Sikkim Public Service Commission

Main Written Examination for the post of
Sub Inspector Excise (Abk)

Paper II : Science, Mathematics & Social Science

Time Allowed : 3Hrs.

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 carefully and without any omission or discrepancy at the appropriate places in the **OMR ANSWER SHEET** for MCQ. Any omission/discrepancy will render the Answer Sheet liable for rejection.

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 booklet contains MCQ and Conventional questions. Section A contains MCQ which needs to be marked in an OMR sheet. Section B (Social Science), Section C(Physics), Section D(Chemistry), Section E(Biology) & Section F(Mathematics) contains Conventional Short Answer Questions which needs to be answered in SEPARATE answer sheets provided for each Section.**

6. 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.

7. After you have completed filling in all your responses on the OMR Sheet & writing section in a separate Answer Sheet, you should hand over the Answer Sheet & OMR Sheet to the Invigilator only. You are permitted to take away with you the Test Booklet.

8. **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

Section A

Multiple Choice Questions

1) Who said "when France sneezes the rest of Europe catches cold"?
   A) Garibaldi
   B) Mazzini
   C) Matternich
   D) Bismark

2) Which treaty recognised Greece as an independent nation?
   A) Treaty of Versailles
   B) Treaty of Vienna
   C) Treaty of Constantinople
   D) Treaty of Lausanne

3) When did Vietnam get independence?
   A) 1887
   B) 1945
   C) 1873
   D) 1858

4) What did the Rowlett Act, 1919 presume?
   A) Detention of political prisoners without trial
   B) Forced recruitment in the army
   C) Forced labour
   D) Equal pay for equal work

5) Who were the "Sanatanis"?
   A) Saints
   B) Dalits
   C) High caste Hindus
   D) None of these

6) Which disease spread like wild fire in Africa in the 1890's?
   A) Cattle plague
   B) Small pox
   C) Pneumonia
   D) None of the above

7) When was the Act of Union passed between England and Scotland, which resulted in the formation of United Kingdom of Great Britain?
   A) 1700
   B) 1707
   C) 1718
   D) 1710

8) The paid servants of the East India Company were called?
   A) Seth
   B) Mamlatdar
   C) Gomastha
   D) Begar

9) Why did Gandhiji withdraw the Non-Cooperation Movement?
   A) Gandhiji realised that people were losing interest in the movement
   B) Gandhiji felt that the movement had turned violent
   C) Some Congress leaders wanted revolutionary mass agitation
   D) Some Congress leaders wanted to participate in the elections to the provincial councils

10) The first weekly paper published in India was _____
   A) Bombay Samachar
   B) Bengal Gazette
   C) Shamsul Akbar
   D) Samachar Chandrika

11) Who is the pioneer of modern Hindi literature?
   A) Srinivas Das
   B) Bharatendu Harishchandra
   C) Pariksha Guru
   D) Devki Nandan

12) Balancing the need to use resources and also conserve them for the future is called _____
   A) Sustainable development
   B) Resource conservation
   C) Resource development
   D) Human resource development

13) In which of the following state is the Simplipal bio-reserve located?
   A) Punjab
   B) Delhi
   C) Orissa
   D) West Bengal

14) Hirakud dam is built on which river?
   A) Chenab
   B) Mahanadi
   C) Krishna
   D) Satluj

15) The Minimum Support Price(MSP) for food grains was introduced in the year?
   A) 1954
   B) 1974
   C) 1964
   D) 1984

16) Which place in India is ideal for utilising tidal energy?
   A) Gulf of Kachchh
   B) Gulf of Khambhat
   C) Gulf of Mannar
   D) None of these

17) Textile industry is an example of
   A) Agro based industry
   B) Co-operative sector industry
   C) Mineral based industry
   D) Marine based industy

18) What is considered as the economic barometer for a country?
   A) Poverty levels
   B) International trade
   C) Economic growth
   D) Population

19) Development of a country is generally determined by
   A) Its per capita income
   B) Its average literacy level
   C) Health status of its people
   D) All of the above

20) Under employed people are found in
   A) Agriculture
   B) Industry
   C) Services
   D) None of these

21) Which of the following does not represent electrical power of a circuit?
   A) I^2R
   B) IR^2
   C) VI
   D) V^2/R

22) A piece of wire of resistance R is cut into five equal parts. These parts are connected in parallel. If R' is equivalent resistance of this combination then R':R is
   A) 1:25
   B) 1:5
   C) 5:1
   D) 25:1

23) One kilo watt hour is equal to
   A) 36×10^6 J
   B) 36×10^{-6} J
   C) 3.6×10^6 J
   D) 0.36×10^6 J

24) An electric bulb is rated 220 V and 100 W when it is operated in 110 V, the power consumed will be'
   A) 100 W
   B) 75 W
   C) 50 W
   D) 25 W

25) The charge contained in an electron is

        A) -1.6×10^{-19} C

        B) 1.6×10^{-19} C

        C) 0.16×10^{-19} C

        D) -16×10^{-19} C

26) At the time of Short Circuit, the current in the circuit ___

        A) Reduces substantially

        B) Does not change

        C) Increases heavily

        D) Reduces slowly

27) The magnetic field lines inside a long current carrying solenoid are nearly

        A) Straight

        B) Circular

        C) Parabolic

        D) Elliptical

28) The variable resistance is called

        A) Rheostat

        B) Resistor

        C) Key

        D) Switch

29) Which of the following gases can be used for storage of fresh sample of an oil for a long time?

        A) Carbon dioxide

        B) Oxygen

        C) Hydrogen

        D) Nitrogen

30) The reaction used for black and white photography

        A) Decomposition of Calcium Carbonate

        B) Decomposition of Silver Chloride

        C) Decomposition of Lead Nitrate

        D) Decomposition of Iron Sulphate

31) It is also an exothermic process
      A)   Reproduction
      B)   Excretion
      C)   Circulation
      D)   Respiration

32) One of the constituents of baking powder is sodium hydrogen carbonate. The other is
      A)   Hydrochloric acid
      B)   Tartaric acid
      C)   Acetic acid
      D)   Sulphuric acid

33) Which of the following does not contain water of crystallisation
      A)   Washing soda
      B)   Gypsum
      C)   Blue vitriol
      D)   Baking soda

34) A solution turns blue litmus to red, its pH is likely to be
      A)   4
      B)   7
      C)   10
      D)   9

35) A lustrous non-metal
      A)   Sulphur
      B)   Florine
      C)   Chlorine
      D)   Iodine

36) Which of the following is butane
      A) C_4H_{10}
      B) C_3H_8
      C) C_2H_6
      D) C_6H_{14}

37) On moving from left to right in a period in the periodic table, the size of the atom
      A) Increases
      B) Decreases
      C) Does not change appreciably
      D) First decreases and then increases

38) Which of the following does not loose an electron easily?
      A) Na
      B) Mg
      C) F
      D) Al

39) Which part of the alimentary canal receives bile from the liver
      A) Stomach
      B) Small Intestine
      C) Large Intestine
      D) Oesophagus

40) The filtration unit present in kidney is
      A) Glomerules
      B) Bouemans capsule
      C) Collecting duct
      D) Nephron

41) The movement of sunflower in accordance with the path of the sun is due to
      A) Phototropism
      B) Geotropism
      C) Chemotropism
      D) Hydrotropism

42) The hormone that wilts the leaves in plants
      A) Auxin
      B) Cytokinins
      C) Abscisic
      D) Gibberellins

43) Regeneration occurs in
    A) Planaria
    B) Amoeba
    C) Fungi
    D) Yeast

44) Identify the acquired traits
    A) Knowledge
    B) Intelligence
    C) None of the above
    D) Both A & B

45) A random change in gene frequency is
    A) Speciation
    B) Genetics
    C) Evolution
    D) Genetic drift

46) Which among the following is a pair of homologous organ
    A) Fore-limb of frog and human
    B) Wing of dragon fly and wing of bird
    C) None of the above
    D) Both A & B

47) In a food chain comprising of – Plants, Goat and Tiger, where does the maximum transfer of energy takes place
    A) Tiger
    B) Goat
    C) Plant
    D) All three

48) Select the mis-matched pair in the following
    A) Biomagnification : accumulation of chemicals at the successive trophic levels of food chain
    B) Ecosystem : Biotic components of environment
    C) Aquarium : man-made ecosystem
    D) Parasites : organisms which obtain food from other living organisms

49) Gustatory receptors are located in
     A) Ear
     B) Eye
     C) Tongue
     D) Lips

50) "Surangams" is one of the water harvesting techniques in
     A) Kerala
     B) Rajasthan
     C) Bihar
     D) Karnataka

51) If -2 is the zero of the polynomial $3x^2 + 4x + 2k$, what is the value of k?
     A) 1
     B) -1
     C) 2
     D) -2

52) There exists infinite _____ numbers between √2 and √3.
     A) Rational
     B) All a,b,c
     C) Real
     D) Irrational

53) Three sides of triangles are given below. Determine which of them is a right angled triangle?
     A) 7 cm, 20cm, 25 cm
     B) 5 cm, 8 cm, 10cm
     C) 3 cm, 8 cm, 6 cm
     D) 13cm , 12 cm, 5 cm

54) If the circumference and area of the circle are numerically equal, then the diameter of the circle is-
     A) 2 cm
     B) 4 cm
     C) 6 cm
     D) 2.5 cm

55) Which of the following is true?
  - A) Mode = 3 Median + 2 Mode
  - B) Mode = 3 Median – 2Mean
  - C) Mode = 2 Median + 3 Mode
  - D) Mode = 2 Median – 3 Mean

56) The radii of two cylinders are in the ratio 3:5. If their heights are in the ratio 2:3, then the ratio of their curved surface areas is-
  - A) 2:5
  - B) 5:2
  - C) 2:3
  - D) 3:2

57) For what value of k, will $k + 9, 2k - 1$ and $2k + 7$ are the consecutive terms of an A.P.
  - A) 8
  - B) 14
  - C) 18
  - D) 22

58) If TP and TQ are two tangents to the circle with centre 'o' so that ∠POQ=110°, then ∠PTQ is equal to
  - A) 60°
  - B) 70°
  - C) 80°
  - D) 90°

59) If $x + 2$ is a factor of $x^2 + ax + 2b$ and $a + b = 4$, then
  - A) a=1 , b=3
  - B) a=3, b=1
  - C) a= -1, b=5
  - D) a=5, b= -1

60) The circumferences of two circles are in the ratio 2:3. The ratio of their areas is-
  - A) 2:3
  - B) 9:4
  - C) 4:9
  - D) None

12

61) The number of terms of the A.P. 7,13,19,...,205 will be
   A) 34
   B) 33
   C) 12
   D) 31

62) If 'a' and 'b' be two odd prime numbers, then $a^2 - b^2$ is
   A) An even prime
   B) An odd prime
   C) Prime
   D) Composite

63) A tangent drawn to a circle is perpendicular to _____ drawn from the point of contact.
   A) Chord
   B) Radius
   C) A line
   D) A line segment

64) In ΔABC and ΔDEF, we have $\frac{AB}{DE} = \frac{BC}{FD}$. Triangle ABC and DEF will be similar if
   A) ∠A = ∠D
   B) ∠A = ∠F
   C) ∠B = ∠E
   D) ∠B = ∠D

65) For the following distribution

Class	30-35	35-40	40-45	45-50	50-55	55-60	60-65
Frequency	14	16	23	18	8	3	18

The sum of upper limit of the modal class is-
   A) 75
   B) 95
   C) 85
   D) 105

66) The value of 'P' for which the polynomial $x^3 + 4x^2 - px + 8$ is exactly divisible by $(x - 2)$ is
    A) 32
    B) 8
    C) 5
    D) 16

67) If a and b are odd positive integers, then $a^2 + b^2$ is
    A) Even
    B) Divisible by 4
    C) Not divisible by 4
    D) (a) and(c)

68) A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and its top reaches a window 6 m above the ground. The length of the ladder is
    A) 6.5 m
    B) 7.5 m
    C) 8.5 m
    D) 9.5 m

69) Two circles touch each other externally at P. AB is a common tangent to the circles touching them at A and B. The value of ∠APB is
    A) 30°
    B) 45°
    C) 60°
    D) 90°

70) The HCF of the smallest composite number and the smallest prime number is
    A) 1
    B) 2
    C) 3
    D) None of these

Section B: SOCIAL SCIENCE

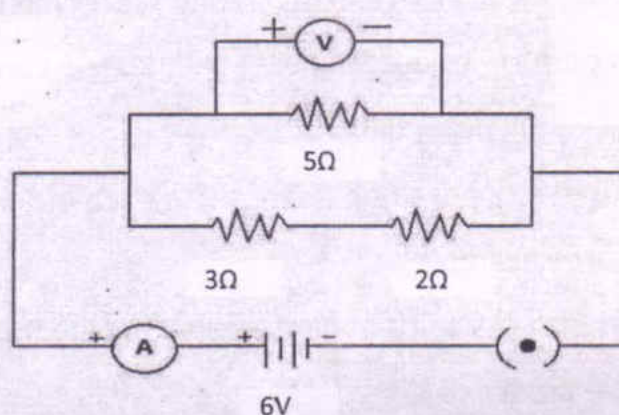Short Answer Questions (*Attempt Any FIVE*)

<div align="right">(5x4=20)</div>

1) Describe any three economic hardships faced by Europe in 1830's

2) How was Civil Disobedience Movement different from Non Co-operation Movement?

3) Describe the three cropping seasons of India

4) "India is an important iron and steel producing country in the world. Yet we are unable to perform to our full potential." Suggest any three measures to achieve full potential.

5) "Agriculture and industry are complimentary to each other." Support the statement with three examples.

6) "Power sharing is the very spirit of democracy." Justify the statement with three suitable points.

7) "Money in your pocket cannot buy all the goods and services that you may need to live well." Is it true or not? Explain

8) Describe any three benefits of globalisation to the Indian economy.

SECTION C: SCIENCE (PHYSICS)

Short Answer Questions (*Attempt Any TWO*)

(4x2=8)

9) In the circuit given below calculate

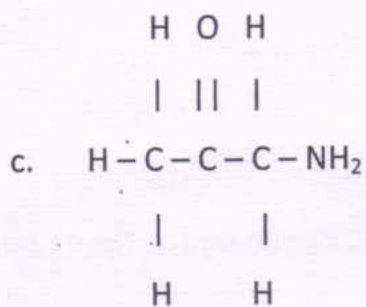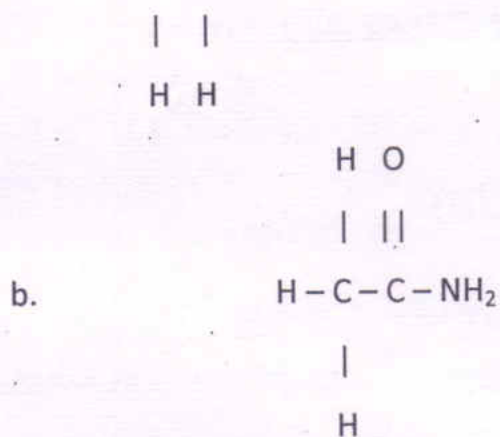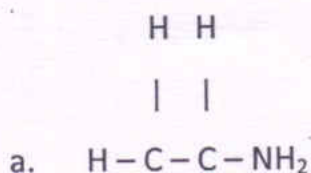   a. Net resistance of the circuit

   b. Current through 2 Ω resistor

6V

10) Two bulbs rated: 100 W: 220 V and 60 W: 220 V are connected in parallel to the electric main supply. Find the current drawn by two bulbs from the line, if the supply voltage is 220 V.

11) Show how would you join three resistors each or resistance 9 Ω so that the equivalent resistance of the combination is 6 Ω

12) How many 176 Ω resistors (in parallel) are required to carry 5A on a 220V line?

Short Answer Questions (*Attempt Any TWO*)

(4x2=8)

13) Identify the name of the functional groups in the following compounds:

a.
$$H - \overset{\displaystyle \overset{H}{|}}{\underset{\displaystyle \underset{H}{|}}{C}} - \overset{\displaystyle \overset{H}{|}}{\underset{\displaystyle \underset{H}{|}}{C}} - NH_2$$

b.
$$H - \overset{\displaystyle \overset{H}{|}}{\underset{\displaystyle \underset{H}{|}}{C}} - \overset{\displaystyle \overset{O}{||}}{C} - NH_2$$

c.
$$H - \overset{\displaystyle \overset{H}{|}}{\underset{\displaystyle \underset{H}{|}}{C}} - \overset{\displaystyle \overset{O}{||}}{C} - \overset{\displaystyle \overset{H}{|}}{\underset{\displaystyle \underset{H}{|}}{C}} - NH_2$$

14) Identify the types of reactions from the following

a. $CaO + H_2O \longrightarrow Ca(OH)_2$

b. $Pb(No_3)_2 + 2KI \longrightarrow PbI_2 + 2KNO_3$

c. $CuSo_4 + Zn \longrightarrow ZnSo_4 + Cu$

15) A solution of a substance "X" is used for testing carbon dioxide. What will be the reaction of "X" with carbon dioxide? Write a balanced equation for this reaction. How is "X" obtained? Give chemical equation.

16) An element "x" belongs to 3rd period and group 16 of the Modern Periodic Table
   d. Identify the element
   e. Is it a metal or a non-metal?
   f. What is the valency of the element?

SECTION E: SCIENCE (BIOLOGY)

(4x2=8)

Short Answer Questions (*Attempt Any TWO*)

17) Write the differences between Lymph and Blood.

18) Smita's father has been advised by the doctor to reduce his sugar intake:

   g. Name the disease he is suffering from and name the hormone too.

   h. Identify the gland that secretes it. Mention the function of the hormone.

   i. Name the hormone which acts on heart.

19) What are STD's? Name four such diseases. Which one of them damages the immune system of the human body?

20) Explain how the sex of the child is determined genetically at the time of conception.

(4x4=16)

Short Answer Questions (*Attempt Any FOUR*)

21) Find all the zeroes of x4-3x3+6x-4, if two of its zeroes are √2 and -√2.

22) Prove that 2√3-7 is irrational.

23) Show that any positive odd integer is of the form 6q+1 or 6q+3 or 6q+5 where q is some integer.

24) In a garden bed there are 23 rose plants in the first row, 21 are in the second, 19 in the third row and so on. There are 5 plants in the last row. How many rows are there of rose plants? Also find the total number of rose plants in the garden.

25) . The mean of the following frequency table is 50. But the frequencies f_1 and f_2 in class 20-40 and 60-80 respectively are missing. Find the missing frequencies.

Classes	0-20	20-40	40-60	60-80	80-100	Total
Frequencies	17	f_1	32	f_2	19	120

26) Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.