

# Sikkim Public Service Commission

Main Written Examination for the Post of **Livestock Assistant**

**Paper - II**

Time Allowed : 3 Hrs.

Maximum Marks : 200

## INSTRUCTIONS TO CANDIDATES

*Read the following instructions carefully before answering the questions :-*

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. Please note that it is the candidate's responsibility to fill in the Roll Number and Test Booklet Serial Number carefully and without any omission or discrepancy at the appropriate places in the **OMR ANSWER SHEET**.
3. Use only **Black Ball Point Pen** to fill the OMR sheet
4. Do not write anything else on the OMR Answer Sheet except the required information.
5. This Test Booklet contains **100 items of Math. , Bio, Phy. and Chem. in MCQ Mode (questions)** to be marked in OMR Sheet.
6. All items from Q.1 to Q. 100 carries **2 marks each**.
7. Before you proceed to mark in the Answer Sheet (OMR), you have to fill in some particulars in the Answer Sheet (OMR) as per given instructions.
8. After you have completed filling in all your responses on the Answer Sheet (OMR) and the examination has concluded, you should hand over the Answer Sheet (OMR) to the Invigilator only . You are permitted to take away with you the Test Booklet.

### 9. **Marking Scheme**

THERE WILL BE NEGATIVE MARKING FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.

- (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, one-third of the marks assigned to that question will be deducted as penalty.
- (ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above to the question.
- (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no penalty for that question.

**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO**

**PAPER - II**  
**MATHEMATICS**

1. The pair of equations  $x+2y+5=0$  and  $-3x-6y+1=0$  have :
- A. infinitely many solutions
  - B. exactly two solutions
  - C. no solution
  - D. a unique solution
2. If a fraction is multiplied by itself and then divided by the reciprocal of the same fraction, the result is  $18\frac{26}{27}$ . Find the fraction.
- A.  $1\frac{1}{3}$
  - B.  $2\frac{2}{3}$
  - C.  $3\frac{2}{3}$
  - D.  $\frac{8}{27}$
3. If a person walks at 14km/hr instead of 10km/hr, he would have walked 20 km more. The actual distance travelled by him is :
- A. 50 km
  - B. 80 km
  - C. 60 km
  - D. 56 km
4. If  $\sec \theta = \frac{5}{4}$ , then the value of  $\frac{1-\tan \theta}{1+\tan \theta}$  is :
- A.  $\frac{3}{4}$
  - B.  $\frac{7}{16}$
  - C.  $\frac{1}{7}$
  - D. 7

5. The price of petrol goes up by 10%. By how much percent a motorist must reduce the consumption of petrol so that the expenditure on it remains unchanged.
- A.  $11\frac{1}{11}\%$
- B.  $9\frac{2}{11}\%$
- C.  $10\frac{1}{11}\%$
- D.  $9\frac{1}{11}\%$
6. A box contains Rs. 480 in the denominations of one-rupee notes, five - rupee notes and ten-rupee notes. The number of notes of each denomination is equal. Find the total number of notes in the box.
- A. 60
- B. 90
- C. 80
- D. 75
7. If 7 times the 7<sup>th</sup> term of an A.P. is equal to 11 times its 11<sup>th</sup> term, then its 18<sup>th</sup> term will be :
- A. 0
- B. 18
- C. 7
- D. 13
8. If x is 20% less than y, then the vlaue of  $\frac{x}{y}$  is :
- A.  $\frac{1}{2}$
- B.  $\frac{3}{4}$
- C.  $\frac{4}{5}$
- D. None of these



9.  $\frac{4}{7}$  of a pole is in the mud. When  $\frac{1}{3}$  of it is pulled out, 250 cm of the pole is still in the mud. What is the full length of the pole.
- A. 1000cm  
B. 1005cm  
C. 1150cm  
D. 1050cm
10. The value of  $k$  for which the system of equations:  $2x - y = 5$ ,  $6x + ky = 15$  has infinitely many solutions is:
- A. -3  
B.  $\frac{1}{3}$   
C.  $-\frac{1}{2}$   
D. 3
11. A bus travelling with  $\frac{5}{7}$  of its actual speed covers 42 km in 1 hr 40min 48 sec. Find the actual speed of the bus.
- A. 40 km/hr  
B. 35 km/hr  
C. 22.5 km/hr  
D. 25 km/hr
12. For some integer  $q$ , every odd integer is of the form:
- A.  $q+1$   
B.  $2q$   
C.  $2q+1$   
D.  $q$
13. If the zeroes of the quadratic polynomial  $x^2 + (a+1)x + b$  are 2 and -3, then :
- A.  $a=5, b=-1$   
B.  $a=0, b=-6$   
C.  $a=2, b=-6$   
D.  $a=-7, b=-1$

14. If  $\sqrt{a}x - \sqrt{b}y = b - a$  and  $\sqrt{b}x - \sqrt{a}y = 0$ , then the value of  $xy$  is :
- A.  $-\sqrt{ab}$
  - B.  $a\sqrt{b}$
  - C.  $a - b$
  - D.  $\sqrt{ab}$
15. The circumference of two circles are in the ratio 2 : 3. The ratio of their areas is :
- A. 3 : 9
  - B. 4 : 9
  - C. 6 : 9
  - D. 5 : 10
16. If  $\sec 4A = \operatorname{cosec}(A - 20^\circ)$ , where  $4A$  is an acute angle, then the value of  $A$  is :
- A.  $22^\circ$
  - B.  $20^\circ$
  - C.  $40^\circ$
  - D.  $30^\circ$
17. The mean height of 8 students is 152 cm. Two more students of height 143 cm and 156 cm join the group. Find the new mean height.
- A. 100 cm
  - B. 150 cm
  - C. 151.5 cm
  - D. 110.5 cm
18. The quadratic equation  $2x^2 - \sqrt{5}x + 1 = 0$  has:
- A. more than two real roots
  - B. no real roots
  - C. two equal real roots
  - D. two distinct real roots
19. The 4<sup>th</sup> term from the end of the A.P. 2, 5, 8, ..... , 35 is :
- A. 24
  - B. 25
  - C. 21
  - D. 26

20. The consecutive vertices of a parallelogram  $ABCD$  are  $A(1, 2)$ ,  $B(1, 0)$  and  $C(4, 0)$ . Find the fourth vertex  $D$ .
- A.  $(1, 3)$   
B.  $(4, 2)$   
C.  $(5, 2)$   
D.  $(4, 6)$
21. The angle of elevation of the top of a building at a point on the ground is  $30^\circ$ . If the height of the tower is tripled, find the angle of elevation of the top of the building at the same point.
- A.  $90^\circ$   
B.  $45^\circ$   
C.  $30^\circ$   
D.  $60^\circ$
22. At one end  $A$  of a diameter  $AB$  of a circle of radius 5cm, tangent  $XAY$  is drawn to the circle. The length of the chord  $PQ$  parallel to  $XY$  and at a distance 8cm from  $A$  is:
- A. 6.5 cm  
B. 6 cm  
C. 8 cm  
D. 7.5 cm
23. If three sides of a triangle are  $x$ ,  $\sqrt{3}x$ ,  $\sqrt{2}x$ , then the measure of the angle opposite to the longest side is:
- A.  $30^\circ$   
B.  $60^\circ$   
C.  $90^\circ$   
D.  $45^\circ$
24. The surface areas of two spheres are in the ratio 16 : 9. Find the ratio of their volumes:
- A. 56 : 28  
B. 64 : 24  
C. 64 : 27  
D. 60 : 20

25. The probability of selecting a red ball at random from a jar that contains only red, blue and orange balls is  $\frac{1}{4}$ . The probability of selecting a blue ball at random from the same jar is  $\frac{1}{3}$ . If the jar contains 10 orange balls, find the total number of balls in the jar.
- A. 16
  - B. 24
  - C. 20
  - D. 32

### BIOLOGY

26. Which one of the following has the largest population in a food chain.
- A. Primary consumers
  - B. Producer
  - C. Secondary Consumers
  - D. Tertiary Consumers.
27. A Typical genotypic monohybrid ratio is
- A. 9 : 3 : 3 : 1
  - B. 1 : 2 : 1
  - C. 3 : 1
  - D. 9 : 3
28. Fertilization of ovum in mammals takes place in
- A. Vestibule
  - B. Vagina
  - C. Uterus
  - D. Fallopian tube
29. A plant with both male and female flowers is
- A. Unisexual
  - B. Bisexual
  - C. Monoecious
  - D. Dioecious



30. The transfer of energy in food chain is
- A. Bidirectional
  - B. Unidirectional
  - C. Reversible
  - D. Multidirectional
31. Process by which we can add or delete certain gene is
- A. Gene therapy
  - B. Cytogenesis
  - C. Biotechnology
  - D. Genetic engineering
32. Disease not caused by bacteria
- A. Pneumonia
  - B. Typhoid
  - C. Malaria
  - D. Tuberculosis
33. Double Helix structure of DNA Was proposed by
- A. Hugo De Vries
  - B. Watson & Creek
  - C. Meselson & Stahl
  - D. Gregor John Mendel
34. Vitamin required for synthesis of Prothrombin which helps in blood clotting
- A. Vitamin D
  - B. Vitamin C
  - C. Vitamin K
  - D. Vitamin E
35. Protein synthesis in an animal cell takes
- A. Only in the cytoplasm
  - B. In the nucleus as well as in cytoplasm
  - C. In cytoplasm as well as in mitochondria
  - D. Only in ribosomes attached to the nuclear envelope



36. Rhizobium is a
- A. free living bacteria
  - B. found in the root nodules of pea.
  - C. found in root nodules of cereals
  - D. parasite in the cavities of Azolla leaves.
37. Diagnostic technique which detects the presence of an antigen or antibody in a sample by antigen-antibody reaction is
- A. ELISA
  - B. Sonography
  - C. C T Scan
  - D. Electrocardiogram
38. Which among the following nitrogenous base is not found in DNA
- A. Adenine
  - B. Thyamine
  - C. Uracil
  - D. Cytosine
39. The artery that carries deoxygenated blood is
- A. Hepatic artery
  - B. Pulmonary artery
  - C. Radial artery
  - D. Renal artery
40. Gastric juice is secreted inside
- A. Stomach
  - B. Mouth cavity
  - C. Small intestine
  - D. large intestine
41. Select the statement which explains best parasitism
- A. One organism is benefited
  - B. Both organism are benefited
  - C. One organism is benefited, other is not affected
  - D. One organism is benefited, other is affected

42. Test tube babies are produced
- A. Embryo formation in test tube
  - B. Without fertilization
  - C. Fertilization in vitro
  - D. Fertilization in vivo
43. The ultraviolet radiation in the stratosphere are absorbed by
- A. Oxygen
  - B.  $\text{SO}_2$
  - C. Ozone
  - D. Argon
44. Nerves which arise from different parts of the brain is
- A. Optic nerve
  - B. Spinal nerve
  - C. Cranial nerve
  - D. Auditory nerve
45. Which of the following fruit is a case parthenogenesis
- A. Fruit without seed after pollination
  - B. Fruit with seed after pollination
  - C. Fruit with viable seeds without fertilization
  - D. Fruit with viable seeds after fertilization
46. Which is the correct order of mitotic cell division
- A. Metaphase, prophase, telophase, anaphase
  - B. Anaphase telophase prophase, metaphase
  - C. Preopphase, metaphase, anaphase, telophase
  - D. Telophase, anaphase, metaphase, prophase
47. Which among the following is not a dicot seed
- A. Pea
  - B. Beans
  - C. Maize
  - D. Gram

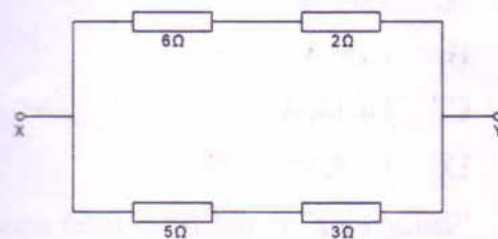
48. People with AB blood group have
- A. Antigens A and B and their antibodies
  - B. Antigens A and B but no antibodies
  - C. Antigens A and Antibodies to B
  - D. Antibodies to A and B but no antigens
49. Which one of the following is not ear bone.
- A. Malleus
  - B. Incus
  - C. Radius
  - D. Stapes
50. Power house of the cell is
- A. Ribosomes
  - B. Golgi bodies
  - C. Mitochondria
  - D. Chloroplast

### PHYSICS

51. An electric dipole is placed in a non-uniform electric field. The dipole will exhibit
- A. Pure translation
  - B. Pure rotation
  - C. Both translation and rotation
  - D. Neither translation nor rotation
52. A hollow metal sphere of radius 5cm has an electric potential 10V on its surface. The potential at its centre is
- A. Zero
  - B. 2V
  - C. 5V
  - D. Infinite
53. To increase the capacitance of a parallel-plate capacitor, you can:
- A. increase the area of the plates
  - B. increase the distance between the plates
  - C. increase the potential difference across the plates
  - D. none of the above



54. Given  $n$  capacitors with charge  $Q$  and capacitance  $C$ , the energy stored is maximum when they are connected in
- Series
  - Parallel
  - Suitable combination of series and parallel
  - This cannot be determined without knowing more about the situation.
55. In the circuit shown, a potential difference of 3V is applied across XY. What is the current in the  $5\ \Omega$  resistor?



- $15/8\text{ A}$
  - $3/4\text{ A}$
  - $3/5\text{ A}$
  - $3/8\text{ A}$
56. For a moving coil galvanometer, Current Sensitivity and Voltage Sensitivity, **both** can be increased by
- Increasing the number of turns of the coil
  - Decreasing the number of turns of the coil
  - Increasing the coil area.
  - Decreasing the coil area.
57. A copper bar is placed in a uniform magnetic field. The field lines will be
- The same as before
  - More concentrated in the bar
  - Pushed away from the bar
  - Focused at a point
58. Units for magnetic flux density
- $\text{Wb} / \text{m}^2$
  - $\text{Wb} / \text{A.m}$
  - $\text{A} / \text{m}$
  - $\text{T} / \text{m}$
59. Electromagnets are made of soft iron because soft iron has
- High susceptibility Low retentivity
  - Low susceptibility High retentivity
  - High susceptibility High retentivity
  - Low susceptibility Low retentivity



60. In AC circuits, laminated iron sheets is employed in order to
- A. Prevent rusting
  - B. Minimize heat loss due to eddy currents
  - C. Minimize heat loss due to conduction
  - D. Add some weight to the device
61. What is the RMS current flowing through a resistor  $100\ \Omega$ , connected across an AC source of peak voltage  $141\text{ V}$ ?
- A.  $1.41\text{ A}$
  - B.  $1.00\text{ A}$
  - C.  $14.1\text{ kA}$
  - D.  $1\text{ kA}$
62. "Back emf" is the term also used for the emf which is produced by
- A. batteries
  - B. solar cells
  - C. thermo couples
  - D. solenoids
63. Which of these have the shortest wavelength
- A. Short-radio waves
  - B. Yellow Light
  - C. Gamma Rays
  - D. Heat Rays
64. Which of the following spectral series of hydrogen atom is lying in visible range of electromagnetic wave?
- A. Lyman
  - B. Balmer
  - C. Paschen
  - D. Pfund
65. The angle of minimum deviation in case of an equilateral prism made of a transparent material of refractive index  $\sqrt{3}$ , will be
- A.  $30^\circ$
  - B.  $45^\circ$
  - C.  $60^\circ$
  - D.  $90^\circ$

66. A convex lens and a concave lens each of focal lengths  $f$  are placed in contact. Their equivalent focal length will be
- A. 0
  - B.  $f$
  - C.  $2f$
  - D.  $\infty$
67. Two slits are separated by a distance of 0.5 mm and illuminated with monochromatic light of wavelength 6000 Å. If the screen is placed 2.5 m from the slits, the distance of the third bright image from the centre will be:
- A. 1.5 mm
  - B. 3 mm
  - C. 6 mm
  - D. 9 mm
68. A polarizing filter will reduce the intensity of unpolarized light by
- A. 75%
  - B. 50%
  - C. 25%
  - D. 0%
69. A photocell is illuminated by a small bright source placed 1 m away. When the same source of light is placed 1/2 m away, the number of electrons emitted by cathode would
- A. Increase by a factor of 2
  - B. Decrease by a factor of 2
  - C. Increase by a factor of 4
  - D. Decrease by a factor of 4
70. Electrons are accelerated through a potential difference  $V$ . If the accelerating potential is now made  $4V$ , the de-Broglie wavelength of electrons will
- A. Increase by a factor of 2
  - B. Decrease by a factor of 2
  - C. Increase by a factor of 4
  - D. Decrease by a factor of 4

71. A free neutron will decay into  
 A. Proton and electron  
 B. Electron and positron  
 C. Proton, electron and anti-neutrino  
 D. Proton, positron and anti-neutrino
72. A radioactive substance has a half life of 5 years. What percentage of the initial amount of sample would be left after 15 years?  
 A. 33.3%  
 B. 25 %  
 C. 12.5 %  
 D. 11.1 %
73. The nucleus which has radius one third of the radius of  $\text{Cs}^{189}$  is  
 A.  $\text{Be}^9$   
 B.  $\text{F}^{19}$   
 C.  $\text{C}^{12}$   
 D.  $\text{Li}^7$
74. The given Truth Table is for which gate?
- | Input | Input | Output |
|-------|-------|--------|
| A     | B     | Y      |
| 0     | 0     | 1      |
| 0     | 1     | 1      |
| 1     | 0     | 1      |
| 1     | 1     | 0      |
- A. AND  
 B. OR  
 C. NAND  
 D. NOR
75. Which of the following is an example of a *transducer*  
 A. Printer  
 B. Loud speaker  
 C. Gramophone  
 D. Microphone

### CHEMISTRY

76. Anisotropic in nature due to physical properties of crystalline solids means:  
 A. They show same value of physical properties in all directions.  
 B. They show different value of physical properties in different directions.  
 C. They show values of physical properties which are common multiple of each other.  
 D. They show values of physical properties equal over a unit area.



77. The term Desorption is:
- A. Settling down of adsorbate on the surface of adsorbent.
  - B. Settling down of adsorbate in the bulk of adsorbent.
  - C. Removal of adsorbate from the surface of the adsorbent.
  - D. Entering of adsorbate slowly from the surface into the bulk of the adsorbent.
78. If Radhika has one sample of unlabelled alcohol and she adds Lucas reagent into the sample. The sample immediately turns turbid indicating that the sample is :
- A. Secondary alcohol
  - B. Primary alcohol
  - C. Quarternary alcohol
  - D. Tertiary alcohol
79. We cannot store Copper sulphate in a Zinc pot because
- A. Copper is more reactive than Zinc hence Zinc pot gets corroded.
  - B. Copper sulphate helps in reduction of Zinc.
  - C. Copper Sulphate is a good reducing agent for Zinc.
  - D. Zinc is more reactive than Copper therefore the pot gets corroded.
80. Which of the following is an Ambidentate Ligand:
- A. Thiocyanide
  - B. Cyanide
  - C. Ammine
  - D. Chloro
81. 3-Oxopentanal consist which of the following functional groups?
- A. Alcohol and Aldehyde
  - B. Carboxylic acid and Aldehyde
  - C. Halogen and Aldehyde
  - D. Ketone and Aldehyde
82. An application of Reverse osmosis is:
- A. Peptization
  - B. Desalination
  - C. Electrolysis
  - D. Electro - dialysis



83. Two monosaccharides are joined by an oxide linkage with the loss of water molecule known as:
- A. Sucrosidic linkage
  - B. Glycosidic linkage
  - C. Fructosidic linkage
  - D. Maltosidic linkage
84. On what factors does the rate of a chemical reaction depend?
- i) Temperature
  - ii) Pressure
  - iii) Concentration of the reactants
  - iv) Catalyst
- A. i and ii
  - B. i,ii and iii
  - C. i,ii and iv
  - D. i,ii,iii and iv
85. When Rahul suffers from Acidity what category of drug will you prescribe to him as a friend?
- A. Analgesic
  - B. Antacid
  - C. Antipyretic
  - D. Antiseptic
86. In the process 'Vulcanization of Rubber', raw rubber is gently warmed with:
- A. Sulphur
  - B. Phosphorous
  - C. Iodine
  - D. Bromine
87. Calamine is a metallic ore of which of the following metal?
- A. Iron
  - B. Aluminium
  - C. Zinc
  - D. Copper

88. The chemical formula of Freon (a derivative of methane) is:
- A.  $\text{CH}_3\text{Cl}$
  - B.  $\text{CHCl}_3$
  - C.  $\text{CH}_2\text{Br}_2$
  - D.  $\text{CCl}_2\text{F}_2$
89. Brass is an alloy of which two metals?
- A. Copper and Tin
  - B. Copper and Zinc
  - C. Copper and Iron
  - D. Copper and Vanadium
90. 'Rusting' an example of corrosion is the:
- A. Reduction of Iron
  - B. Reduction of Tin
  - C. Oxidation of Iron
  - D. Oxidation of Tin
91. Semiconductor of n - type can be made by doping Silicon with:
- A. Arsenic
  - B. Germanium
  - C. Gallium
  - D. Indium
92. The amount of energy released during Physical Adsorption is
- A. Greater than that of Chemical Adsorption.
  - B. Lesser than that of Chemical Adsorption.
  - C. Equal to that of Chemical Adsorption.
  - D. Sometimes greater and sometimes lesser than Chemical Adsorption.
93. Jellies are examples of what type of colloidal solution?
- A. Solid in Liquid solution
  - B. Liquid in Liquid solution
  - C. Liquid in Solid solution
  - D. Gas in Liquid solution

94. Friedal Craft's reaction does not take place in Benzoic acid because
- A. Carboxylic group is electron donating hence makes the benzene ring electron rich.
  - B. Carboxylic group is electron withdrawing hence deactivates the benzene ring and makes it electron deficient.
  - C. Carboxylic group makes the Benzene ring ortho – para directing.
  - D. None of the Above
95. All natural and artificial radioactive decay takes place by
- A. First order reaction
  - B. Zero Order reaction
  - C. Third order reaction
  - D. Second order reaction
96.  $\text{NO}_2$  dimerises because
- A. it is an easily mixable gas.
  - B. it helps in depletion of ozone.
  - C. it is a very strong oxidizing agent.
  - D. it has an odd no of electron.
97. When you open a Coca cola bottle,  $\text{CO}_2$  is released. Which law is applied in the given statement?
- A. Raoult's law
  - B. Saytzeff's law
  - C. Henry's law
  - D. Markonikov's law
98. What does Denaturation of Alcohol mean?
- A. Made unfit for drinking
  - B. Made into tincture of iodine.
  - C. Distillation of alcohol by removal of water completely.
  - D. Mixing of alcohol and water in a ratio of equal amounts.



99. Scurvy is caused by the deficiency of vitamin C that is found in which of the following source ?

- A. Sunlight
- B. Yeast
- C. Milk
- D. Citrus fruits

100. Which of the following is an artificial sweetening agent?

- A. Barbiturates
- B. Cimetidine
- C. Aspartame
- D. Terfenadine