# Sikkim Public Service Commission

Written Examination for the post of Inspector, Legal Metrology

**PAPER – II**

Time Allowed: 3.00 hours

Maximum Marks:150

## INSTRUCTIONS TO CANDIDATES

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

1. **IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET DOES NOT HAVE ANY UNPRINTED, TORN OR MISSING PAGES OR ITEMS. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.**
2. **Use only Black Ball Point Pen to fill the OMR Sheet.**
3. Please note that it is the candidate's responsibility to fill in the Roll Number carefully without any omission or discrepancy at the appropriate places in the **OMR ANSWER SHEET**. Any omission/discrepancy will render the OMR Sheet liable for rejection.
4. Do not write anything else on the OMR Answer Sheet except the required information.
5. This Test Booklet is divided into three sections – **Section A (40 marks), Section B (80 marks) and Section C (30 marks).**
6. All Sections are **Compulsory**.
7. Before you proceed to mark in the OMR Answer Sheet, you have to fill in some particulars as per given instructions.
8. After you have completed filling in all your responses on the OMR Answer Sheet and the examination has concluded, you should hand over the OMR Sheet to the Invigilator only. You are permitted to take with you the Test Booklet.
9. **Marking Scheme**

   THERE WIL BE **NEGATIVE MARKING** FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBECTVE TYPE QUESTIONS

   (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 the 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

### (ARITHMETIC AND LOGICAL REASONING)

**Choose the correct answer for the following: (2x20=40)**

1. **Out of the total production of iron from hematite, an ore of iron, 20% of ore get wasted. Out of the remaining ore, only 25% is pure iron. If the pure iron obtained in a year from a mine of hematite was 80,000 kg, then the quantity of hematite mined from the mine in the year is:**
   (a) 5,00,000 kg
   (b) 4,00,000 kg
   (c) 4,50,000 kg
   (d) None of the above

2. **If 80% of A is 50% of B and B = X % of A, then the value of X is**
   (a) 400
   (b) 300
   (c) 160
   (d) 150

3. **The average age of three boys is 15 years. If their ages are in ratio of 3:5:7. The age of the youngest boy is:**
   (a) 21 Years
   (b) 18 Years
   (c) 15 Years
   (d) 9 Years

4. **Average of 80 numbers are 42. If five more numbers are included, the average of 85 numbers become 45. Find the average of 5 (included numbers)**
   (a) 82
   (b)89
   (c)93
   (d) 98

5. **During conversion of a solid from one shape to another, the volume of the new shape will _____.**
   (a) Increase
   (b) Decrease
   (c) Remain unaltered
   (d) Be doubled

6. **Volumes of two spheres are in the ratio 64:27. The ratio of their surface areas is:**
   (a) 3: 4
   (b) 4: 3
   (c) 9: 16
   (d) 16: 9

**7. The length of a rectangular sheet of paper is 35 cm and the breadth is 25 cm. What is the perimeter of the paper?**

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

**8. 5 cm is equal to**

(a) 0.005 km
(b) 0.00005 km
(c) 0.000005 km
(d) None of these

**9. Ron purchased a table for Rs 1260, and due to some scratches on the top of the table, Ron has to sell it for Rs. 1197. Find the loss percent.**

(a) 6%
(b) 3%
(c) 4%
(d) 5%

**10. The marked price of an article for sale is 20% of its cost price. How much percent does the dealer gain by allowing a discount of 15%?**

(a) 5%
(b) 7%
(c) 10%
(d) 6.25%

**11. A man takes 6 hours and 15 minutes in walking a distance and riding back to starting place. He could walk both ways in 7 hours and 45 minutes. The time taken by him to ride both ways is**

(a) 4 hours
(b) 4 hours and 30 Minutes
(c) 4 hours and 45 Minutes
(d) 5 Hours

**12. A train 300 Meter long is running at a speed of 25 meter per sec. It will cross a bridge of 200 meters long in**

(a) 5 sec
(b) 10 sec
(c) 20 sec
(d) 25 sec

**13. A sum of Rs. 2665 is lent into two parts so that the interest on the first part for 8 years at 3% per annum may be equal to the interest on the second part for 3 years at 5% per annum. Find the second sum?**

(a) 1025
(b) 1035
(c) 1640
(d) 1645

**14. What is the difference between the compound interest and simple interest on Rs.8000 at 15% p.a. for 2 years?**

(a) 280
(b)170
( c)180
(d) 160

**15. Raj can do piece of work in 20 days. He started the work and left after some days, when 25% work was done. After it Abhijit joined and completed it in 10 working days. In how many days Raj and Abhijit can do the complete work, working together.**

(a) 6
(b) 8
(c) 10
(d) 12

**16. A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With help of C, they did the job in 4 days. Then, C alone can do the job in**

(a) 9(1/5) days
(b) 9(2/5) days
(c) 9(3/5) days
(d) 10 days

**17. If x, y and z are in proportion, then:**

(a) x: y : : z : x
(b) x: y : : y : z
(c) x: y : : z : y
(d) x: z : : y : z

**18. What decimal of an hour is a second?**

(a) 0.0025
(b) 0.00256
(c) 0.00027
(d) 0.000126

**19. What is the median of 8, 5, 7,9, 11, 6,10?**

(a) 9
(b)8
(c)10
(d) 7

**20 On which of the following percent profit or profit loss is calculated?**

(a.) Sell Prize
(b) Cost Prize
(c) Market Price
(d) None of these

## SECTION – B

## (PHYSICS)

**Choose the correct answer for the following: (2x40=80)**

**21. A horizontal straight wire 10 cm long extending from east to west is falling with a speed of 5.0 m $s^{-1}$, at right angles to the horizontal component of the earth's magnetic field, $0.30 \times 10^{-4}$ Wb $m^{-2}$. What is the instantaneous value of the EMF induced in the wire?**

(a) $0.15 \times 10^{-4}$ V
(b) $0.06 \times 10^{-4}$ V
(c) $0.06 \times 10^{-4}$ V
(d) $1.5 \times 10^{-4}$ V

**22. Who is credited with the development of the AC generator?**

(a) Faraday
(b) Nicola Tesla
(c) Eddy
(d) Lenz

**23. The magnetic field lines of a magnet**

(a) Field lines begin from a south pole.
(b) Form continuous closed loop
(c) The tangent to the field line at a given point represents the magnitude of the net magnetic field B at that point.
(d) All of the above

**24. The magnetic potential energy $U_m$ is given**

(a) $= -\mathbf{m}.\ \mathbf{B}$

(b) $= \mathbf{m}.\mathbf{B}$

(c) $= -\ \mathbf{m} \times \mathbf{B}$

(d) $= \mathbf{m} \times \mathbf{B}$

**25. Which one is a scalar quantity ?**

(a) Magnetic field, B
(b)Magnetic moment m
( c)Magnetic flux $\varphi_B$
(d)Magnetization M

**26. When an optician prescribes a corrective lens of power + 2.5 D, the required lens is a**

(a) convex lens of focal length - 40 cm

(b) concave lens of focal length + 40 cm

(c) concave lens of focal length - 40 cm

(d) convex lens of focal length + 40 cm

**27. In a glass prism**

(a) Red light travels slower than violet light.

(b) Both light travels with same speed

(c) Red light travels faster than violet light.

(d) None of the above

**28. In a telescope**

(a) the objective has a large focal length and a smaller aperture than the eyepiece

(b) the objective has a smaller focal length and a much larger aperture than the eyepiece

(c) the objective has a large focal length and a much larger aperture than the eyepiece

(d) the objective has a smaller focal length and a much smaller aperture than the eyepiece

**29. The linear magnification m by a simple microscope is :**

(a) $m = (1-f/D)$

(b) $m = (1+f/D)$

(c) $m = (1- D/f)$

(d) $m = (1+ D/f)$

**30. Focal length of a convex lens 30cm comes in contact with a concave lens of focal length 20cm. Focal length of this combination will be :**

(a) = 60 cm

(b )= – 60 cm

(c) = 60m

(d) = -60 m

**31. At what angle should a ray of light be incident on the face of a prism of refracting angle 60° so that it just suffers total internal reflection at the other face? The refractive index of the material of the prism is 1.524.**

(a) 29.25 degree

(b) 29.00 degree

(c) 29.75 degree

(d) 29.50 degree

**32. A car moving along a straight highway with speed of 126 km $h^{-1}$ is brought to a stop within a distance of 200 m. How long does it take for the car to stop?**

(a) 11.00 Sec

(b) 11.11 Sec

(c) 11.44 Sec

(d) 11.22 Sec

**33. Path length is .....to the magnitude of the displacement between the same points.**

(a) greater

(b) greater or equal

(c) smaller

(d) none of the above

**34. A cricketer can throw a ball to a maximum horizontal distance of 100 m. How much high above the ground can the cricketer throw the same ball?**

(a) 60 m

(b) 70 m

(c) 50 m

(d) 40 m

**35. An aircraft executes a horizontal loop of radius 1.00 km with a steady speed of 900 km/h. Calculate its centripetal acceleration.**

(a) 62.6 $M/S^2$

(b) 62.5 $M/S^2$

(c) 62.3 $M/S^2$

(d) 62.4 $M/S^2$

**36. The mutual inductance of a pair of two magnetically coupled coils of self-inductances $L_1$ and $L_2$ respectively is given by**

(a) $L_1 + L_2$

(b) $L_1 - L_2$

(c) $k\sqrt{L_1L_2}$

(d) $k\sqrt{L_1/L_2}$

**37. Fill in the blank**

1 m = ____ light year

(a) $1.057 \times 10^{-13}$

(b) $1.057 \times 10^{-14}$

(c) $1.057 \times 10^{-15}$

(d) $1.057 \times 10^{-16}$

**38. A body weighs 63 N on the surface of the earth. What is the gravitational force on it due to the earth at a height equal to half the radius of the earth?**

(a) 26 N

(b) 27 N

(c)28 N

(d)29 N

**39. Two heavy spheres each of mass 100 kg and radius 0.10 m are placed 1.0 m apart on a horizontal table. What is the gravitational force at the midpoint of the line joining the centers of the spheres?**

(a) 6.67 × 10-5 N

(b) 6.67 × 10-4 N

(c) 6.67 × 10-3 N

(d) 0 N

**40. A class of solids that does not obey Hooke's law are known as ?**

(a) Elastomers

(b)Plastic

(c) Brittle

(d) Ductile

**41. Which one is most elastic?**

(a) Aluminum

(b) Brass

(c) Steel

(d) Copper

**42. The relative density of aluminum is given by**

(a) 2.7

(b) 2.7 kg $m^{-3}$

(c) 2.7 kg $cm^{-3}$

(d) 2.7 g $m^{-3}$

**43. Which one has largest compressibility?**

(a) Solids

(b) Liquids

(c) Gases

(d) All

**44. Hydraulic lift and hydraulic brakes are examples of ?**

(a) Pascal's law

(b) Hook's Law

(c) Newton's Law

(d) Len's Law

**45. Archimedes principal can be summarized as;**

(a) The loss of weight of a body submerged (partially or fully) in a fluid is less than to the weight of the fluid displaced.

(b) The loss of weight of a body submerged (partially or fully) in a fluid is equal to the weight of the fluid displaced.

(c) The loss of weight of a body submerged (partially or fully) in a fluid is greater to the weight of the fluid displaced.

(d) The loss of weight of a body submerged (partially or fully) in a fluid is doubled to the weight of the fluid displaced.

**46. A hydraulic automobile lift is designed to lift cars with a maximum mass of 3000 kg. The area of cross-section of the piston carrying the load is 425 $cm^2$. What maximum pressure would the smaller piston have to bear?**

(a) $6.52 \times 10^5$ Pa

(b) $6.12 \times 10^5$ Pa

(c) $6.92 \times 10^5$ Pa

(d) $6.72 \times 10^5$ Pa

**47. Absolute zero temperature is_____ .**

(a) – 273.00 °C

(b) 273.00 °C

(c) – 273.15 °C

(d) 273.15 °C

**48. The coefficient of volume expansion of glycerin is $49 \times 10^{-5}\ K^{-1}$. What is the fractional change in its density for a 30 °C rise in temperature?**

(a) 0.00145

(b) 0.0145

(c) 0.145

(d) 1.45

**49. Dry Ice is**

(a) Solid $Co_2$

(b) Solid $O_2$

(c) Solid $H_2$

(d) Solid $N_2$

**50. The ratio of electric force and gravitational force between a proton and an electron is**

(a) $\sim 2.4 \times 10^{39}$

(b) $\sim 2.4 \times 10^{-39}$

(c) ~2.4

(d) ~4.8

**51. In a uniform electric field E, a dipole experiences a torque $\tau$ given by**

(a) $\tau = p \times E$

(b) $\tau = p.\ E$

(c) $\tau = p/\ E$

(d) $\tau = E/p$

**52. Two-point charges $q_A = 3\ \mu C$ and $q_B = -3\ \mu C$ are located 20 cm apart in vacuum. If a negative test charge of magnitude $1.5 \times 10^{-9}$ C is placed at the midpoint O of the line AB joining the two charges, what is the force experienced by the test charge?**

(a) $8.1 \times 10^{-3}$ N along OA
(b) $8.1 \times 10^{3}$ N along OA
(c) $8.1 \times 10^{-3}$ N along OB
(d) $8.1 \times 10^{3}$ N along OB

**53. Electrostatic field inside a conductor is given by**

(a) One

(b) cannot say

(c) infinite

(d) Zero

**54. The magnetic field of earth is about**

(a) $3.6 \times 10^{-4}$ T

(b) $3.6 \times 10^{-5}$ T

(c) $3.6 \times 10^{-6}$ T

(d) $3.6 \times 10^{-7}$ T

**55. Gauss law of magnetism states that the**

( a) $\int \mathbf{B}.\mathbf{ds} = 0$

(b) $\int \mathbf{B}.\mathbf{dl} = 0$

(c) $\int \mathbf{B} \times.\mathbf{ds} = 0$

(d) $\int \mathbf{B} \times \mathbf{dl} = 0$

**56. A pair of adjacent coils has a mutual inductance of 1.5 H. If the current in one coil changes from 0 to 20 A in 0.5 s, what is the change of flux linkage with the other coil?**

(a) 25 Wb

(b) 35 Wb

(c) 30 Wb

(d) 40 Wb

**57. Weight of an object is the____ with which the earth attracts it**

(a) velocity

(b) momentum

(c) pressure

(d) Force

**58. Impulse is the product of force and time which equals change in _____.**

(a) Work

(b) Momentum

(c) Distance

(d) Displacement

**59. In FPS unit, mass is measured by ?**

(a) Kilogram

(b) Gram

(c) Pound

(d) All of the above

**60. Principle of buoyancy is given by ?**

(a) Isaac Newton

(b) Michael Faraday

(c) Archimedes

(d) Galileo Galilei

## SECTION – C

## (BASICS OF COMPUTER)

**Choose the correct answer for the following: (2x15=30)**

**61. $(122)_{10}$ is equivalent to_____ binary number.**

(a) $(1111010)_2$

(b) $(1111011)_2$

(c) $(1111001)_2$

(d)$(1111110)_2$

**62. Data entered through input device is temporarily stored in the main memory in computers which is also known as_____.**

(a) ROM

(b) Hard Disc

(c) RAM

(d) pen drive

**63. WWW stand for**

(a) world wide web

(b) world wide wave

(c) world wide week

(d) world with web

**64. 1 TB is equivalent to_____GB.**

(a) 500

(b) 1000

(c) 512

(d) 1024

**65. Comments are_____ statements in a program.**

(a) logical

(b) abnormal

(c) executable

(d) non-executable

**66. The Government of India's Information Technology Act, 2000 was amended in the year_____ .**

(a) 2009

(b) 2008

(c) 2007

(d) 2010

**67. When we have not followed the rules of the particular programming language while writing a program _____ .**

(a) Syntax errors are raised

(b) Virus are raised

(c) Emoji are raised

(d) Computer stops working

**68. Which method is used to write the object in a binary file ?**

(a) load

(b) dump

(c) tell

(d) seek

**69. Data structure "Stack" follows _____ principle.**

(a) FIFO

(b) LIFO

(c) FILO

(d) LILO

**70. Data structure "Queue" follows _____ principle.**

(a) FIFO

(b) LIFO

(c) FILO

(d) LILO

**71. Time during which a job is processed by a computer is known as?**

(a) Execution time

(b) Waiting time

(c) Delay time

(d) Real time

**72. Which network protocol is used to send an email?**

(a) FTP

(b)SSH

(c)POP3

(d) SMTP

**73. Which of the following natural element is the primary element in computer chips?**

(a) Silicon

(b)Carbon

(c)Iron

(d) Uranium

**74. A computer is accurate, but if the result of a computation is false, what is the main reason for it?**

(a)Power failure

(b)The computer circuits

(c)Incorrect data entry

(d) Distraction

**75. What is system software?**

(a) Word Processing

(b) Program Language

(c) Graphics

(d) Browser

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