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| <b>NEET (UG) – 2027 PRACTICE EXAMINATION</b><br>MOST-EXPECTED FULL SYLLABUS TEST BOOKLET |  |  | <b>SET 3</b> |
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|                        |                                                                                  |                         |                                                      |
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| <b>Candidate</b>       | Aamirah Fathima                                                                  | <b>Test Booklet Set</b> | 3                                                    |
| <b>Time Allowed</b>    | 3 hours 20 minutes<br>(200 minutes)                                              | <b>Maximum Marks</b>    | 720                                                  |
| <b>Total Questions</b> | 180 (all compulsory)                                                             | <b>Marking Scheme</b>   | +4 for correct, –1 for incorrect, 0 if not attempted |
| <b>Subjects</b>        | Physics (Q.1–45)   Chemistry (Q.46–90)   Botany (Q.91–135)   Zoology (Q.136–180) |                         |                                                      |

### **IMPORTANT INSTRUCTIONS**

1. The Test Booklet consists of **180 questions**. The maximum marks are **720**.
2. There are four parts in the question paper, viz. Physics, Chemistry, Botany and Zoology, consisting of **45 questions each**. All questions are compulsory.
3. Each question carries **4 marks**. For every correct response 4 marks will be awarded. For every incorrect response **one mark** will be deducted. No deduction is made for questions not attempted.
4. Only **one** option out of the four given against each question is correct. Darken the appropriate circle on the answer sheet with a ball point pen. More than one darkened circle will be treated as an incorrect response.
5. Use of electronic calculators, log tables, mobile phones or any other electronic device is **not permitted**.
6. Rough work is to be done on the space provided in this Test Booklet only. Do not write anything on the answer sheet other than the required entries.
7. Values of physical constants, wherever required, are to be taken as:  $g = 10 \text{ m s}^{-2}$ ,  $c = 3 \times 10^8 \text{ m s}^{-1}$ ,  $N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$ ,  $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$ .
8. The syllabus followed is the rationalised NCERT syllabus notified for NEET (UG). Deleted chapters have not been examined.
9. Do not check the answer key until the full paper has been attempted under timed conditions.

|                             |
|-----------------------------|
| <i>SPACE FOR ROUGH WORK</i> |
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## PHYSICS

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**1.** The dimensional formula of the universal gravitational constant  $G$  is

- (1)  $[ML^2T^{-2}]$  (2)  $[M^{-1}L^3T^{-2}]$   
(3)  $[M^{-1}L^2T^{-1}]$  (4)  $[ML^3T^{-2}]$

**2.** The product  $2.5 \times 1.25$ , expressed to the correct number of significant figures, is

- (1) 3.125 (2) 3.13  
(3) 3.1 (4) 3

**3.** The position of a particle is given by  $x = 4t^2 + 2t$ . Its velocity at  $t = 2$  s is

- (1)  $10 \text{ m s}^{-1}$  (2)  $16 \text{ m s}^{-1}$   
(3)  $18 \text{ m s}^{-1}$  (4)  $20 \text{ m s}^{-1}$

**4.** A projectile thrown with a fixed speed has the same horizontal range for angles of projection

- (1)  $30^\circ$  and  $45^\circ$  (2)  $30^\circ$  and  $60^\circ$   
(3)  $45^\circ$  and  $60^\circ$  (4)  $20^\circ$  and  $60^\circ$

**5.** A man of mass  $m$  stands in a lift descending with acceleration  $a$ . His apparent weight is

- (1)  $m(g + a)$  (2)  $m(g - a)$   
(3)  $mg$  (4)  $ma$

**6.** A gun of mass 4 kg fires a bullet of mass 20 g with a muzzle velocity of  $400 \text{ m s}^{-1}$ . The recoil velocity of the gun is

- (1)  $0.5 \text{ m s}^{-1}$  (2)  $1 \text{ m s}^{-1}$   
(3)  $2 \text{ m s}^{-1}$  (4)  $4 \text{ m s}^{-1}$

**7.** A body falls freely from rest. The ratio of its kinetic energy at half the height of fall to that on reaching the ground is

- (1) 1 : 4 (2) 1 : 2  
(3) 1 :  $\sqrt{2}$  (4) 2 : 1

**8.** The moment of inertia of a uniform circular ring of mass  $M$  and radius  $R$  about a diameter is

- (1)  $MR^2$  (2)  $MR^2/2$   
(3)  $MR^2/4$  (4)  $2MR^2$

**9.** A solid sphere rolls down an incline without slipping from a height  $h$ . Its speed at the bottom is

- (1)  $\sqrt{2gh}$  (2)  $\sqrt{10gh/7}$   
(3)  $\sqrt{4gh/3}$  (4)  $\sqrt{gh}$

**10.** The acceleration due to gravity at a height equal to the radius of the earth is

- (1)  $g/2$  (2)  $g/4$   
(3)  $g/8$  (4)  $2g$

**11.** A geostationary satellite orbits the earth with a period of

- (1) 1 hour (2) 12 hours  
(3) 24 hours (4) 365 days

**12.** A wire of a given material breaks under a load  $W$ . If a wire of the same material and same radius but half the length is taken, it will break under a load of

- (1)  $W/2$  (2)  $W$   
(3)  $2W$  (4)  $4W$

**13.** Water flows through a pipe whose cross-sectional area narrows to one quarter. The speed of flow in the narrow section becomes

- (1) One quarter (2) Half  
(3) Twice (4) Four times

**14.** The rise of a liquid in a capillary tube is

- (1) Directly proportional to the radius  
(2) Inversely proportional to the radius  
(3) Independent of the radius  
(4) Proportional to the square of the radius

**15.** The relation between the coefficient of volume expansion  $\gamma$  and the coefficient of linear expansion  $\alpha$  is

- (1)  $\gamma = \alpha$  (2)  $\gamma = 2\alpha$   
(3)  $\gamma = 3\alpha$  (4)  $\gamma = \alpha/3$

**16.** The heat required to melt 10 g of ice at  $0^\circ\text{C}$  into water at  $0^\circ\text{C}$  is (latent heat of fusion =  $80 \text{ cal g}^{-1}$ )

- (1) 80 cal (2) 400 cal  
(3) 800 cal (4) 8000 cal

**17.** In an isochoric process, the heat supplied to a gas

- (1) Is entirely converted into work  
(2) Entirely increases the internal energy  
(3) Is zero  
(4) Equals the enthalpy change plus work

**18.** The coefficient of performance of a refrigerator working between 250 K and 300 K is

- (1) 1 (2) 5  
(3) 6 (4) 0.2

**19.** The pressure exerted by an ideal gas is given by

- |                                            |                                            |
|--------------------------------------------|--------------------------------------------|
| (1) $P = \rho v^2$                         | (2) $P = \frac{1}{3}\rho v^2_{\text{rms}}$ |
| (3) $P = \frac{2}{3}\rho v^2_{\text{rms}}$ | (4) $P = 3\rho v^2_{\text{rms}}$           |

**20.** The total energy of a particle of mass  $m$  executing SHM of angular frequency  $\omega$  and amplitude  $A$  is

- |                              |                                |
|------------------------------|--------------------------------|
| (1) $\frac{1}{2}m\omega A^2$ | (2) $\frac{1}{2}m\omega^2 A^2$ |
| (3) $m\omega^2 A^2$          | (4) $\frac{1}{2}m\omega^2 A$   |

**21.** The distance between two successive nodes in a stationary wave is

- |                 |                 |
|-----------------|-----------------|
| (1) $\lambda$   | (2) $\lambda/2$ |
| (3) $\lambda/4$ | (4) $2\lambda$  |

**22.** The speed of a transverse wave on a stretched string of tension  $T$  and linear mass density  $\mu$  is

- |                    |                    |
|--------------------|--------------------|
| (1) $\sqrt{\mu/T}$ | (2) $\sqrt{T/\mu}$ |
| (3) $T/\mu$        | (4) $T\mu$         |

**23.** Electric field lines

- (1) Can intersect one another
- (2) Never intersect one another
- (3) Always form closed loops
- (4) Start from negative charges

**24.** Two point charges of  $+4 \mu\text{C}$  and  $-4 \mu\text{C}$  are placed 2 m apart. The electric potential at the midpoint of the line joining them is

- |           |           |
|-----------|-----------|
| (1) Zero  | (2) 36 kV |
| (3) 72 kV | (4) 18 kV |

**25.** The energy stored in a  $2 \mu\text{F}$  capacitor charged to a potential of 100 V is

- |            |            |
|------------|------------|
| (1) 0.01 J | (2) 0.02 J |
| (3) 0.1 J  | (4) 1 J    |

**26.** Kirchhoff's junction rule is based on the conservation of

- |              |                   |
|--------------|-------------------|
| (1) Energy   | (2) Charge        |
| (3) Momentum | (4) Magnetic flux |

**27.** Resistances of  $4 \Omega$  and  $6 \Omega$  are connected in parallel. Their equivalent resistance is

- |                  |                  |
|------------------|------------------|
| (1) $2.0 \Omega$ | (2) $2.4 \Omega$ |
| (3) $5.0 \Omega$ | (4) $10 \Omega$  |

**28.** A 100 W bulb and a 60 W bulb, both rated 220 V, are connected in series across a 220 V supply. Then

- (1) The 100 W bulb glows brighter
- (2) The 60 W bulb glows brighter
- (3) Both glow equally
- (4) Neither glows

**29.** The magnetic field at a point 2 cm from a long straight wire carrying 5 A is

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (1) $2 \times 10^{-5} \text{ T}$ | (2) $5 \times 10^{-5} \text{ T}$ |
| (3) $5 \times 10^{-6} \text{ T}$ | (4) $1 \times 10^{-4} \text{ T}$ |

**30.** The current sensitivity of a moving coil galvanometer is increased by

- (1) Decreasing the number of turns
- (2) Increasing the torsional constant of the suspension
- (3) Increasing the number of turns and the area of the coil
- (4) Decreasing the magnetic field

**31.** The net magnetic flux through any closed surface is always zero because

- (1) Magnetic fields are weak
- (2) Isolated magnetic monopoles do not exist
- (3) Magnetic field lines are straight
- (4) Magnetic materials are neutral

**32.** The magnetic flux through a coil changes from 5 Wb to 1 Wb in 0.2 s. The magnitude of the average induced emf is

- |          |          |
|----------|----------|
| (1) 4 V  | (2) 10 V |
| (3) 20 V | (4) 25 V |

**33.** Eddy currents are put to practical use in

- (1) Electric heaters
- (2) Induction furnaces and electromagnetic braking
- (3) Fuse wires
- (4) Filament lamps

**34.** In a series LCR circuit  $R = 3 \Omega$  and  $(X_L - X_C) = 4 \Omega$ . The impedance of the circuit is

- |                |                |
|----------------|----------------|
| (1) 1 $\Omega$ | (2) 3 $\Omega$ |
| (3) 5 $\Omega$ | (4) 7 $\Omega$ |

**35.** A wattless current flows in a circuit containing

- (1) Only a resistor
- (2) Only a pure inductor or capacitor
- (3) A resistor and an inductor
- (4) A resistor at resonance

**36.** In an electromagnetic wave, the electric field, the magnetic field and the direction of propagation are

- (1) All parallel
- (2) Mutually perpendicular
- (3) At  $45^\circ$  to one another
- (4) Randomly oriented

**37.** The power of a lens of focal length 25 cm is

- (1) 0.25 D
- (2) 2 D
- (3) 4 D
- (4) 25 D

**38.** The magnifying power of an astronomical telescope in normal adjustment is

- (1)  $f_e/f_o$
- (2)  $f_o/f_e$
- (3)  $f_o \times f_e$
- (4)  $f_o + f_e$

**39.** In Young's double slit experiment, constructive interference occurs when the path difference equals

- (1)  $(2n + 1)\lambda/2$
- (2)  $n\lambda$
- (3)  $n\lambda/2$
- (4)  $(2n - 1)\lambda/4$

**40.** According to Brewster's law, the tangent of the polarising angle is equal to

- (1) The wavelength of light
- (2) The refractive index of the medium
- (3) The critical angle
- (4) Unity

**41.** The de Broglie wavelength of an electron accelerated through a potential difference of V volts is nearly

- (1)  $12.27/\sqrt{V} \text{ \AA}$
- (2)  $12.27 V \text{ \AA}$
- (3)  $1.227/V \text{ \AA}$
- (4)  $\sqrt{V}/12.27 \text{ \AA}$

**42.** The density of a nucleus

- (1) Increases with mass number
- (2) Decreases with mass number
- (3) Is independent of mass number
- (4) Is proportional to  $A^2$

**43.** In the hydrogen spectrum, the transition from  $n = 3$  to  $n = 2$  produces a line in the

- (1) Lyman series, ultraviolet
- (2) Balmer series, visible
- (3) Paschen series, infrared
- (4) Brackett series

**44.** A full wave rectifier is fed from a 50 Hz AC supply. The ripple frequency of its output is

- (1) 25 Hz
- (2) 50 Hz
- (3) 100 Hz
- (4) 200 Hz

**45.** In an n-type semiconductor, the majority charge carriers are

- (1) Holes
- (2) Electrons
- (3) Positive ions
- (4) Negative ions

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## CHEMISTRY

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**46.** The molarity of a solution containing 5.85 g of NaCl in 500 mL of solution is (molar mass = 58.5)

- |           |           |
|-----------|-----------|
| (1) 0.1 M | (2) 0.2 M |
| (3) 0.5 M | (4) 1.0 M |

**47.** The mass of CO<sub>2</sub> produced by the complete combustion of 12 g of carbon is

- |          |          |
|----------|----------|
| (1) 12 g | (2) 22 g |
| (3) 44 g | (4) 88 g |

**48.** The electronic configuration of Cu<sup>2+</sup> (Z = 29) is

- |                                          |                                          |
|------------------------------------------|------------------------------------------|
| (1) [Ar]3d <sup>9</sup> 4s <sup>0</sup>  | (2) [Ar]3d <sup>8</sup> 4s <sup>1</sup>  |
| (3) [Ar]3d <sup>10</sup> 4s <sup>1</sup> | (4) [Ar]3d <sup>10</sup> 4s <sup>2</sup> |

**49.** The number of radial nodes in a 3s orbital is

- |       |       |
|-------|-------|
| (1) 0 | (2) 1 |
| (3) 2 | (4) 3 |

**50.** The first ionisation enthalpy of boron is lower than that of beryllium because

- (1) Boron is larger
- (2) The 2p electron of boron is more easily removed than the paired 2s electron of beryllium
- (3) Boron has a half-filled shell
- (4) Beryllium is a metal

**51.** The most electronegative element in the periodic table is

- |              |              |
|--------------|--------------|
| (1) Chlorine | (2) Oxygen   |
| (3) Fluorine | (4) Nitrogen |

**52.** Which of the following contains a coordinate (dative) bond?

- |                      |                                  |
|----------------------|----------------------------------|
| (1) CH <sub>4</sub>  | (2) NH <sub>4</sub> <sup>+</sup> |
| (3) H <sub>2</sub> O | (4) CO <sub>2</sub>              |

**53.** The dipole moment of NH<sub>3</sub> is greater than that of NF<sub>3</sub> because in NH<sub>3</sub>

- (1) Nitrogen is more electronegative than hydrogen
- (2) The bond moments and the lone pair moment act in the same direction
- (3) There is no lone pair
- (4) The molecule is planar

**54.** The He<sub>2</sub> molecule does not exist because its bond order is

- |         |          |
|---------|----------|
| (1) 0.5 | (2) Zero |
| (3) 1   | (4) 2    |

**55.** According to Fajans' rules, covalent character in an ionic bond increases with

- (1) Larger cation and smaller anion
- (2) Smaller cation with high charge and larger anion
- (3) Low charge on the cation
- (4) Symmetrical anions only

**56.** For a spontaneous process in an isolated system, the entropy change is

- |              |               |
|--------------|---------------|
| (1) Negative | (2) Zero      |
| (3) Positive | (4) Undefined |

**57.** A bomb calorimeter measures the heat change at constant

- |                            |                       |
|----------------------------|-----------------------|
| (1) Pressure, giving ΔH    | (2) Volume, giving ΔU |
| (3) Temperature, giving ΔG | (4) Entropy           |

**58.** An aqueous solution of sodium acetate is

- |            |                |
|------------|----------------|
| (1) Acidic | (2) Neutral    |
| (3) Basic  | (4) Amphoteric |

**59.** A very large value of the equilibrium constant K indicates that

- (1) Reactants predominate at equilibrium
- (2) Products predominate at equilibrium
- (3) The reaction is very slow
- (4) The reaction is endothermic

**60.** Ostwald's dilution law is applicable to

- |                         |                       |
|-------------------------|-----------------------|
| (1) Strong electrolytes | (2) Weak electrolytes |
| (3) Non-electrolytes    | (4) Molten salts      |

**61.** The equivalent mass of KMnO<sub>4</sub> acting as an oxidising agent in acidic medium is

- |         |         |
|---------|---------|
| (1) M/2 | (2) M/3 |
| (3) M/5 | (4) M/6 |

**62.** Which of the following species is a nucleophile?

- |                     |                                  |
|---------------------|----------------------------------|
| (1) BF <sub>3</sub> | (2) AlCl <sub>3</sub>            |
| (3) CN <sup>-</sup> | (4) NO <sub>2</sub> <sup>+</sup> |

63. The correct order of stability of free radicals is

- (1)  $1^\circ > 2^\circ > 3^\circ$  (2)  $3^\circ > 2^\circ > 1^\circ$   
(3)  $2^\circ > 3^\circ > 1^\circ$  (4) All are equally stable

64. Which of the following exhibits optical isomerism?

- (1) 1-Chlorobutane (2) 2-Chlorobutane  
(3) 2-Chloropropane (4) Chloroethane

65. Kolbe's electrolysis of an aqueous solution of sodium acetate gives

- (1) Methane (2) Ethane  
(3) Ethene (4) Ethyne

66. The peroxide (Kharasch) effect is observed with

- (1) HCl only (2) HBr only  
(3) HI only (4) All hydrogen halides

67. According to Hückel's rule, an aromatic compound must have

- (1)  $4n$   $\pi$  electrons  
(2)  $(4n + 2)$   $\pi$  electrons in a planar cyclic system  
(3) Only six carbon atoms  
(4) No delocalised electrons

68. Henry's law states that the solubility of a gas in a liquid is

- (1) Inversely proportional to its partial pressure  
(2) Directly proportional to its partial pressure  
(3) Independent of pressure  
(4) Proportional to the square of pressure

69. A solution showing a negative deviation from Raoult's law forms

- (1) A minimum boiling azeotrope  
(2) A maximum boiling azeotrope  
(3) No azeotrope  
(4) An ideal solution

70. The quantity of electricity required to deposit one mole of aluminium from molten  $\text{Al}_2\text{O}_3$  is

- (1) 1 F (2) 2 F  
(3) 3 F (4) 6 F

71. In a hydrogen-oxygen fuel cell, the electrolyte commonly used is

- (1) Dilute  $\text{H}_2\text{SO}_4$  (2) Aqueous KOH  
(3) Molten NaCl (4) Solid AgCl

72. For a reaction, doubling the concentration of a reactant leaves the rate unchanged. The order with respect to that reactant is

- (1) Zero (2) One  
(3) Two (4) Half

73. The half-life of a zero-order reaction is given by

- (1)  $0.693/k$  (2)  $[A]_0/2k$   
(3)  $2k/[A]_0$  (4)  $1/k[A]_0$

74. Transition metal ions are usually coloured because of

- (1) s-p transitions (2) d-d electronic transitions  
(3) Charge on the nucleus (4) Large atomic size

75. Among the lanthanoids, the element that commonly shows the +4 oxidation state is

- (1) La (2) Ce  
(3) Gd (4) Lu

76. In acidic medium, potassium dichromate oxidises  $\text{Fe}^{2+}$  to  $\text{Fe}^{3+}$  and is itself reduced to

- (1)  $\text{Cr}^{2+}$  (2)  $\text{Cr}^{3+}$   
(3)  $\text{CrO}_4^{2-}$  (4) Cr metal

77. In the spectrochemical series, the ligand producing the largest crystal field splitting among the following is

- (1)  $\text{I}^-$  (2)  $\text{H}_2\text{O}$   
(3)  $\text{NH}_3$  (4) CO

78.  $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$  and  $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$  are

- (1) Linkage isomers (2) Ionisation isomers  
(3) Coordination isomers (4) Geometrical isomers

79. The oxidation state and coordination number of iron in  $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$  are

- (1) +3 and 3 (2) +3 and 6  
(3) +2 and 6 (4) +6 and 3

80. An  $\text{S}_\text{N}2$  reaction at a chiral carbon proceeds with

- (1) Retention of configuration (2) Inversion of configuration  
(3) Racemisation (4) No stereochemical change

**81.** Chloroform is stored in dark coloured bottles filled to the brim because on exposure to air and light it forms

- |                          |              |
|--------------------------|--------------|
| (1) Carbon tetrachloride | (2) Phosgene |
| (3) Chloral              | (4) Methanol |

**82.** Phenol reacts with bromine water to give

- |                          |                   |
|--------------------------|-------------------|
| (1) o-Bromophenol        | (2) p-Bromophenol |
| (3) 2,4,6-Tribromophenol | (4) Bromobenzene  |

**83.** Oxidation of a secondary alcohol with acidified potassium dichromate gives

- |                       |              |
|-----------------------|--------------|
| (1) An aldehyde       | (2) A ketone |
| (3) A carboxylic acid | (4) An ether |

**84.** Clemmensen reduction of propanone gives

- |                 |                    |
|-----------------|--------------------|
| (1) Propan-2-ol | (2) Propane        |
| (3) Propene     | (4) Propanoic acid |

**85.** The correct order of reactivity towards nucleophilic addition is

- |                                                                      |                                                                      |
|----------------------------------------------------------------------|----------------------------------------------------------------------|
| (1) $\text{CH}_3\text{COCH}_3 > \text{CH}_3\text{CHO} > \text{HCHO}$ | (2) $\text{HCHO} > \text{CH}_3\text{CHO} > \text{CH}_3\text{COCH}_3$ |
| (3) $\text{CH}_3\text{CHO} > \text{HCHO} > \text{CH}_3\text{COCH}_3$ | (4) All react equally                                                |

**86.** Heating sodium ethanoate with soda lime gives

- |             |             |
|-------------|-------------|
| (1) Ethane  | (2) Methane |
| (3) Ethanol | (4) Ethanal |

**87.** In the gaseous phase, the order of basicity of amines is

- |                                                 |                                                 |
|-------------------------------------------------|-------------------------------------------------|
| (1) $\text{NH}_3 > 1^\circ > 2^\circ > 3^\circ$ | (2) $3^\circ > 2^\circ > 1^\circ > \text{NH}_3$ |
| (3) $2^\circ > 1^\circ > 3^\circ > \text{NH}_3$ | (4) $1^\circ > 2^\circ > 3^\circ > \text{NH}_3$ |

**88.** Gabriel phthalimide synthesis is used to prepare

- |                             |                              |
|-----------------------------|------------------------------|
| (1) Aromatic primary amines | (2) Aliphatic primary amines |
| (3) Secondary amines        | (4) Tertiary amines          |

**89.** The storage polysaccharide of animals is

- |              |               |
|--------------|---------------|
| (1) Starch   | (2) Cellulose |
| (3) Glycogen | (4) Inulin    |

**90.** Deficiency of vitamin C in the diet causes

- |               |                     |
|---------------|---------------------|
| (1) Beri-beri | (2) Scurvy          |
| (3) Rickets   | (4) Night blindness |

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## BOTANY

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**91.** The correct sequence of taxonomic categories from lower to higher is

- (1) Species, genus, family, order, class, phylum, kingdom
- (2) Species, genus, order, family, class, phylum, kingdom
- (3) Genus, species, family, order, class, kingdom, phylum
- (4) Species, family, genus, order, class, phylum, kingdom

**92.** Slime moulds are

- (1) Prokaryotic decomposers
- (2) Saprophytic protists forming a plasmodium
- (3) Parasitic fungi
- (4) Photosynthetic algae

**93.** Nitrifying bacteria such as *Nitrosomonas* are

- (1) Photosynthetic autotrophs
- (2) Chemosynthetic autotrophs
- (3) Saprophytes
- (4) Obligate parasites

**94.** In a lichen, the fungal partner is called the

- (1) Phycobiont
- (2) Mycobiont
- (3) Symbiont
- (4) Endophyte

**95.** Heterospory, an important evolutionary step, is shown by

- (1) *Funaria* and *Marchantia*
- (2) *Selaginella* and *Salvinia*
- (3) *Riccia* and *Sphagnum*
- (4) *Equisetum* and *Lycopodium*

**96.** In *Chlorophyceae*, the stored food and the main cell wall material are respectively

- (1) Mannitol and algin
- (2) Starch and cellulose
- (3) Floridean starch and cellulose
- (4) Laminarin and pectin

**97.** Whorled phyllotaxy is seen in

- (1) China rose
- (2) *Calotropis*
- (3) *Alstonia*
- (4) Mustard

**98.** Epipetalous stamens and axile placentation are characteristic of the family

- (1) *Fabaceae*
- (2) *Solanaceae*
- (3) *Liliaceae*
- (4) *Brassicaceae*

**99.** Ginger and turmeric are examples of

- (1) Tuber
- (2) Rhizome
- (3) Corm
- (4) Bulb

**100.** The xylem in a dicot root is

- (1) Endarch
- (2) Exarch
- (3) Mesarch
- (4) Centrarch

**101.** The periderm consists of

- (1) Phellem, phellogen and phelloderm
- (2) Only cork cambium
- (3) Xylem and phloem
- (4) Epidermis and cortex

**102.** Sclerenchyma cells are

- (1) Living with thin walls
- (2) Dead with thick lignified walls
- (3) Living with cellulosic thickenings at corners
- (4) Photosynthetic

**103.** Mesosomes in a prokaryotic cell are formed by

- (1) Invaginations of the plasma membrane
- (2) Extensions of the nucleoid
- (3) Folding of the cell wall
- (4) Aggregation of ribosomes

**104.** The Golgi apparatus is mainly concerned with

- (1) Protein synthesis
- (2) Packaging, modification and dispatch of materials
- (3) Lipid digestion
- (4) Photosynthesis

**105.** Histone proteins associated with DNA are

- (1) Negatively charged
- (2) Positively charged due to lysine and arginine
- (3) Neutral
- (4) Acidic due to aspartate

**106.** Enzymes that catalyse the transfer of a group from one substrate to another belong to the class

- |                     |                  |
|---------------------|------------------|
| (1) Oxidoreductases | (2) Transferases |
| (3) Hydrolases      | (4) Lyases       |

**107.** The glycosidic linkage in cellulose is

- |                   |                  |
|-------------------|------------------|
| (1) $\alpha$ -1,4 | (2) $\beta$ -1,4 |
| (3) $\alpha$ -1,6 | (4) $\beta$ -1,6 |

**108.** In meiosis, the chromosome number is halved because

- (1) DNA replicates twice and there is one division
- (2) DNA replicates once and there are two successive nuclear divisions
- (3) There is no DNA replication
- (4) Chromatids do not separate

**109.** Cytokinesis in plant cells occurs by

- (1) Furrowing of the plasma membrane
- (2) Cell plate formation
- (3) Fragmentation of the nucleus
- (4) Budding

**110.** Photolysis of water during photosynthesis is associated with

- |                      |                            |
|----------------------|----------------------------|
| (1) Photosystem I    | (2) Photosystem II         |
| (3) The Calvin cycle | (4) The cytochrome complex |

**111.** Cyclic photophosphorylation results in the synthesis of

- |                        |                 |
|------------------------|-----------------|
| (1) ATP only           | (2) NADPH only  |
| (3) Both ATP and NADPH | (4) Oxygen only |

**112.** The most abundant enzyme in the biosphere is

- |                     |                 |
|---------------------|-----------------|
| (1) PEP carboxylase | (2) RuBisCO     |
| (3) ATP synthase    | (4) Nitrogenase |

**113.** In CAM plants such as pineapple, stomata

- (1) Open during the day and close at night
- (2) Open at night and close during the day
- (3) Remain open always
- (4) Remain closed always

**114.** One turn of the Krebs cycle yields

- |                                           |                                           |
|-------------------------------------------|-------------------------------------------|
| (1) 3 NADH, 1 FADH <sub>2</sub> and 1 GTP | (2) 2 NADH, 2 FADH <sub>2</sub> and 1 ATP |
| (3) 4 NADH and 2 GTP                      | (4) 1 NADH, 1 FADH <sub>2</sub> and 2 ATP |

**115.** Fermentation of glucose by yeast produces

- |                 |                                 |
|-----------------|---------------------------------|
| (1) Lactic acid | (2) Ethanol and CO <sub>2</sub> |
| (3) Acetyl CoA  | (4) Pyruvate only               |

**116.** Apical dominance in plants is caused by

- (1) Auxin produced at the shoot apex
- (2) Cytokinin from the roots
- (3) Ethylene from ripening fruits
- (4) Abscissic acid in the leaves

**117.** Gibberellins are used in the brewing industry to

- (1) Delay ripening
- (2) Speed up the malting process
- (3) Induce dormancy
- (4) Cause abscission

**118.** Microsporogenesis is the process of formation of

- (1) Embryo sac from megaspore
- (2) Microspores from the pollen mother cell by meiosis
- (3) Pollen tube from pollen grain
- (4) Endosperm from PEN

**119.** Entry of the pollen tube into the ovule through the micropyle is called

- |                 |              |
|-----------------|--------------|
| (1) Chalazogamy | (2) Mesogamy |
| (3) Porogamy    | (4) Syngamy  |

**120.** Double fertilisation involves

- (1) Two syngamies
- (2) Syngamy and triple fusion
- (3) Two triple fusions
- (4) Fusion of two polar nuclei only

**121.** Apple and strawberry are examples of

- |                           |                           |
|---------------------------|---------------------------|
| (1) True fruits           | (2) False fruits          |
| (3) Parthenocarpic fruits | (4) Aggregate fruits only |

**122.** Mendel's law of segregation states that

- (1) Alleles of different genes assort independently
- (2) The two alleles of a gene separate during gamete formation
- (3) Dominant alleles are always expressed together
- (4) Genes are located on chromosomes

**123.** Human skin colour is an example of

- (1) Codominance
- (2) Polygenic inheritance
- (3) Incomplete dominance
- (4) Pleiotropy

**124.** Sickle cell anaemia results from the substitution of

- (1) Valine by glutamic acid at position 6 of the  $\alpha$  chain
- (2) Glutamic acid by valine at position 6 of the  $\beta$  chain
- (3) Lysine by valine at position 6 of the  $\beta$  chain
- (4) Glycine by alanine in the  $\alpha$  chain

**125.** Turner's syndrome is characterised by the karyotype

- (1) 47, XXY
- (2) 45, XO
- (3) 47, XYY
- (4) 47, +21

**126.** Semiconservative replication of DNA was experimentally proved in *E. coli* by

- (1) Griffith
- (2) Hershey and Chase
- (3) Meselson and Stahl
- (4) Taylor

**127.** In prokaryotes, the enzyme that catalyses the synthesis of all types of RNA is

- (1) RNA polymerase I
- (2) RNA polymerase II
- (3) A single RNA polymerase
- (4) DNA polymerase III

**128.** tRNA is called the adaptor molecule because it

- (1) Carries the genetic code
- (2) Reads the codon on mRNA at one end and carries the amino acid at the other
- (3) Forms the ribosome
- (4) Replicates DNA

**129.** The chain terminating codons are

- (1) AUG, GUG, UUG
- (2) UAA, UAG, UGA
- (3) AAA, GGG, CCC
- (4) AUG only

**130.** Gause's competitive exclusion principle states that

- (1) Two species can always coexist
- (2) Two closely related species competing for the same limiting resource cannot coexist indefinitely
- (3) Predators always eliminate prey
- (4) Competition never affects populations

**131.** A population with a broad-based age pyramid indicates

- (1) A declining population
- (2) A stable population
- (3) An expanding population
- (4) A population at carrying capacity

**132.** Energy flow in an ecosystem is

- (1) Cyclic
- (2) Unidirectional
- (3) Bidirectional
- (4) Random

**133.** The mass of living material at a trophic level at a given time is called

- (1) Standing state
- (2) Standing crop
- (3) Productivity
- (4) Biomagnification

**134.** Species diversity is generally highest

- (1) At the poles
- (2) In temperate regions
- (3) In the tropics
- (4) At high altitudes

**135.** Cryopreservation of gametes and tissue culture are methods of

- (1) In situ conservation
- (2) Ex situ conservation
- (3) Hotspot protection
- (4) Sacred grove management

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## ZOOLOGY

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**136.** Aschelminthes (roundworms) are

- (1) Acoelomate
- (2) Pseudocoelomate
- (3) Truly coelomate
- (4) Diploblastic

**137.** A rasping organ called the radula is characteristic of

- (1) Annelida
- (2) Mollusca
- (3) Arthropoda
- (4) Echinodermata

**138.** Which of the following is a characteristic of amphibians?

- (1) Body covered with scales
- (2) Moist skin without scales and a three-chambered heart
- (3) Four-chambered heart
- (4) Presence of an air bladder

**139.** The egg-laying mammal among the following is

- (1) Macropus
- (2) Ornithorhynchus
- (3) Pteropus
- (4) Balaenoptera

**140.** The epithelium lining the alveoli of the lungs is

- (1) Simple squamous
- (2) Simple cuboidal
- (3) Stratified squamous
- (4) Ciliated columnar

**141.** The blood of a cockroach is

- (1) Red and carries oxygen
- (2) Colourless and does not carry oxygen
- (3) Blue due to haemocyanin
- (4) Green due to chlorocruorin

**142.** The tidal volume of a healthy human adult is about

- (1) 150 mL
- (2) 500 mL
- (3) 1200 mL
- (4) 2500 mL

**143.** The enzyme carbonic anhydrase, important in CO<sub>2</sub> transport, is present in high concentration in

- (1) Plasma
- (2) Red blood cells
- (3) Alveolar epithelium
- (4) Platelets

**144.** The respiratory rhythm centre is located in the

- (1) Cerebrum
- (2) Medulla oblongata
- (3) Cerebellum
- (4) Hypothalamus

**145.** If the stroke volume is 70 mL and the heart rate is 72 per minute, the cardiac output is approximately

- (1) 1 L per minute
- (2) 3 L per minute
- (3) 5 L per minute
- (4) 7 L per minute

**146.** The average life span of a human erythrocyte is about

- (1) 20 days
- (2) 60 days
- (3) 120 days
- (4) 240 days

**147.** A person is said to be hypertensive when the blood pressure repeatedly exceeds

- (1) 120/80 mm Hg
- (2) 130/85 mm Hg
- (3) 140/90 mm Hg
- (4) 160/110 mm Hg

**148.** Ammonotelism is seen in

- (1) Birds
- (2) Bony fishes and aquatic amphibians
- (3) Land reptiles
- (4) Mammals

**149.** A long loop of Henle extending deep into the medulla is a feature of

- (1) Cortical nephrons
- (2) Juxtamedullary nephrons
- (3) All nephrons equally
- (4) The collecting duct

**150.** Atrial natriuretic factor causes

- (1) Vasoconstriction and rise in blood pressure
- (2) Vasodilation and fall in blood pressure
- (3) Increased water reabsorption
- (4) Release of renin

**151.** During muscle contraction, calcium ions bind to

- (1) Myosin head
- (2) Troponin on the actin filament
- (3) Tropomyosin directly
- (4) The sarcolemma

**152.** Osteoporosis in older women is commonly associated with

- (1) Excess calcium intake
- (2) Decreased levels of oestrogen
- (3) Increased thyroxine
- (4) Vitamin C deficiency

**153.** In humans, the number of floating ribs is

- (1) One pair
- (2) Two pairs
- (3) Three pairs
- (4) Five pairs

**154.** The organ of Corti, which contains hair cells, is located in the

- (1) Vestibule
- (2) Cochlea
- (3) Semicircular canals
- (4) Tympanic membrane

**155.** Stimulation of the sympathetic nervous system

- (1) Decreases heart rate and constricts pupils
- (2) Increases heart rate and dilates pupils
- (3) Increases peristalsis
- (4) Stimulates salivation

**156.** In a reflex arc, the impulse is carried from the receptor to the spinal cord by

- (1) An efferent neuron
- (2) An afferent neuron
- (3) An interneuron only
- (4) A motor neuron

**157.** Parathyroid hormone

- (1) Lowers blood calcium
- (2) Raises blood calcium by bone resorption
- (3) Lowers blood glucose
- (4) Raises blood potassium

**158.** Adrenaline and noradrenaline are secreted by the

- (1) Adrenal cortex
- (2) Adrenal medulla
- (3) Thyroid gland
- (4) Pineal gland

**159.** Diabetes insipidus results from the deficiency of

- (1) Insulin
- (2) Antidiuretic hormone
- (3) Thyroxine
- (4) Aldosterone

**160.** The scrotum helps in spermatogenesis by maintaining a temperature

- (1) Equal to body temperature
- (2) About 2–2.5 °C lower than body temperature
- (3) About 5 °C higher than body temperature
- (4) That fluctuates widely

**161.** In human females, the formation of primary oocytes

- (1) Begins at puberty
- (2) Is completed during embryonic development
- (3) Continues throughout life
- (4) Occurs after each menstrual cycle

**162.** The secondary oocyte completes the second meiotic division

- (1) Before ovulation
- (2) Only after the entry of the sperm
- (3) At the time of implantation
- (4) During the follicular phase

**163.** Colostrum is important for the newborn because it is rich in

- (1) Fat and carbohydrate
- (2) Antibodies, especially IgA
- (3) Iron and calcium
- (4) Vitamin D

**164.** Which of the following sexually transmitted infections is NOT completely curable?

- (1) Gonorrhoea
- (2) Syphilis
- (3) Chlamydia
- (4) Genital herpes

**165.** LNG-20 and Progestasert are examples of

- (1) Non-medicated IUDs
- (2) Copper releasing IUDs
- (3) Hormone releasing IUDs
- (4) Barrier methods

**166.** In the test tube baby programme, the embryo up to the 8-blastomere stage is transferred into the

- (1) Uterus
- (2) Fallopian tube
- (3) Ovary
- (4) Cervix

**167.** Lamarck's theory is best summarised as

- (1) Survival of the fittest
- (2) Inheritance of acquired characters
- (3) Mutation as the source of variation
- (4) Reproductive isolation

**168.** Which of the following does NOT disturb Hardy-Weinberg equilibrium?

- (1) Gene flow
- (2) Genetic drift
- (3) Random mating in a large population
- (4) Natural selection

**169.** Selection that favours both extreme phenotypes over the mean is called

- (1) Stabilising selection
- (2) Directional selection
- (3) Disruptive selection
- (4) Sexual selection

**170.** The approximate cranial capacity of Neanderthal man was

- (1) 650 cc
- (2) 900 cc
- (3) 1400 cc
- (4) 1650 cc

**171.** Typhoid fever is confirmed by

- (1) The ELISA test
- (2) The Widal test
- (3) A blood smear for parasites
- (4) The Mantoux test

**172.** Elephantiasis or filariasis is caused by

- (1) *Ascaris lumbricoides*
- (2) *Wuchereria bancrofti*
- (3) *Plasmodium vivax*
- (4) *Trichophyton*

**173.** Allergic reactions are mediated by the antibody

- (1) IgG
- (2) IgA
- (3) IgE
- (4) IgM

**174.** Vaccination produces

- (1) Passive immunity
- (2) Active immunity with memory cells
- (3) Innate immunity
- (4) Autoimmunity

**175.** Heroin, a highly addictive drug, is chemically

- (1) Diacetylmorphine, a depressant
- (2) A cannabinoid stimulant
- (3) Cocaine derivative
- (4) An amphetamine

**176.** In the plasmid pBR322, insertion of foreign DNA at the BamHI site inactivates the gene for

- (1) Ampicillin resistance
- (2) Tetracycline resistance
- (3) The origin of replication
- (4)  $\beta$ -galactosidase

**177.** *Agrobacterium tumefaciens* is called nature's genetic engineer because it

- (1) Produces restriction enzymes
- (2) Transfers T-DNA of its Ti plasmid into plant cells
- (3) Makes plasmids for bacteria
- (4) Synthesises insulin

**178.** Competent bacterial cells for transformation are usually prepared by treating them with

- (1) Sodium chloride
- (2) Divalent calcium ions
- (3) Ethidium bromide
- (4) Agarose

**179.** The Bt gene incorporated into Bt cotton to protect it against bollworms is

- (1) cry IAb
- (2) cry IAc and cry IIAb
- (3) cry IIIA
- (4) cry IIIB

**180.** Rosie, the first transgenic cow, produced milk enriched in

- (1) Casein
- (2) Human alpha-lactalbumin
- (3) Lactose
- (4) Immunoglobulin G only

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## ANSWER RECORDING SHEET

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Write 1, 2, 3 or 4 against each question number. Leave blank if not attempted. Score: (correct  $\times$  4) – (wrong  $\times$  1).

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| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
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| 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
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| 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 |
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| <i>SPACE FOR ROUGH WORK</i> |
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