



The backbone of Medical Entrance Institute is solely the quality of Teachers

MBBS
BDS
B.Sc. Nursing
Paramedical/Applied Sciences
Entrance Preparation

BPKIHS Based Model Examination

INSTRUCTIONS:

There are 200 Multiple Choice Questions (MCQs) each question having four choices of which only one choice is correct. Fill mark to correct option.

- Mark should be dark and completely fill the circle.
- Rough work must not be done on the answer sheet.
- Make the marks ONLY in the space provided.
- Please DO NOT make any stray marks on the answer sheet.
- Use gel pen. DO NOT use ball pen or pencil.

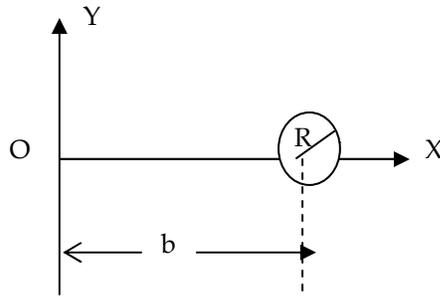
Date : 2069-11-19 Saturday
Time : 08:00 AM-11:00 AM
Venue : VIBRANT Building
Full Marks : 200

VIBRANT MBBS ENTRANCE PREPARATION

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a. $\frac{MR^2}{2}$

b. $\frac{MR^2}{4}$

c. $M\left(\frac{R^2}{4} + b^2\right)$

d. $M\left(\frac{R^2}{2} + b^2\right)$

13. A satellite in vacuum:

- a. is kept in orbit by remote control
c. derives energy from gravitational field

- b. is kept in orbit by solar energy
d. doesnot require any energy for orbiting

14. The upper end of a wire, 1 m long of 4 mm radius is clamped . The lower end is twisted by an angle of 30°. The angle of shear at the surface is:

a. 12°

b. 0.12°

c. 1.2°

d. 0.012°

15. I is denoted as current. The dimension of permittivity of vacuum is:

a. $M^{-1} L^{-3} T^{+4} I^2$

b. $M^{-1} L^{-3} T^2 I^4$

c. $M^{-1} L^{-2} T^3 I^4$

d. $ML^2T^{-3}I^{-4}$

16. Two stretched membranes of area 2m² and 3 m² are placed in a liquid at the same depth. The ratio of the pressure on them is:

a. 1:1

b. 2:3

c. $\sqrt{2} : \sqrt{3}$

d. $2^2:3^2$

17. Volume 'V' of water flows out per second through the first capillary tube having radius a & length L when connected to a pressure head p. If a tube of same length & radius (a/2) is connected in parallel and combination is connected to same pressure head, then quantity of water flowing out per second through these tubes will be:

a. V

b. V/16

c. $\frac{17}{16} V$

d. $\frac{V}{17}$

18. To measure temperature most accurately one should use

- a. Thermocouple thermometer
c. Constant volume gas thermometer

- b. Resistance thermometer
d. Mercury thermometer'

19. Latent heat of ice is 80 cal/g. A man melts 60gm of ice by chewing in one minute. Then the power of man is:

a. 80W

b. 4800W

c. 336W

d. 19 W

20. The number of degrees of freedom of each molecule of a monatomic gas is:

a. 1

b. 3

c. 6

d. 9

21. Which of the following is a thermodynamic function?

- a. work
b. internal energy

- c. heat
d. temperature

22. A rod AB has a length 150cm. The temperature of A is maintained at 100°C, while temperature of B at 25°C. Then in steady state the temperature of a point P at a distance 50 cm from the end B will be:

a. 80°C

b. 75°C

c. 50°C

d. 25°C

23. The electrostatic potential in a region is given by $V = (5x^3 + 10x^2 - 9)$ volt. What is the value of electric field at $x = 2m$?

a. 100 V/m along positive X-axis

b. 100 V/m along negative X-axis

c. 91 V/m along positive x-axis

d. 86/3 V/m along negative X-axis

24. A sheet of aluminum foil of negligible thickness is placed exactly midway between the plates of a parallel plate capacitor of capacitance C as shown in figure. When the foil is touched to inner plate through a conducting wire. The capacitance of capacitor will become /remain:

a. C

b. C/2

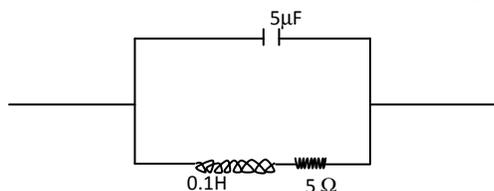
c. 2C

d. 4C

- a. lags behind the applied emf by an angle π
 c. leads the applied emf by an angle $\pi/2$

- b. lags behind the applied emf by an angle $\pi/2$
 d. and applied emf are in same phase

36. In the circuit shown, the resonant frequency is:

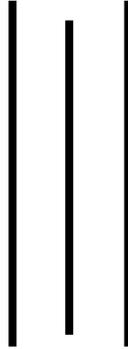


- a. 22KC/S b. 220 KC/S c. 0.22 KC/S d. 0.22 MC/s
37. Sodium has body centred packing. Distance between two nearest atom is 3.7Å . The lattice parameter is:
 a. 4.3Å b. 3.0Å c. 8.6Å d. 6.8Å
38. Monochromatic light of wavelength 667nm is produced by a helium neon Laser. The power emitted is 9mW . The number of photons arriving per second and on the average at a target irradiated by the beam is:
 a. 3×10^{16} b. 9×10^{15} c. 3×10^{19} d. 9×10^{17}
39. Which of the following is a good nuclear fuel?
 a. Thorium-236 b. Neptunium -239 c. Plutonium-239 d. Uranium-236
40. The mass of a lift is 2000Kg . When the tension in the supporting cable is 28000N , then its acceleration is:
 a. 4m/s^2 upward b. 4m/s^2 downwards
 c. 14m/s^2 upwards d. 30m/s^2 downwards
41. Colour of sky is due to:
 a. scattering of light b. Reflection c. Refraction d. Polarization
42. Zener diodes are used for:
 a. Rectification b. amplification c. stabilization of voltage d. detector
43. Which electromagnetic wave is detected by our eye?
 a. infrared b. X-ray c. violet d. ultraviolet
44. A 100W lamp is suspended at a height of 5m above the centre of a table. The intensity at the centre of table in watt/m^2 is
 a. 4 b. 4π c. $1/\pi$ d. $1/4\pi$
45. A ray is reflected by three plane mirrors mutually at right angles to each other. The angle between the incident and reflected rays is:
 a. 0 b. $\pi/2$ c. π d. $3\pi/2$
46. A source of sound is moving with velocity 50m/s towards stationary observer. The observer measures the frequency of sources as 1000Hz . What will be apparent frequency of source when it is moving away from observer after crossing him?
 a. 750Hz b. 857Hz c. 1143Hz d. 1333Hz
47. With increase in temperature frequency of sound from an organ pipe:
 a. increases b. decreases
 c. remains unchanged d. changes erratically
48. The intensity of sound after passing through a slab decreases by 20% . On passing through two such slabs, the intensity will decrease by:
 a. 50% b. 40% c. 36% d. 30%
49. A sonometers string and tuning fork when sounded together gives 6 beats/sec. Whether length of sonometer string is 95cm or 100cm . The frequency of tuning fork is:
 a. 262 b. 256 c. 260 d. 234
50. In secondary rainbow what is the order of colours observed from earth:
 a. violet inner most, red outer most b. red inner most, violet outer most
 c. random d. white and dark alternatively
51. Density of lithium atom is 0.53g/cm^3 . The edge length of Li is 3.5Å . Find out the number of lithium atom in a unit cell. Atomic mass of lithium is 6.94 .

135. In which vertebra of the rabbit the neural spine is long and directed backwards?
 a. Thoracic b. Cervical c. Sacral d. Lumbar
136. Total filtrate formed in 24 hours in human kidney is:
 a. 1.8 litre b. 8.0 litre c. 18 litre d. 180 litre
137. Which of the following is absent from smooth muscle cell?
 a. calcium b. myosin c. actin d. troponin
138. First ECG recorded on human body was by:
 a. Waller b. Einthoven c. Berger d. Chardack
139. The blastopore of gastrula represents:
 a. future mouth b. Future anus
 c. Future nasal opening d. Future genital opening
140. Upwardly directed pigmented part of frog's egg is related with:
 a. colouration b. camouflage c. respiration d. supply of nutrients
141. The most important characteristic features of birds is:
 a. forelimbs modified into wings b. bipedal vertebrate
 c. Homoiothermal d. Exoskeleton of feathers
142. The piercing elements in the mouth part of anopheles mosquito are:
 a. Labrum & labium b. Maxilla and mandible
 c. Hypopharynx and labrum d. labium & mandible
143. 'Neoteny' is related to:
 a. North America due to serial flow of iodine b. Genetic feature of some amphibians
 c. Alternation of generation in life cycle d. Development of sex organs in larva
144. Which of the following plant yields an anticancer drug?
 a. leaves of Vinca rosea b. Leaves of Cassica
 c. Roots of Rawolfia d. Seeds of Papaver
145. The stage of Entamoeba histolytica that causes intestinal ulceration is:
 a. Trophozoite b. Metacystic trophozoite
 c. Binucleate cyst d. Tetranucleate cyst
146. Sea mouse belongs to the phylum:
 a. Mollusca b. Echinodermata c. Annelida d. Chordata
147. Lateral oesophageal hearts in earthworm connects:
 a. Dorsal to ventral vessel b. Dorsal to subneural vessels
 c. Dorsal and supraoesophageal with ventral d. Lateral oesophageal & supraoesophageal
148. Suspensory ligament is a part of:
 a. Tongue b. Brain c. Heart d. Eye
149. An increased responsiveness to a stimulus is known as:
 a. Sensitization b. Habituation c. Imprinting d. Orientation
150. Respiratory movements are controlled by:
 a. cerebellum b. cerebrum c. Medulla oblongata d. Hypothalamus
151. Bureaucracy is:
 a. rule by nobility b. Rule by official desk
 c. Rule by wealthy people d. rule by king
152. One who walks in his sleep:
 a. somnambulist b. soliquist c. somniloquent d. Garrulous
153. The girl has _____ hair.
 a. Black, long, beautiful b. Beautiful, long, black
 c. Black, beautiful, long d. Long, beautiful, black
154. Kennel is related to dog in the same way as sty is related to:
 a. Pig b. sheep c. camel d. cattle
155. Numismatist:
 a. Studies and collects coins b. writes for newspaper
 c. studies plants d. collects postage stamps



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Hints and Solutions

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- 1.d $\rho = m/v = m/\pi r^2 L$
 Or, $\Delta\rho/\rho \times 100\% = (\Delta m/m + 2\Delta r/r + \Delta L/L) \times 100\%$
 $= [0.003/0.3 + 2(0.0005/0.5) + 0.06/6] \times 100\%$
 $= 1 + 2 + 1 = 4\%$
- 2.a $s = bt$
 Or, $ds/dt = b$ (Differentiating with respect to dt)
 Or, $dv/dt = 0$ (Differentiating with respect to dt)
 Therefore, $a = 0$
- 3.a With increase in time, velocity increases linearly for a body dropped from rest.
- 4.c $(\vec{A} \times \vec{B})$ is \perp to both \vec{A} and \vec{B} as $(\vec{A} + \vec{B})$ is in plane of \vec{A} and \vec{B} , hence angle between $(\vec{A} \times \vec{B})$ and $(\vec{A} + \vec{B})$ is $\pi/2$.
- 5.b Change in momentum = $2mu \sin \theta = 2mv \times 1/\sqrt{2} = \sqrt{2} mV$
- 6.c Angular acceleration (a) = $w^2 R = (2\pi n)^2 R = 4\pi^2 n^2 R$
- 7.a Loss of seconds/day (Δt) = $1/2 \propto \Delta\theta \times t$
 $= 1/2 \times 2 \times 15 \times 86400 \approx 12.96 \text{ sec}$
- 8.d Retardation (a) = $\mu mg/m = \mu g$
 Also, $v = u - at$ or, $v = at = \mu gt \Rightarrow t = v/\mu g$
- 9.a $KE = 1/2 mv^2 = 1/2 \times 2 \times |2\hat{i} + 3\hat{j} - 4\hat{k}|^2$
 $= |2\hat{i} + 3\hat{j} - 4\hat{k}|^2 = 4 + 9 + 16 = 29J$
- 10.c After 5 second, velocity of 1 kg piece,
 $V = u - gt = 100 - 10 \times 5 = 50 \text{ m/s}$
 By conservation of momentum
 $Mv = m_1 v_1 + m_2 v_2$
 Taking upward direction positive,
 $1 \times 50 = -0.4 \times 25 + 0.6v_2$
 $\Rightarrow v_2 = 100 \text{ m/s upward}$
- 11.c If a body tied to one end of a light inextensible string of length 'r' is given horizontal velocity v, then condition for oscillation is $V \leq \sqrt{2rg}$.
- 12.c Moment of inertia of disc about a diameter is: $I_g = MR^2/4$
 By, theorem of parallel axis moment of inertia of disc about y-axis is:
 $I = I_g + Mb^2 = MR^2/4 + Mb^2 = M(R^2/4 + b^2)$
- 13.d
- 14.b $\theta = r\phi/L = (4 \times 10^{-3} \text{m} / 1) \times 30^\circ = 0.12^\circ$
- 15.a $F = 1/4\pi\epsilon_0 \times q_1 q_2 / r^2$
 Or, $\epsilon_0 = q_1 q_2 / 4\pi F r^2 = Q^2 / Fr^2 = I^2 T^2 / MLT^{-2} \times L^2 = [M^{-1} L^{-3} T^4 I^2]$
- 16.a $p = \rho dg$ is independent of area.
- 17.c For capillaries in parallel, $1/Reqv = 1/R_1 + 1/R_2$
 Or, $Reqv = R_1 R_2 / R_1 + R_2 = R_1 \times 16R_1 / R_1 + 16R_1 = 16/17 R_1$
 Therefore, $Veqv/V = R_1/Reqv = 17/16 \Rightarrow Veqv = 17/16 V$
- 18.c
- 19.c $P = mL/t = 60 \times 80 / 60 = 80 \text{ cal/s} = 80 \times 4.2 \text{ J/s} = 336 \text{ W}$
- 20.b
- 21.b Internal energy depends only on state of system and is thermodynamic function.
- 22.c Temperature gradient $\Delta\theta/\Delta L = 100 - 25 / 150 = (1/2)^\circ\text{C/m}$
 Temperature of P = $T_B + \Delta\theta/\Delta L$ (length BP) = $25 + 1/2 \times 50 = 50^\circ\text{C}$
- 23.b $V = 5x^3 + 10x^2 - 9$ Therefore, $E = -dv/dx = -[15x^2 + 20x]$
 At $x = 2\text{m}$, $E = -[15 \times (2)^2 + 20 \times 2] = -100 \text{ v/m}$
- 24.c $C = \epsilon_0 A/d$
 Net effective separation become $d/2$

Therefore, $C' = \epsilon_0 A / (d/2) = 2C$

25.a $I = q/t = ne/t = 10^9 \times 1.6 \times 10^{-19} / 10^{-3} = 1.6 \times 10^{-7} \text{ A}$

26.c

27.c In parallel p.d across each bulb is same equal to applied voltage of 500V, which is more than permissible voltage, so both bulbs will get fused.

28.b

29.b Magnetic field at centre of circle, $B = \mu_0 ni / 2r$ also, $I = 2e/T$
Therefore, $B = \mu_0 2e / 2rT = \mu_0 \times 2 \times 1.6 \times 10^{-19} / 2 \times 0.8 \times 2 = 10^{-19} \mu_0$

30.a Opposite currents repel due to magnetic interaction.

31.d

32.b We have; magnetic moment (M) = mL

Therefore, $M' = m \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2} = \frac{mL}{\sqrt{2}}$

Therefore, $M'/M = 1/\sqrt{2} \Rightarrow M' = M/\sqrt{2}$

33.d

34.d Emf (e) $N \Delta\phi / \Delta t = N (\phi_2 - \phi_1) / \Delta t = N(\phi - (-\phi)) / \Delta t = N (2\phi / \Delta t)$
 $= 10 \text{ V}$ (putting values)

35.b Hint: Use CIVIL

36.c $f = 1/2 \pi \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}} = 1/2 \times 3.14 \sqrt{0.1 \times 5 \times 10^{-6} - \frac{5^2}{0.1^2}} = 0.22 \text{ kc/s}$

37.a In bcc Lattice; $d = \sqrt{3} / 2 a = \sqrt{3} / 2 \times 3.7 \text{ \AA} = 4.3 \text{ \AA}$

38.a $N = P / (hc / \lambda) = p \lambda / hc = 3 \times 10^{16}$ (putting values)

39.c

40.a $T - mg = Ma$

$\Rightarrow T = m (g + a)$

$\Rightarrow 28000 = 2000 (10 + a)$

$\Rightarrow a = 4 \text{ m/s upward}$

41.a 42.c 43.c

44.c $I = P / 4 \pi (5)^2 = 100 / 100 \pi = 1/\pi$

45.c

46.a $f^1 = \frac{v}{v - u_s} \times f \Rightarrow 1000 = \frac{350}{350 - 50} \times f$

$\Rightarrow f = 857 \text{ Hz}$

Again $f^{11} = v / (v + u_s) \times f = 350 / (350 + 50) \times 857 \text{ Hz} = 750 \text{ Hz}$

47.a with \uparrow in temperature, velocity \uparrow , so frequency \uparrow & wavelength remains constant

48.c since, intensity \downarrow by 20% on passing through a slab.

Therefore, intensity \downarrow on passing through 2 slabs = $(20 + 20 / 100 \times 80)\%$
 $= 36\%$

49.d

$(n+6) \times 95 = (n-6) \times 100$ (where, $n \rightarrow$ frequency, $nl \rightarrow$ constant)

Therefore $n = 234 \text{ Hz}$

50.b

51.a No of atom (z) = $a^3 \times \rho \times N_A / M$ (where; $a \rightarrow$ edgelength

$\rho \rightarrow$ density

$N_A \rightarrow$ Avogadro's number

$M \rightarrow$ molecular mass)

$= \frac{(3.5 \times 10^{-8})^3 \times 3 \times 0.53 \times 6.023 \times 10^{23}}{6.94} (\because 3.5 \text{ \AA} = 3.5 \times 10^{-8} \text{ cm})$

= 2

52.a. Due to Schottky defect density of crystal decreases

53.d Mole fraction of H_2 = mole of H_2 / (mole of H_2 + mole of thane) = $\frac{w/2}{w/2+w/30}$
= 15/16

54.c Vanderwall's equation of state for real gases is:

$$(P+a/v^2)(v-b) = RT \text{ (for 1 mole)}$$

55.b 56.d

57.a Osmotic pressure (π) = CRT

$$= 0.05 \text{ mol l}^{-1} \times 0.082 \text{ l atm mol}^{-1} \text{ k}^{-1} \times 298 \text{ K}$$

$$= 1.14 \text{ atm}$$

58.b. Eqv. wt of metal = wt of metal combining with 8 gm of O_2

$$= 0.5 \times 8 / 0.79 - 0.50 = 0.5 \times 8 / 0.29 = 13.5 \approx 14$$

59.b Bond order of O_2, O_2^+, O_2^- & O_2^{2-} are 2, 2.5, 1.5 & 1 respectively60.b bond length = $r_H + r_{Cl}$

$$= 1/2 (r^{H-H} + r^{Cl-Cl}) = 1/2 (74 + 198) = 136 \text{ pm}$$

61. c In SiF_4 , si has vacant d- orbital So, it can be lewis acid62. a Pyrophosphoric acid is $H_4P_2O_7$

63.c

64.d Equilibrium constant is affected only by temperature

65.d Degree of dissociation (α) = $D-d/d(n-1)$, where D = mol-mass/2

66.d $K_a = C\alpha^2 = 0.1 \times (0.001/100)^2 = 1.01 \times 10^{-11}$

67.a 68.c

69.a $\Delta S = \Delta H/T = 900 \times 18 / 373 = 43.4 \text{ J mol}^{-1} \text{ K}^{-1}$

70.b

71.c $E^\circ_{\text{cell}} = E^\circ_{Fe^{3+}/Fe^{2+}} - E^\circ_{Sn^{2+}/Sn}$

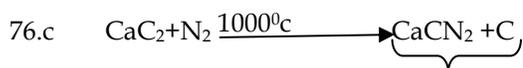
$$= 0.77 - (-0.14)$$

$$= +0.91 \text{ V}$$

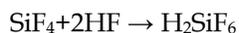
72.d Cu^{2+} has greater reduction potential than Fe^{2+}

73.c.

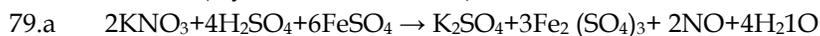
74.a 75.d



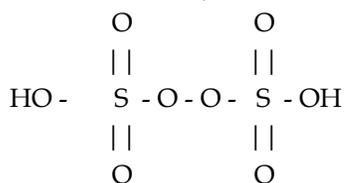
Nitrolium which is a fertilizer

77.b H_3BO_3 is not a protonic acid

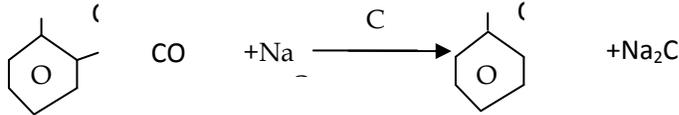
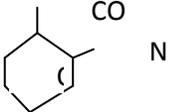
(Hydrofluorosilicic acid)



80.c

The structure of $H_2S_2O_8$ (Marshall's acid) is:

(hot)

- 82.b In plattner chlorine process, roasted ore are treated with chlorine. The gold chloride is treated with reducing agent like H_2S i.e. $2 AuCl_3 + 3H_2S \rightarrow 2Au + 3S + 6HCl$
- 83.c Mercuric chloride (corrosive sublimate) is a poison
84. d
- 85.b $EAN = \text{At.no.} - \text{cationic charge} + (\text{co-ordination no.} \times 2)$
 $= 26 - 3 + (6 \times 2)$
 $= 35$
- 86.a As^{3+} is member of II B group
 The group reagent for 3rd group is NH_4OH in presence of NH_4Cl .
- 87.b
- 88.a Resonating structure do not always possess identical bonding eq.
 $:O=C=O: \leftrightarrow : \ddot{O}-C \equiv O: + \leftrightarrow : O \equiv C-\ddot{O}:$
- 89.c In 1,1-dichloropentane i.e. $Cl_2C=CHCH_2CH_2CH_3$, one of the double bonded carbon atom c_1 has 2 similar atom. So geometrical isomerism is not possible
- 90.c No bond resonance is hyperconjugation
- 91.d δ^- δ^+
 $CH_3CH_2-NH-H^{\delta+} + CH_3-CH_2-MgI \rightarrow CH_3-CH_2-NHCH_2-CH_3 + MgI$
- 92.a $C_6H_6(i) \xrightarrow{O_3} 3 \text{ CHO}$
 (ii) \downarrow
 CHO (glyoxal)
- 93.d $C_{10}H_{16}Cl_2$ is known as artificial camphor
- 94.b  $Cyclohexanone + Na \xrightarrow{C} Sodium\ cyclohexanone + Na_2C$
- 95.a Lesser is steric hindrance, greater is the rate of esterification.
- 96.a $C_6H_5-O-C_2H_5 + \text{Conc. HBr} \xrightarrow{\Delta} C_6H_5OH + C_2H_5Br$
- 97.c Mild oxidising agent only can do this
- 98.a  N Is most acidic due to ortho effect
99. b $CH_3-C \equiv N + H_2O \xrightarrow{\text{acid}} CH_3-C(=O)-NH_2$
 amide intermediate
 $CH_3-C(=O)-NH_2 + H_2O \xrightarrow{\text{acid}} CH_3-C(=O)-OH + NH_3$
 (Acetic acid)
- 100.c 101.c 102.b 103.b 104.d 105.b 106.c 107.c 108.d 109.b 110.c 111.a 112.b 113.b
 114.d 115.d 116.a 117.d 118.b 119.d 120.b 121.d 122.d 123.d 124.a 125.b 126.a 127.c
 128.a 129.c 130.a 131.d 132.b 133.b 134.a 135.a 136.d 137.d 138.c 139.b 140.b 141.d
 142.b 143.d 144.a 145.a 146.c 147.c 148.d 149.a 150.c 151.b 152.a 153.b 154.a 155.a
 156.c 157.c 158.a 159.c 160.a 161.b 162.d 163.b 164.b 165.b 166.a 167.d 168.c 169.d
 170.b 171.b 172.b 173.b 174.c 175.a 176.b 177.c 178.a 179.c 180.b 181.a 182.b 183.a
 184.a 185.b 186.a 187.a 188.a 189.b 190.a 191.c 192.b 193.a 194.b 195.a 196.b 197.a
 198.c 199.b 200.a

✿ ALL THE BEST ✿