COMMON ENTRANCE TEST - 2005

DATE	SUBJECT	TIME
04 - 05 - 2005	PHYSICS	10.30 AM to 11.50 AM

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
60	80 MINUTES	70 MINUTES

MENTION YOUR CET NUMBER					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					A - 1	017793

20 = 60

IMPORTANT INSTRUCTIONS TO CANDIDATES

(Candidates are advised to read the following instructions carefully, before answering on the OMR answer sheet.)

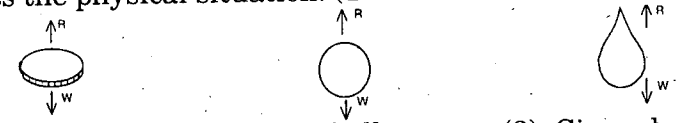
1. Ensure that you have entered your Name and CET Number on the top portion of the OMR answer sheet.
2. **ENSURE THAT THE TIMING MARKS ON THE OMR ANSWER SHEET ARE NOT DAMAGED / MUTILATED / SPOILED.**
3. This Question Booklet is issued to you by the invigilator after the 2nd Bell. i.e., after 10.35 a.m.
4. Carefully enter the Version Code and Serial Number of this question booklet on the top portion of the OMR answer sheet.
5. As answer sheets are designed to suit the Optical Mark Reader (OMR) system, please take special care while filling the entries pertaining to CET Number and Version Code.
6. Until the 3rd Bell is rung at 10.40 a.m. :
   - Do not remove the staple present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.
7. After the 3rd Bell is rung at 10.40 a.m., remove the staple present on the right hand side of this question booklet and start answering on the bottom portion of the OMR answer sheet.
8. This question booklet contains 60 questions and each question will have four different options / choices.
9. During the subsequent 70 minutes :
   - Read each question carefully.
   - Determine the correct answer from out of the four available options / choices given under each question.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN against the question number on the OMR answer sheet.**

CORRECT METHOD OF SHADING THE CIRCLE ON THE OMR SHEET IS AS SHOWN BELOW :

10. Please note that :
    - For each correct answer : ONE mark will be awarded.
    - For each wrong answer : QUARTER (1/4) mark will be deducted.
    - If more than one circle is shaded : ONE mark will be deducted.
    - **Even a minute unintended ink dot on the OMR sheet will also be recognised and recorded by the scanner. Therefore, avoid multiple markings of any kind.**
11. Use the space provided on each page of the question booklet for Rough work AND do not use the OMR answer sheet for the same.
12. After the last bell is rung at 11.50 a.m., stop writing on the OMR answer sheet.
13. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
14. After separating and retaining the top sheet (CET Cell Copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
15. **Preserve the replica of the OMR answer sheet for a minimum period of One year.**

PHYSICS

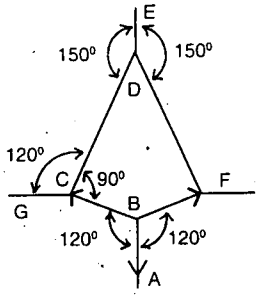
1. When a body falls in air, the resistance of air depends to a great extent on the shape of the body. 3 different shapes are given. Identify the combination of air resistances which truly represents the physical situation. (The cross sectional areas are the same)



(1) Disc (2) ball (3) Cigar shaped

1) $1 < 2 < 3$ 2) $2 < 3 < 1$
3) $3 < 2 < 1$ 4) $3 < 1 < 2$

2. The adjacent figure is the part of a horizontally stretched net. Section AB is stretched with a force of 10N. The tensions in the sections BC and BF are .....

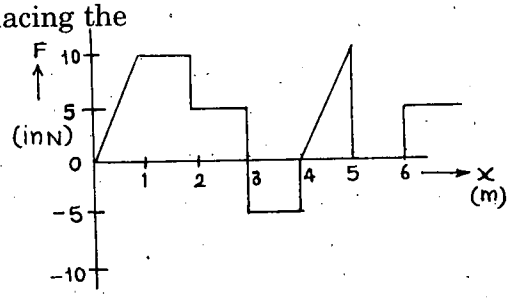


1) 10 N, 11 N
2) 10 N, 6 N
3) 10 N, 10 N
4) Can't calculate due to insufficient data

3. Out of the following four dimensional quantities, which one qualifies to be called a dimensional constant ?

1) acceleration due to gravity 2) surface tension of water
3) weight of a standard kilogram mass 4) the velocity of light in vacuum

4. The relationship between the force F and position x of a body is as shown in the figure. The work done in displacing the body from $x = 1m$ to $x = 5m$ will be .....



1) 30 J
2) 15 J
3) 25 J
4) 20 J

5. From the top of a tower two stones, whose masses are in the ratio 1 : 2 are thrown - one straight up with an initial speed u and the second straight down with the same speed u. Then, neglecting air resistance .....

1) the heavier stone hits the ground with a higher speed
2) the lighter stone hits the ground with a higher speed.
3) both the stones will have the same speed when they hit the ground
4) the speed can't be determined with the given data.

(Space for Rough Work)

6. If M is the mass of the earth and R its radius, the ratio of the gravitational acceleration and the gravitational constant is .....

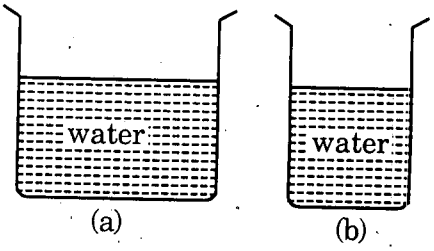
1) $\frac{R^2}{M}$ 2) $\frac{M}{R^2}$

3) MR^2 4) $\frac{M}{R}$

7. A student unable to answer a question on Newton's laws of motion attempts to pull himself up by tugging on his hair. He will not succeed .....

1) as the force exerted is small
2) the frictional force while gripping, is small
3) Newton's law of inertia is not applicable to living beings
4) as the force applied is internal to the system

8. From the adjacent figure, the correct observation is .....



1) The pressure on the bottom of tank (a) is greater than at the bottom of (b)
2) The pressure on the bottom of tank (a) is smaller than at the bottom of (b)
3) The pressure depend on the shape of the container.
4) The pressure on the bottom of (a) and (b) is the same

9. Which one of the following is not a unit of Young's modulus ?

1) Nm^{-1} 2) Nm^{-2}

3) dyne cm^{-2} 4) Mega Pascal

10. A piece of blue glass heated to a high temperature and a piece of red glass at room temperature, are taken inside a dimly lit room. Then .....

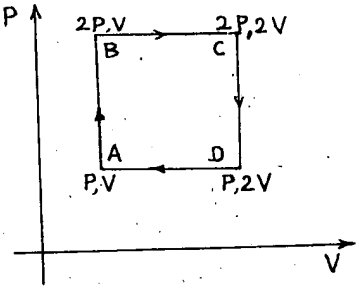
1) the blue piece will look blue and red will look as usual
2) red look brighter red and blue look ordinary blue.
3) blue shines like brighter red compared to the red piece
4) both the pieces will look equally red

(Space for Rough Work)

11. The wavelength of the radiation emitted by a body depends upon .....

1) the nature of the surface
2) the area of the surface
3) the temperature of the surface
4) all of the above factors

12. An ideal monoatomic gas is taken around the cycle *ABCDA* as shown in the P-V diagram. The work done during the cycle is given by .....



1) $\frac{1}{2} PV$
2) PV
3) $2PV$
4) $4PV$

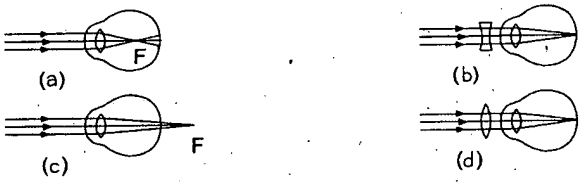
13. Which mirror is to be used to obtain a parallel beam of light from a small lamp ?

1) Plane mirror
2) Convex mirror
3) Concave mirror
4) Any one of the above

14. Which of the following is a wrong statement ?

1) $D = \frac{1}{f}$ where f is the focal length and D is called the refractive power of a lens.
2) Power is called a dioptre when f is in metres.
3) Power is called a diptre and does not depend on the system of unit used to measure f.
4) D is positive for convergent lens and negative for divergent lens.

15.



Identify the wrong description of the above figures.

1) (a) represents far - sightedness
2) (b) correction for short sightedness
3) (c) represents far - sightedness
4) (d) correction for far - sightedness

(Space for Rough Work)

16. Infrared radiation was discovered in 1800 by .....

1) William Wollaston
2) William Herschel
3) Wilhelm Roentgen
4) Thomas Young

17. A particle on the trough of a wave at any instant will come to the mean position after a time (T = time period) .....

1) $\frac{T}{2}$
2) $\frac{T}{4}$
3) T
4) $2T$

18. The disc of a siren containing 60 holes rotates at a constant speed of 360 rpm. The emitted sound is in unison with a tuning fork of frequency .....

1) 10 Hz
2) 360 Hz
3) 216 kHz
4) 6 Hz

19. The ratio of velocity of sound in hydrogen and oxygen at STP is .....

1) 16 : 1
2) 8 : 1
3) 4 : 1
4) 2 : 1

20. In an experiment with sonometer a tuning fork of frequency 256 Hz resonates with a length of 25 cm and another tuning fork resonates with a length of 16 cm. Tension of the string remaining constant the frequency of the second tuning fork is .....

1) 163.84 Hz
2) 400 Hz
3) 320 Hz
4) 204.8 Hz

(Space for Rough Work)

21. The apparent frequency of a note is 200 Hz. When a listener is moving with a velocity of 40 ms^{-1} towards a stationary source. When he moves away from the same source with the same speed, the apparent frequency of the same note is 160 Hz. The velocity of sound in air in m/s is .....

1) 340 2) 330

3) 360 4) 320

22. The wave theory of light, in its original form, was first postulated by .....

1) Isaac Newton 2) Christian Huygens

3) Thomas Young 4) Augustin Jean Fresnel

23. If a liquid does not wet glass, its angle of contact is .....

1) zero 2) acute

3) obtuse 4) right angle

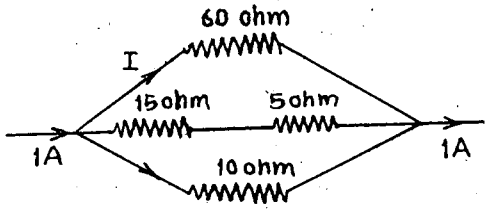
24. The magnitude of I in ampere unit is .....

1) 0.1

2) 0.3

3) 0.6

4) none of these



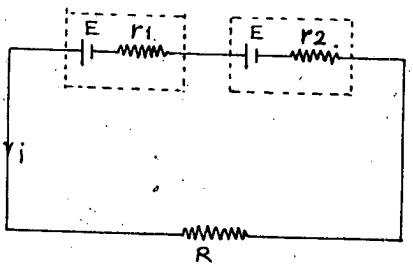
25. Electron of mass m and charge q is travelling with a speed v along a circular path of radius r at right angles to a uniform magnetic field of intensity B. If the speed of the electron is doubled and the magnetic field is halved the resulting path would have a radius

1) $2r$ 2) $4r$

3) $\frac{r}{4}$ 4) $\frac{r}{2}$

(Space for Rough Work)

26. If the potential difference across the internal resistance r_1 is equal to the emf E of the battery, then .....



1) $R = r_1 + r_2$
2) $R = \frac{r_1}{r_2}$
3) $R = r_1 - r_2$
4) $R = \frac{r_2}{r_1}$

27. By using only two resistance coils-singly, in series, or in Parallel-one should be able to obtain resistances of 3, 4, 12 and 16 ohms. The separate resistances of the coil are .....

1) 3 and 4
2) 4 and 12
3) 12 and 16
4) 16 and 3

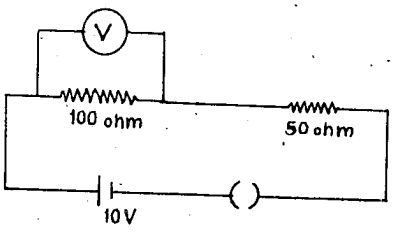
28. The electrons in the beam of a television tube move horizontally from South to North. The vertical component of the earth's magnetic field points down. The electron is deflected towards .....

1) West
2) no deflection
3) East
4) North to South

29. A tangent Galvanometer has a reduction factor of 1A and it is placed with the plane of its coil perpendicular to the magnetic meridian. The deflection produced when a current of 1A is passed through it is .....

1) 60^0
2) 45^0
3) 30^0
4) None of these

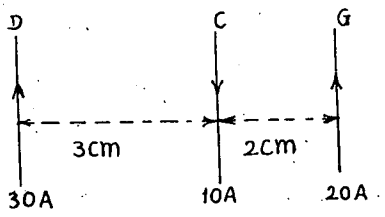
30. In the given circuit, the voltmeter records 5 volts. The resistance of the voltmeter in ohms is .....



1) 200
2) 100
3) 10
4) 50

(Space for Rough Work)

31. Three long, straight and parallel wires, carrying current, are arranged as shown in figure. The force experienced by a 25 cm length of wire C is .....



1) $10^{-3}\,N$
2) $2.5 \times 10^{-3}\,N$
3) zero
4) $1.5 \times 10^{-3}\,N$

32. A 5.0 amp current is setup in an external circuit by a 6.0 volt storage battery for 6.0 minutes. The chemical energy of the battery is reduced by .....

1) $1.08 \times 10^{4}\,J$
2) 1.08×10^{4} volt
3) $1.8 \times 10^{4}\,J$
4) 1.8×10^{4} volt

33. The current in a simple series circuit is 5.0 amp. When an additional resistance of 2.0 ohms is inserted, the current drops to 4.0 amp. The original resistance of the circuit in ohms was .....

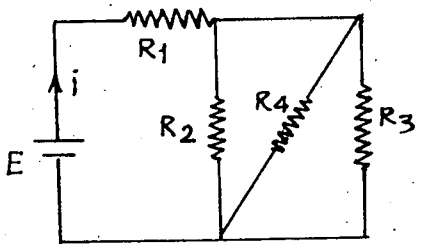
1) 1.25
2) 8
3) 10
4) 20

34. In the circuit given $E = 6.0V$, $R_1 = 100$ ohms

$R_2 = R_3 = 50$ ohms

$R_4 = 75$ ohms

The equivalent resistance of the circuit, in ohms, is .....



1) 11.875
2) 26.31
3) 118.75
4) none of these

35. Two resistances are connected in two gaps of a metrebridge. The balance point is 20 cm. from the zero end. A resistance of 15 ohms is connected in series with the smaller of the two. The null point shifts to 40 cm. The value of the smaller resistance, in ohms, is .....

1) 3
2) 6
3) 9
4) 12

(Space for Rough Work)

36. An electric field of 1500 v/m and a magnetic field of 0.40 weber/metre^2 act on a moving electron. The minimum uniform speed along a straight line the electron could have is .....

1) $1.6 \times 10^{15}\, m/s$
2) $6 \times 10^{-16}\, m/s$
3) $3.75 \times 10^{3}\, m/s$
4) $3.75 \times 10^{2}\, m/s$

37. In an ammeter 10% of main current is passing through the Galvanometer. If the resistance of the Galvanometer is G, then the shunt resistance, in ohms, is .....

1) $9\,G$
2) $\frac{G}{9}$
3) $90\,G$
4) $\frac{G}{90}$

38. Among the following properties describing diamagnetism identify the property that is wrongly stated-

a) diamagnetic material do not have permanent magnetic moment.
b) diamagnetism is explained in terms of electromagnetic induction.
c) diamagnetic materials have a small positive susceptibility.
d) the magnetic moment of individual electrons neutralise each other.

1) a
2) b
3) c
4) d

39. The induction coil works on the principle of .....

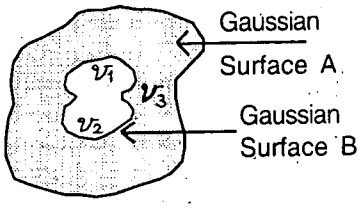
1) self-induction
2) mutual induction
3) Ampere's rule
4) Fleming's right hand rule

40. The square root of the product of inductance and capacitance has the dimension of .....

1) length
2) mass
3) time
4) no dimension

(Space for Rough Work)

41. The electric flux for Gaussian surface A that enclose the charged particles in free space is .....
(given $q_1 = -14nc, q_2 = 78.85\ nc,\ q_3 = -56\ nc$)



1) $10^3\ Nm^2C^{-1}$ 2) $10^3\ CN^{-1}m^{-2}$

3) $6.32 \times 10^3\ Nm^2C^{-1}$ 4) $6.32 \times 10^3\ CN^{-1}m^{-2}$

42. Four metal conductors having different shapes .....
a) a sphere b) cylindrical
c) pear d) lightning conductor
are mounted on insulating stands and charged. The one which is best suited to retain the charges for a longer time is .....

1) a 2) b
3) c 4) d

43. The potential to which a conductor is raised, depends on .....
1) the amount of charge 2) geometry and size of the conductor
3) both (1) and (2) 4) only on (1)

44. The work done in carrying a charge q once round a circle of radius r with a charge Q at the centre is .....

1) $\frac{qQ}{4\pi\in_0 r}$ 2) $\frac{qQ}{4\pi\in_0^2 r^2}$

3) $\frac{qQ}{4\pi\in_0 r^2}$ 4) None of these

45. An air filled parallel plate condenser has a capacity of 2PF. The separation of the plates is doubled and the interspace between the plates is filled with wax. If the capacity is increased to 6PF, the dielectric constant of wax is .....
1) 2 2) 3
3) 4 4) 6

(Space for Rough Work)

46. Identify the wrong statement in the following. Coulomb's law correctly describes the electric force that .....

1) binds the electrons of an atom to its nucleus.
2) binds the protons and neutrons in the nucleus of an atom.
3) binds atoms together to form molecules.
4) binds atoms and molecules to form solids.

47. A single slit of width a is illuminated by violet light of wavelength 400 nm and the width of the diffraction pattern is measured as y. When half of the slit width is covered and illuminated by yellow light of wavelength 600 nm, the width of the diffraction pattern is .....

1) the pattern vanishes and the width is zero
2) $\frac{y}{3}$
3) $3y$
4) none of these

48. At Kavalur in India, the astronomers using a telescope whose objective had a diameter of one metre started using a telescope of diameter 2.54 m. this resulted in .....

1) the increase in the resolving power by 2.54 times for the same λ
2) the increase in the limiting angle by 2.54 times for the same λ
3) decrease in the resolving power.
4) no effect on the limiting angle.

49. When unpolarized light beam is incident from air onto glass $(n = 1.5)$ at the polarizing angle .....

1) reflected beam is polarized 100 percent .
2) reflected and refracted beams are partially polarized.
3) the reason for (1) is that almost all the light is reflected.
4) All of the above

50. Select the right option in the following

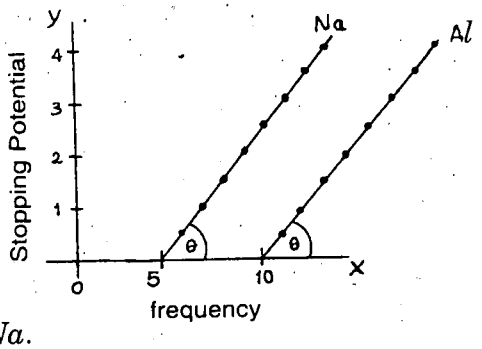
1) Christian Huygens, a contemporary of Newton established the wave theory of light by assuming that light waves were transverse
2) Maxwell provided the compelling theoretical evidence that light is a transverse wave.
3) Thomas Young experimentally proved the wave behaviour of light and Huygens assumption.
4) All three statements given above, correctly answers the question 'what is light' ?

(Space for Rough Work)

51. Two coherent light beams of intensity I and $4I$ are superposed. The maximum and minimum possible intensities in the resulting beam are .....

1) $9I$ and I
2) $9I$ and $3I$
3) $5I$ and I
4) $5I$ and $3I$

52. From the figure describing photoelectric effect we may infer correctly that .....



1) *Na* and *Al* both have the same threshold frequency.
2) Maximum kinetic energy for both the metals depend linearly on the frequency.
3) The stopping potentials are different for *Na* and *Al* for the same change in frequency.
4) *Al* is a better photo sensitive material than *Na*.

53. The electron in a hydrogen atom makes a transition from $n = n_1$ to $n = n_2$ state. The time period of the electron in the initial state (n_1) is eight times that in the final state (n_2). The possible values of n_1 and n_2 are .....

1) $n_1 = 8,\ n_2 = 1$
2) $n_1 = 4,\ n_2 = 2$
3) $n_1 = 2,\ n_2 = 4$
4) $n_1 = 1,\ n_2 = 8$

54. If the forward voltage in a diode is increased, the width of the depletion region .....

1) increases
2) decreases
3) fluctuates
4) no change

55. Two nucleons are at a separation of one Fermi. Protons have a charge of $+ 1.6 \times 10^{-19} C$. The net nuclear force between them is F_1, if both are neutrons, F_2 if both are protons and F_3 if one is proton and the other is neutron. Then .....

1) $F_1 = F_2 > F_3$
2) $F_1 = F_2 = F_3$
3) $F_1 < F_2 < F_3$
4) $F_1 > F_2 > F_3$

(Space for Rough Work)

56. The energy that should be added to an electron to reduce its de Broglie wavelength from one nm to 0.5 nm is .....

1) four times the initial energy
2) equal to the initial energy
3) twice the initial energy
4) thrice the initial energy

57. Mean life of a radioactive sample is 100 seconds. Then its half life (in minutes) is .....

1) 0.693
2) 1
3) 10^{-4}
4) 1.155

58. Consider two nuclei of the same radioactive nuclide. One of the nuclei was created in a supernova explosion 5 billion years ago. The other was created in a nuclear reactor 5 minutes ago. The probability of decay during the next time is .....

1) different for each nuclei
2) nuclei created in explosion decays first
3) nuclei created in the reactor decays first.
4) independent of the time of creation.

59. Bohr's atom model assumes .....

1) The nucleus is of infinite mass and is at rest.
2) Electrons in a quantised orbit will not radiate energy.
3) mass of the electron remains constant.
4) All the above conditions.

60. Identify the property which is not characteristic for a semi-conductor.....

1) at a very low temperatures it behaves like an insulator.
2) at higher temperatures two types of charge carriers will cause conductivity.
3) The charge carriers are electrons and holes in the valance band at higher temperatures.
4) the semiconductor is electrically neutral.

(Space for Rough Work)

(Space for Rough Work)

A-1

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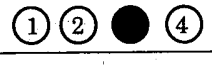

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13. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
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CHEMISTRY

1. A mixture of two moles of carbon monoxide and one mole of oxygen, in a closed vessel is ignited to convert the carbon monoxide to carbon dioxide. If ΔH is the enthalpy change and ΔE is the change in internal energy, then,
   1) $\Delta H > \Delta E$
   2) $\Delta H < \Delta E$
   3) $\Delta H = \Delta E$
   4) the relationship depends on the capacity of the vessel

2. The cooling in refrigerator is due to .....
   1) Reaction of the refrigerator gas
   2) Expansion of ice
   3) The expansion of the gas in the refrigerator
   4) The work of the compressor

3. For a system in equilibrium, $\Delta G = 0$, under conditions of constant .....
   1) temperature and pressure
   2) temperature and volume
   3) pressure and volume
   4) energy and volume

4. Molar heat of vaporisation of a liquid is 6 kJ $mole^{-1}$. If the entropy change is 16 J $mole^{-1} K^{-1}$, the boiling point of the liquid is .....
   1) 375^0 C
   2) 375 K
   3) 273 K
   4) 102^0 C

5. The temperature of the system decreases in an .....
   1) adiabatic compression
   2) isothermal compression
   3) isothermal expansion
   4) adiabatic expansion

(Space for Rough Work)

6. 15 moles of H_2 and 5.2 moles of I_2 are mixed and allowed to attain equilibrium at 500°C. At equilibrium, the concentration of HI is found to be 10 moles. The equilibrium constant for the formation of HI is .....

1) 50 2) 15
3) 100 4) 25

7. If, in the reaction $N_2O_4 \leftrightarrow 2NO_2$, x is that part of N_2O_4 which dissociates, then the number of molecules at equilibrium will be

1) 1 2) 3
3) $(1 + x)$ 4) $(1 + x)^2$

8. Which of these does not influence the rate of reaction ?

1) Nature of the reactants 2) Concentration of the reactants
3) Temperature of the reaction 4) Molecularity of the reaction

9. For the reaction $A + B \rightarrow C$, it is found that doubling the concentration of A increases the rate by 4 times, and doubling the concentration of B doubles the reaction rate. What is the overall order of the reaction ?

1) 4 2) $\frac{3}{2}$
3) 3 4) 1

10. The rate at which a substance reacts depends on its .....

1) atomic weight 2) atomic number
3) molecular weight 4) active mass

(Space for Rough Work)

11. For the reaction $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$, the value of K_C at 800°C is 0.1. When the equilibrium concentrations of both the reactants is 0.5 mol, what is the value of K_p at the same temperature ?

1) 0.5 2) 0.1

3) 0.01 4) 0.025

12. The extent of adsorption of a gas on a solid depends on .....

1) nature of the gas 2) pressure of the gas

3) temperature of the gas 4) all are correct

13. An emulsifier is a substance which .....

1) stabilises the emulsion 2) homogenises the emulsion

3) coagulates the emulsion 4) accelerates the dispersion of liquid in liquid

14. Which of the following types of metals form the most efficient catalysts ?

1) alkali metals 2) alkaline earth metals

3) transition metals 4) all the above

15. The species among the following, which can act as an acid and a base is .....

1) $HSO_4^{\ominus}$ 2) SO_4^{2-}

3) $H_3O^{\oplus}$ 4) $Cl^{\ominus}$

(Space for Rough Work)

16. A buffer solution has equal volumes of 0.2M NH_4OH and 0.02 M NH_4Cl. The p^{kb} of the base is 5. The pH is .....

1) 10 2) 9
3) 4 4) 7

17. The hydrogen electrode is dipped in a solution of pH 3 at 25°C. The potential would be (the value of 2.303 RT/F is 0.059 V)

1) 0.177 V 2) 0.087 V
3) 0.059 V 4) – 0.177 V

18. 20 ml of 0.5 N HCl and 35 ml of 0.1N $NaOH$ are mixed. The resulting solution will .....

1) be neutral 2) be basic
3) turn phenolphthalein solution pink 4) turn methyl orange red

19. Corrosion of iron is essentially an electrochemical phenomenon where the cell reaction are .....

1) Fe is oxidised to Fe^{2+} and dissolved oxygen in water is reduced to $\overset{\ominus}{O}H$
2) Fe is oxidised to Fe^{3+} and H_2O is reduced to O_2^{2-}
3) Fe is oxidised to Fe^{2+} and H_2O is reduced to O_2^-
4) Fe is oxidised to Fe^{2+} and H_2O is reduced to O_2

20. The standard electrode potential is measured by .....

1) Electrometer 2) Voltmeter
3) Pyrometer 4) Galvanometer

(Space for Rough Work)

21. A precipitate of $AgCl$ is formed when equal volumes of the following are mixed. $\left[K_S \text{ for } AgCl = 10^{-10}\right]$

1) $10^{-4}\ M\ AgNO_3$ and $10^{-7}\ M\ HCl$
2) $10^{-5}\ M\ AgNO_3$ and $10^{-6}\ M\ HCl$
3) $10^{-5}\ M\ AgNO_3$ and $10^{-4}\ M\ HCl$
4) $10^{-6}\ M\ AgNO_3$ and $10^{-6}\ M\ HCl$

22. Which one of the following defects in the crystals lowers its density ?

1) Frenkel defect
2) Schottky defect
3) F-centres
4) Interstitial defect

23. A radioactive isotope has a half life of 10 days. If today 125 mg is left over, what was its original weight 40 days earlier ?

1) 2 g
2) 600 mg
3) 1 g
4) 1.5 g

24. Which of the particles cannot be accelerated ?

1) α - particle
2) β - particle
3) Protons
4) Neutrons

25. In which of the following nuclear reactions neutron is emitted ?

1) ${}^{27}_{13}Al + {}^{4}_{2}He \rightarrow {}^{30}_{15}P$
2) ${}^{12}_{6}C + {}^{1}_{1}H \rightarrow {}^{13}_{7}N$
3) ${}^{30}_{15}P \rightarrow {}^{30}_{14}Si$
4) ${}^{241}_{96}Am + {}^{4}_{2}He \rightarrow {}^{245}_{97}Bk$

(Space for Rough Work)

26. Gold is extracted by hydrometallurgical process, based on its property .....

1) of being electropositive
2) of being less reactive
3) to form complexes which are water soluble
4) to form salts which are water soluble

27. In blast furnace, iron oxide is reduced by .....

1) Hot blast of air
2) Carbon monoxide
3) Carbon
4) Silica

28. Which of the following pairs of elements cannot form an alloy ?

1) Zn, Cu
2) Fe, Hg
3) Fe, C
4) Hg, Na

29. Which compound is zero valent metal complex ?

1) $[Cu(NH_3)_4]SO_4$
2) $[Pt(NH_3)_2 Cl_2]$
3) $[Ni(CO)_4]$
4) $K_3[Fe(CN)_6]$

30. Alum is a water purifier because it .....

1) coagulates the impurities.
2) softens hard water
3) gives taste
4) destroys the pathogenic bacteria

(Space for Rough Work)

31. A compound A has a molecular formula C_2Cl_3OH . It reduces Fehling's solution and on oxidation, gives a monocarboxylic acid B. A can be obtained by the action of chlorine on ethyl alcohol. A is .....

1) chloroform
2) chloral
3) methyl chloride
4) monochloro acetic acid

32. Which of the following haloalkanes is most reactive ?

1) 1-chloropropane
2) 1-bromopropane
3) 2-chloropropane
4) 2-bromopropane

33. The reaction in which phenol differs from alcohol is .....

1) it undergoes esterification with carboxylic acid
2) it reacts with ammonia
3) it forms yellow crystals of iodoform
4) it liberates H_2 with Na metal

34. An organic compound A containing C, H and O has a pleasant cdour with boiling point of 78^0C. On boiling A with conc. H_2SO_4, a colourless gas is produced which decolourises bromine water and alkaline $KMnO_4$. The organic liquid A is .....

1) C_2H_5Cl
2) $C_2H_5COOCH_3$
3) C_2H_5OH
4) C_2H_6

35. Which of the following is an amphoteric acid ?

1) Glycinc
2) Salicylic acid
3) Benzoic acid
4) Citric acid

(Space for Rough Work)

36. Benzyl alcohol and sodium benzoate is obtained by the action of sodium hydroxide on benzaldehyde. This reaction is known as .....

1) Perkin's reaction
2) Cannizzaro's reaction
3) Sandmeyer's reaction
4) Claisen condensation

37. Ethyl chloride on heating with $AgCN$, forms a compound 'X'. The functional isomer of 'X' is-

1) $C_2 H_5 NC$
2) $C_2 H_5 NH_2$
3) $C_2 H_5 CN$
4) None of the above

38. A compound, containing only carbon, hydrogen and oxygen, has a molecular weight of 44. On complete oxidation it is converted into a compound of molecular weight 60. The original compound is .....

1) an aldehyde
2) an acid
3) an alcohol
4) an ether

39. Grignard reagent adds to .....

1) $>C = 0$
2) $-C \equiv N$
3) $>C = S$
4) all of the above

40. Which of the following biomolecules contain a non-transition metal ion ?

1) Vitamin B_{12}
2) Chlorophyll
3) Haemoglobin
4) Insulin

(Space for Rough Work)

41. Three dimensional molecules with cross links are formed in the case of a .....
    1) Thermoplastic
    2) Thermosetting plastic
    3) Both
    4) None

42. Sucrose molecule is made up of .....
    1) a gluco pyranose and a fructo pyranose
    2) a gluco pyranose and a fructo furanose
    3) a gluco furanose and a fructo pyranose
    4) a gluco furanose and a fructo furanose

43. Water insoluble component of starch is .....
    1) amylopectin
    2) amylose
    3) cellulose
    4) none of the above

44. An example for a saturated fatty acid, present in nature is .....
    1) Oleic acid
    2) Linoleic acid
    3) Linolenic acid
    4) Palmitic acid

45. A Nanopeptide contains ..... peptide linkages.
    1) 10
    2) 8
    3) 9
    4) 18

(Space for Rough Work)

46. An example of a sulphur containing amino acid is .....

1) Lysine 2) Serine
3) Cysteine 4) Tyrosine

47. Which of the following is not present in a nucleotide ?

1) cytosine 2) guanine
3) adenine 4) tyrosine

48. Antiseptic chloroxylenol is .....

1) 4 - chloro - 3, 5 - dimethyl phenol 2) 3 - chloro - 4, 5 - dimethyl phenol
3) 4 - chloro - 2, 5 - dimethyl phenol 4) 5 - chloro - 3, 4 - dimethyl phenol

49. An atom of an element A has three electrons in its outermost orbit and that of B has six electrons in its outermost orbit. The formula of the compound between these two will be .....

1) A_3B_6 2) A_2B_3
3) A_3B_2 4) A_2B

50. Among Na^+, Na, Mg and Mg^{2+}, the largest particle is .....

1) Mg^{2+} 2) Mg
3) Na 4) Na^+

(Space for Rough Work)

51. Molarity of 0.2 N H_2SO_4 is .....

1) 0.2 2) 0.4
3) 0.6 4) 0.1

52. In the equation of state of an ideal gas $PV = nRT$, the value of the universal gas constant would depend only on .....

1) the nature of the gas 2) the pressure of the gas
3) the units of the measurement 4) None of the above

53. A commercial sample of hydrogen peroxide is labelled as 10 volume. Its percentage strength is nearly .....

1) 1% 2) 3%
3) 10% 4) 90%

54. Activated charcoal is used to remove colouring matter from pure substances. It works by .....

1) oxidation 2) reduction
3) bleaching 4) adsorption

55. When plants and animals decay, the organic nitrogen is converted into inorganic nitrogen. The inorganic nitrogen is in the form of .....

1) Ammonia 2) Elements of nitrogen
3) Nitrates 4) Nitrides

(Space for Rough Work)

56. A gas decolourised by $KMnO_4$ solution but gives no precipitate with ammonical cuprous chloride is .....

1) Ethane
2) Methane
3) Ethene
4) Acetylene

57. $H_3C - \underset{\underset{Cl}{|}}{C} = CH - \underset{\underset{CH_3}{|}}{CH} - CH_3$ is

1) 2-chloro-4-methyl-2-pentene
2) 4-chloro-2-methyl-3-pentene
3) 4-methyl-2-chloro-2-pentene
4) 2-chloro-4,4-dimethyl-2-butene

58. Amongst the following, the compound that can most readily get sulphonated is ?

1) Benzene
2) Toluene
3) Nitrobenzene
4) Chlorobenzene

59. Household gaseous fuel (LPG) mainly contains .....

1) CH_4
2) C_2H_2
3) C_2H_4
4) C_4H_{10}

60. Use of chlorofluoro carbons is not encouraged because .....

1) they are harmful to the eyes of people that use it.
2) they damage the refrigerators and air conditioners.
3) they eat away the ozone in the atmosphere.
4) they destroy the oxygen layer.

(Space for Rough Work)

(Space for Rough Work)

A-1

COMMON ENTRANCE TEST - 2005

DATE	SUBJECT	TIME
03 - 05 - 2005	BIOLOGY	10.30 AM to 11.50 AM

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
60	80 MINUTES	70 MINUTES

MENTION YOUR CET NUMBER	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	A - 1	084673

IMPORTANT INSTRUCTIONS TO CANDIDATES

(Candidates are advised to read the following instructions carefully, before answering on the OMR answer sheet.)

1. Ensure that you have entered your Name and CET Number on the top portion of the OMR answer sheet.
2. **ENSURE THAT THE TIMING MARKS ON THE OMR ANSWER SHEET ARE NOT DAMAGED / MUTILATED / SPOILED.**
3. This Question Booklet is issued to you by the invigilator after the 2nd Bell. i.e., after 10.35 a.m.
4. Carefully enter the Version Code and Serial Number of this question booklet on the top portion of the OMR answer sheet.
5. As answer sheets are designed to suit the Optical Mark Reader (OMR) system, please take special care while filling the entries pertaining to CET Number and Version Code.
6. Until the 3rd Bell is rung at 10.40 am. :
   - Do not remove the staple present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.
7. After the 3rd Bell is rung at 10.40 a.m., remove the staple present on the right-hand side of this question booklet and start answering on the bottom portion of the OMR answer sheet.
8. This question booklet contains 60 questions and each question will have four different options / choices.
9. During the subsequent 70 minutes :
   - Read each question carefully.
   - Determine the correct answer from out of the four available options / choices given under each question.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN against the question number on the OMR answer sheet.**

CORRECT METHOD OF SHADING THE CIRCLE ON THE OMR SHEET IS AS SHOWN BELOW :

10. Please note that :
    - For each correct answer : ONE mark will be awarded.
    - For each wrong answer : QUARTER (1/4) mark will be deducted.
    - If more than one circle is shaded : ONE mark will be deducted.
    - **Even a minute unintended ink dot on the OMR sheet will also be recognised and recorded by the scanner. Therefore, avoid multiple markings of any kind.**
11. Use the space provided on each page of the question booklet for Rough work AND do not use the OMR answer sheet for the same.
12. After the last bell is rung at 11.50 a.m., stop writing on the OMR answer sheet.
13. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
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BIOLOGY

1. Which of the following tissue originates exclusively from the ectoderm of the embryo ?
   1) Epithelial tissue
   2) Muscular tissue
   3) Connective tissue
   4) Nervous tissue

2. The pyramid of energy is always upright for any ecosystem. This situation indicates the fact that .....
   1) Carnivores have a better energy conversion efficiency than herbivores.
   2) Producers have the lowest energy conversion efficiency.
   3) Herbivores have a better energy conversion efficiency than carnivores.
   4) Energy conversion efficiency is the same in all trophic levels.

3. Gynoecium in the members of family Leguminosae is composed of .....
   1) One carpel
   2) Two carpels
   3) Three carpels
   4) Five carpels

4. Identify from the following, the compound that links glycolysis and Krebs cycle.
   1) Pyruvic acid
   2) Oxalo acetic acid
   3) Acetyl Co-A
   4) Lactic acid

5. Which part of the human brain controls the breathing movements ?
   1) Cerebellum
   2) Medulla oblongata
   3) Cerebrum
   4) Diencephalon

(Space for Rough Work)

6. When the chromosome number of a given organism has one additional chromosome in one of the homologous pairs, the condition is known as .....

1) Monosomy 2) Trisomy
3) Nullisomy 4) Polyploidy

7. If a germ cell in a female gonad and a germ cell in a male gonad begin undergoing meiosis simultaneously, what will be the ratio of ova and sperms produced ?

1) 1 : 2 2) 1 : 1
3) 2 : 1 4) 1 : 4

8. Soil conservation is a practice in which .....

1) soil is well aerated
2) soil is protected from being carried away by wind and water
3) soil erosion is allowed
4) soil fertility is enhanced

9. The main function of lacteals in the villi of human small intestine is the absorption of .....

1) Glucose and vitamins 2) Amino acids and glucose
3) Fatty acids and glycerol 4) Water and mineral salts

10. A micro-organism, when viewed under a compound microscope with an objective lens of 40 X and an eye piece of 10 X magnification measured 4000 μ in length. The same micro-organism when observed under a dissection microscope with a lens of 10 X magnification, would measure .....

1) 100 μ 2) 40 μ
3) 400 μ 4) 10 μ

(Space for Rough Work)

11. Leaf fall occurs in a tree when there is an increase in the concentration of .....
    1) Auxins
    2) Abscissic acid
    3) Cytokinins
    4) Gibberellins

12. Which of the following is a disease resistant, high yielding breed of poultry developed in Karnataka ?
    1) White leg horn
    2) Aseel
    3) Plymouth rock
    4) Giriraja

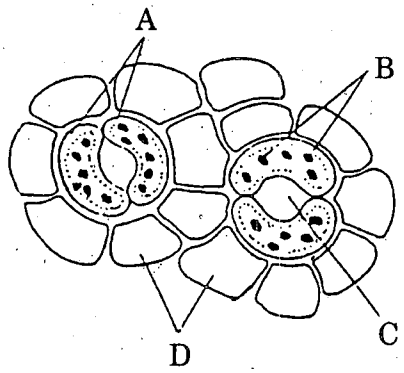
13. Sertoli cells are nourishing cells in the testis. They also secrete a hormone. Identify the same.
    1) Testosterone
    2) Gonadotropin
    3) Inhibin
    4) Relaxin

14. Molecular biology is concerned with the study of .....
    1) all aspects of micro organisms
    2) structure and functions of polymers of life
    3) the chemistry of living organisms
    4) the process by which molecules of chemical substances organized into primitive form of life.

15. The inner, darker and harder portion of secondary xylem that can not conduct water, in an older dicot stem, is called .....
    1) Bast
    2) Alburnum
    3) Duramen
    4) Wood

(Space for Rough Work)

16. The following figure shows the stomatal apparatus. Identify the parts labelled as A, B, C and D



Choose the correct answer from the following.

1) A = Subsidiary cells, B = Chloroplasts, C = Stoma, D = Guard cells.
2) A = Guard cells, B = Stoma, C = Chloroplasts, D = Subsidiary cells.
3) A = Subsidiary cells, B = Stoma, C = Chloroplasts D = Guard cells
4) A = Guard cells, B = Chloroplasts, C = Stoma, D = Subsidiary cells

17. In which of the following plants, there will be no transpiration ?

1) Plants living in deserts
2) Aquatic, submerged plants
3) Plants growing in hilly regions
4) Aquatic plants with floating leaves

18. Which of the following groups of algae do not have eukaryotic organization ?

1) Blue green algae
2) Green algae
3) Golden brown algae
4) Red algae

19. Identify from the following, a hormone produced by the pituitary gland in both males and females but functional only in females.

1) Relaxin
2) Vasopressin
3) Somatotropic hormone
4) Prolactin

20. Which one of the following is not a characteristic feature of bryophytes ?

1) Filamentous rhizoids
2) Dominant gametophytic generation
3) Vascular tissues
4) Amphibious habitat

(Space for Rough Work)

21. Green house effect is the cumulative result of the influences of certain gases. Identify the gas, which is not involved in this influence.

1) Chloroflurocarbons
2) Methane
3) Carbon dioxide
4) Nitrogen

22. Column I lists some principles, pertaining to physiology of plants. Column II lists the names of scientists who proposed the idea. Match the two columns. Identify the correct choice from those given

Column - I	Column - II
A. Mass flow hypothesis	p. J. C. Bose
B. Relay pump theory	q. Strasburger
C. Transpiration pull theory	r. Munch
D. Pulsatile movement theory	s. Godlewski
	t. Dixon and Jolly

1) A = r; B = s; C = p; D = t
2) A = r; B = s; C = t; D = p
3) A = s; B = r; C = t; D = p
4) A = s; B = r; C = p; D = t

23. Which one of the following types of silk is being produced extensively in South India?

1) Mulberry
2) Eri
3) Muga
4) Tussar

24. Identify from the following plant parts, the major contributors to human food.

1) Root
2) Stem
3) Leaves
4) Fruits

25. Alcohol is the most socially accepted narcotic drug. Excessive consumption of alcohol leads to .....

1) Loss of Memory
2) State of hallucination
3) Cirrhosis of liver
4) Suppression of brain functions

(Space for Rough Work)

26. Haemophilia is a condition where there is .....

1) No production of melanin in the skin
2) No production of haemoglobin in the blood
3) A delay in the clotting of blood
4) A failure in the clotting mechanism of blood

27. Read the statements A and B

A) The human small intestine is the longest portion in the alimentary canal
B) Absorption of digested food requires a very large surface area

Identify the correct choice on the two statements

1) Statements A and B are both correct
2) Statement A is correct, B is wrong
3) Statement B is correct, A is wrong
4) Both the statements are wrong

28. In the lac-operon model, lactose molecules function as

1) repressors which bind with the operator gene
2) Inducers which bind with the operator gene
3) Corepressors which bind with the repressor protein
4) Inducers which bind with the repressor protein

29. When a cell of diameter 2 μ grows to double its diameter, what will happen to its surface area volume relationship?

1) It will remain the same
2) It will reduce to half
3) It will double
4) It can not be determined

30. Which of the following is a genetically dominant trait in human beings?

1) O blood group
2) Colour blindness
3) Rh+ve blood group
4) Albinism

(Space for Rough Work)

31. Identify from the following, a characteristic pigment associated with chlorophyll-b molecules.
    1) Ferredoxin
    2) Plastoquinone
    3) Plastocyanin
    4) Cytochrome

32. In which of the following regions of a nephron does maximum reabsorption of useful substances, takes place?
    1) Glomerulus
    2) Henle's loop
    3) Distal convoluted tubule
    4) Proximal convoluted tubule

33. Which of the following statements is true with reference to cross pollination in angiosperms?
    1) It can fail to occur due to distance barrier
    2) It requires the production of a large number of pollen grains
    3) It most often results in high yield of plants
    4) It occur only in unisexual flowers

34. Which of the following natural process is likely to hasten organic evolution ?
    1) Overproduction
    2) Favourable environment
    3) Reproductive isolation
    4) Abundant genotypic variations

35. A technology which has found immense use in solving cases of disputed parentage, is .....
    1) DNA finger printing
    2) Polymerase chain reaction
    3) Recombinant DNA technology
    4) Monoclonal antibody production

(Space for Rough Work)

36. Identify from the following, a plant tissue in which lignin does not occur in the cellwalls

1) Sclerenchyma fibers
2) Collenchyma
3) Xylem tracheae
4) Sclereids

37. Which of the following statement is not true with reference to mitochondria?

1) They contain DNA
2) They divide in synchrony with cell cycle
3) They store and release chemical energy
4) They contain cristae

38. Column I lists the parts of the human brain and column II lists the functions. Match the two columns and identify the correct choice from those given

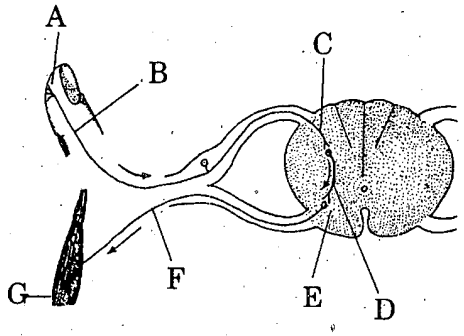
Column - I	Column - II
A. Cerebrum	p. controls the pituitary
B. Cerebellum	q. controls vision and hearing
C. Hypothalamus	r. controls the rate of heart beat
D. Midbrain	s. seat of intelligence
	t. maintains body posture

1) A = s; B = t; C = q; D = p
2) A = t; B = s; C = q; D = p
3) A = s; B = t; C = p; D = q
4) A = t; B = s; C = p; D = q

39. The site of EMP pathway of breakdown of glucose in a cell, is

1) Mitochondria
2) Nucleoplasm
3) Peroxysome
4) Cytoplasm

40. The following diagram indicates the reflex arc. Identify the parts labelled as A,B,C,D,E,F and G. Choose the correct option.



1) A = Sense organ; B = Sensory nerve; C = Ventral horn; D = Interneuron; E = Dorsal horn; F = Motor nerve; G = Effector
2) A = Sense organ; B = Sensory nerve ; C = Dorsal horn; D = Interneuron; E = Ventral horn; F = Motor nerve; G = Effector
3) A = Effector; B = Motor nerve; C = Ventral horn; D = Interneuron; E = Dorsal horn; F = Sensory nerve; G = Sense organ
4) A = Sense organ; B = Motor nerve; C = Dorsal horn; D = Interneuron; E = Ventral horn; F = Sensory nerve; G = Effector

41. How many human teeth appear twice during the life span of an individual?
    1) 32 2) 16
    3) 20 4) 22

42. If the size of a fertilized egg of frog is compared with the size of its blastula and gastrula stages, which of the following observations will be correct?
    1) All the three will be of the same size
    2) There is a progressive increase in size from zygote to blastula to gastrula
    3) Gastrula will be larger, while zygote and blastula will be of same size
    4) Zygote will be smaller, while blastula and gastrula will be larger.

43. During protein synthesis AUG functions as the initiator codon in mRNA. What should be the anticodon on the tRNA molecule that picks up and brings the amino acid specified by this codon?
    1) TAC 2) UAC
    3) GUA 4) CAU

44. Choose the odd pair out in the following
    1) Epithelium - Keratin 2) Areolar connective tissue- collagen
    3) Muscle fibre- actin 4) Neuron- melanin

45. The macronutrient which is an essential component of all organic compounds, yet not obtained by plants from soil, is
    1) Carbon 2) Nitrogen
    3) Magnesium 4) Phosphorous

(Space for Rough Work)

46. How many times a red blood corpuscle will have to pass through the heart in its journey from hepatic artery to the aorta?
    1) Only once
    2) Two times
    3) Four times
    4) Several times

47. The law of limiting factors was proposed with particular reference to photosynthesis. Identify the scientist who proposed this law.
    1) Weismann
    2) Calvin
    3) Blackmann
    4) Emerson

48. Osmoregulation in Paramecium is a function of ....
    1) Trichocysts
    2) Contractile vacuole
    3) Cytostome
    4) Cytopyge

49. Identify from the following the branch of biology which provides direct evidences in favour of organic evolution.
    1) Taxonomy
    2) Morphology
    3) Embryology
    4) Palaentology

50. Which of the following groups of cells in the male gonad, represent haploid cells?
    1) Germinal epithelial cells
    2) Spermatogonial cells
    3) Primary spermatocytes
    4) Secondary spermatocytes

(Space for Rough Work)

51. A nucleosome is a portion of the chromonema containing.....
    1) both DNA and histones 2) Only histones
    3) both DNA and RNA 4) Only DNA

52. Maximum amount of oxygen is exchanged from the blood in the ------
    1) arteries of the body 2) capillaries surrounding tissue cells
    3) capillaries surrounding the alveoli 4) left auricle of the heart

53. Which of the following term is used to describe the component isolated from a plant, for invitro culturing in the specific medium?
    1) Embryoid 2) Callus
    3) Explant 4) Synthetic seeds

54. If a cell has twice as much DNA as in a normal functional cell, it means that the cell.....
    1) has completed division 2) is preparing to divide
    3) has caesed to function 4) has reached the end of its lifespan

55. Apical dominance in plants is due to the presence of -----
    1) Gibberellins in the lateral bud 2) Cytokinins in the leaf apex
    3) Abscissic acid at the shoot tip 4) Auxins at the shoot tip

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(Space for Rough Work)

56. Which of the following structures are derivatives of the endoderm?

1) Muscles and blood
2) Alimentary canal and respiratory structures
3) Skin and nerve cord
4) Excretory and reproductive structures

57. The sequence of nitrogen bases in a portion of a coding segment of DNA was AAT GCT TAG GCA. What will be the sequence of nitrogen bases in the corresponding region of the transcripted mRNA?

1) AAT GCT TAG GCA
2) UUT CGT TUC CGU
3) TTA CGA ATC CGT
4) UUA CGA AUC CGU

58. Which chamber of the human heart has the thickest muscular wall?

1) Left ventricle
2) Left auricle
3) Right ventricle
4) Right auricle

59. Entomology is concerned with the study of

1) Agricultural practices
2) Formation and properties of soil
3) Various aspects of insects
4) Various aspects of human life

60. Which of the following is called as a detritivore?

1) An animal feeding on a plant
2) An animal feeding on decaying organic matter
3) An animal feeding on another animal
4) A plant feeding on an animal

(Space for Rough Work)

(Space for Rough Work)

A-1