intraspecific competition
- Reduced feeding efficiency in one species due to the presence of interfering species
- Interspecific competition
- Competition within closely related species

156) Industrial melanism is an example of : [4]

- Natural selection
- Neo Darwinism
- Neo Lamarckism
- Mutation

157) Use of an artificial kidney during hemodialysis may result in:

- Nitrogenous waste build - up in the body
- Non - elimination of excess potassium ions
- Reduced absorption of calcium ions from the gastrointestinal tract
- Reduced RBC production

Which of the following options is the most appropriate?

[4]

- (iii) and (iv) are correct
- (i) and (iv) are correct
- (ii) and (iii) are correct
- (i) and (ii) are correct

158) Which of the following statements is correct?

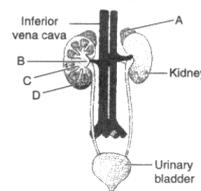
- The ascending limb of loop of Henle is impermeable to water.

- The descending limb of loop of Henle is impermeable to water.
- The ascending limb of loop of Henle is permeable to water.
- The descending limb of loop of Henle is permeable to electrolytes.

[4]

- Statement d is correct
- Statement c is correct
- Statement b is correct
- Statement a is correct

159) Figure shows human urinary system with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and/or functions :



[4]

- B - Pelvis - broad funnel shaped space inner to hilum, directly connected to loops of Henle
- A - Adrenal gland - located at the anterior part of kidney. Secrete Catecholamines which stimulate glycogen breakdown
- C - Medulla - inner zone of kidney and contains complete nephrons
- D - Cortex - outer part of kidney and do not contain any part of nephrons

160) Osteoporosis, an age - related disease of the skeletal system, may occur due to:

- Decreased level of estrogen
- Accumulation of uric acid leading to inflammation of joints
- An immune disorder affecting neuromuscular junction leading to fatigue
- High concentration of Ca^{++} and Na^+

[4]

- Only D
- Only B
- Only A
- Only C

161) Name the ion responsible for the unmasking of active sites for myosin for cross - bridge activity during muscle contraction. [4]

- Calcium
- Potassium
- Magnesium
- Sodium

162) The H - zone in the skeletal muscle fibre is due to:

- The absence of myofibrils in the central portion of A - band
- The central gap between myosin filaments in the A - band
- The central gap between actin filaments extending through myosin filaments in the A - band
- Extension of myosin filaments in the central portion of the A - band

[4]

- Only A
- Only D
- Only B
- Only C

163) The human hind brain comprises three parts, one of which is: [4]

- Corpus callosum
- Cerebellum
- Hypothalamus
- Spinal

164) Nissal bodies are mainly composed of: [4]

- a) Proteins and lipids
- b) Free ribosomes and RER
- c) DNA and RNA
- d) Nucleic acid and SER

165) Which of the following structure or regions is incorrectly paired with its function? [4]

- a) Corpus callosum: Band of fibres connecting left and right cerebral hemispheres.
- b) Medulla oblongata: Controls respiration and cardiovascular reflexes.
- c) Limbic system: Consists of fibre tracts that interconnect different regions of brain: Controls movement.
- d) Hypothalamus: Production of releasing hormones and regulation of temperature, hunger, and thrust.

166) The 24 hour (diurnal) rhythm of our body such as the sleep - wake cycle is regulated by the hormone: [4]

- a) Adrenaline
- b) Melatonin
- c) Calcitonin
- d) Prolactin

167) Name a peptide hormone that acts mainly on hepatocytes, adipocytes and enhances cellular glucose uptake and utilization. [4]

- a) Secretin
- b) Insulin
- c) Glucagon
- d) Gastrin

168) The posterior pituitary gland is not a true endocrine gland because: [4]

- a) It secretes enzymes
- b) It is provided with a duct
- c) It only stores and releases hormone
- d) It is under the regulation of hypothalamus

169) Match the following columns and select the correct option:

Column - I	Column - II
(A) Pituitary hormone	(i) Steroid
(B) Epinephrine	(ii) Neuropeptides
(C) Endorphins	(iii) Peptides, proteins
(D) Cortisol	(iv) Biogenic amines

[4]

- a) (A) - (iv), (B) - (iii), (C) - (i), (D) - (ii)
- b) (A) - (iii), (B) - (iv), (C) - (ii), (D) - (i)
- c) (A) - (iii), (B) - (iv), (C) - (i), (D) - (ii)
- d) (A) - (iv), (B) - (i), (C) - (ii), (D) - (iii)

170) Blood pressure in the mammalian aorta is maximum during: [4]

- a) Systole of the left atrium
- b) Diastole of the right atrium
- c) Diastole of the right ventricle
- d) Systole of the left ventricle

171) Which of the following is associated with decrease in cardiac output? [4]

- a) Parasympathetic neural signals
- b) Sympathetic nerves
- c) Adrenal medullary hormones
- d) Pneumotaxic centre

172) Serum differs from blood in Lacking: [4]

- a) Albumins
- b) Clotting factors
- c) Globulins
- d) Antibodies

173) Select the correct statement from the following:

- i. Gel electrophoresis is used for amplification of a DNA segment.
- ii. The polymerase enzyme joins the gene of interest and the vector DNA.
- iii. Restriction enzyme digestions are performed by incubating purified DNA molecules with the restriction enzymes of optimum conditions.
- iv. PCR is used for isolation and separation of gene of interest.

[4]

- a) Statement d is correct.
- b) Statement a is correct.
- c) Statement c is correct.
- d) Statement b is correct.

174) In recombinant DNA technology, antibiotics are used [4]

- a) To keep medium bacteria - free.
- b) To detect alien DNA.
- c) As selectable markers.
- d) To impart disease resistance to the host plant.

175) Which one is a true statement regarding DNA polymerase used in PCR? [4]

- a) It serves as a selectable marker
- b) It is used to ligate introduced DNA in recipient cell
- c) It is isolated from a virus
- d) It remains active at high temperature

176) Which one of the following techniques made it possible to genetically engineer living organisms? [4]

- a) Recombinant DNA techniques
- b) Hybridization
- c) X - ray diffraction
- d) Heavier isotope labelling

177) Which one of the following is now being commercially produced by biotechnological procedures? [4]

- a) Quinine
- b) Morphine
- c) Nicotine
- d) Insulin

178) Silencing of mRNA has been used in producing transgenic plants resistant to: [4]

- a) Boll worms
- b) White rusts
- c) Nematodes
- d) Bacterial blights

179) The first human hormone produced by recombinant DNA technology is: [4]

- a) Oestrogen
- b) Insulin
- c) Progesterone
- d) Thyroxine

180) Which part of the tobacco plant is infected by *Meloidogyne incognita*? [4]

- a) Root
- b) Leaf
- c) Stem
- d) Flower