Directions: Answer the following questions by selecting the most appropriate option:

1. Present day education cuts off the man from life because
   (1) it is not an integral part of life
   (2) it is unable to provide bread and butter to man
   (3) it is unable to provide job to man
   (4) it is unable to fulfill the basic needs of a man

2. According to modern concept of teaching, the teacher should play mainly the role of a
   (1) Philosopher
   (2) Friend
   (3) Working partner
   (4) Instructor

3. Which source will provide maximum and up-to-date information about a subject?
   (1) Encyclopaedias
   (2) Internet
   (3) Latest academic journals
   (4) International conferences

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4. Some students of your class have become inattentive; which strategy would you use to regain their attention?

(1) A brief physical activity  
(2) Suspending the class for sometime  
(3) Asking children to be attentive  
(4) Sending the class out for games

5. When a teacher enters in the class room for the first time he should talk about

(1) school building  
(2) school headmaster  
(3) textbook  
(4) himself and students

6. The education system developed by Mahatma Gandhi is known as

(1) Basic education system  
(2) Vocational education system  
(3) Child centred education system  
(4) Handicraft education system
7. Which of the following acts of the teacher does **not** help in creating proper learning environment?

1. Providing the children with feeling of security
2. Giving the children sense of freedom
3. Allowing children to criticize other children
4. Making children fearless

8. Which of the following is **not** the cause of truancy of students?

1. Uninteresting school programme
2. Teacher’s partial behaviour
3. Too much homework
4. Too many holidays

9. When a teacher gives the learner the sense of success, he is using

1. the law of readiness
2. the law of practice
3. the law of effect
4. the law of mental set

10. According to Naturalism, the centre of education should be

1. Teacher
2. Child
3. Curriculum
4. None of the above
11. A student of your class is in the habit of telling a lie. How would you deal with him?
   (1) tell him not to tell a lie
   (2) punish him
   (3) just ignore him
   (4) will take him into confidence and counsel

12. The best provision for the education of the talented children is
   (1) Ability grouping
   (2) Giving double promotion
   (3) Enriching programme
   (4) Providing special schools

13. As per National Policy on Education, 1986 percentage of national production must be invested on education
   (1) 6%
   (2) 10%
   (3) 4%
   (4) 3%

14. School administration assigned you some extra classes which are meant for weak students. What will be your reaction as a teacher?
   (1) Protest and not take classes
   (2) Request reconsideration of decision
   (3) Tell student to prepare on their own
   (4) Accept it as your responsibility
15. Study the following statements about lecturing as a method of teaching:

A. It is an efficient method of giving information.
B. It is an efficient way of making students think critically.

Which of these statements is/are correct?

(1) A only  (2) B only  
(3) Both A & B  (4) Neither A nor B

16. Before starting to teach a teacher must:

(1) make the students stand  
(2) make the students mentally ready  
(3) clean the black board  
(4) ask the students to keep silence

17. While teaching if you realize that what you have taught is not correct, you would

(1) leave the topic unfinished and shift to another  
(2) tell the students that it was a mistake and correct it  
(3) divert the attention of the students  
(4) Scold students

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P. T. O.
18. Salim is very good in Music but is not able to do well in Mathematics. As a teacher of Mathematics, how will you handle Salim?

(1) Tell him that Music does not have a future
(2) Tell him to leave Music and study Maths
(3) Call his parents and talk to them
(4) Tell him that he can do well in Mathematics and explain the Mathematical concepts to him

19. A talented child can not be identified through observation because

(1) observation is not an objective technique
(2) observation is a subjective technique
(3) observation is used by those who are expert
(4) All of the above

20. While delivering a long lecture what a teacher should do?

(1) Should break in between
(2) Should speak continuously
(3) Should ask questions in between
(4) Should change own posture
21. A girl of your class is interested in sports and wants to pursue her career in sports. What will you suggest her?

(1) Girls have no future in sports
(2) She should put in hard work to achieve her ambition
(3) Ask her to be focused only in academics
(4) Girls can not excel in sports as they are not physically strong

22. Which is not true about intelligence?

(1) Intelligence is the ability to learn
(2) Intelligence is the ability to solve problems
(3) Intelligence is the ability to work hard
(4) Intelligence is the ability to adapt to novel situation

23. The most effective evaluation method is

(1) Annual examination method
(2) Examination with book method
(3) Semestral method
(4) Objective question paper method

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24. Match the following:

A. Slide Projector (i) Visual mean  
B. TV (ii) Audio mean  
C. Chart (iii) Audio-visual mean  
D. Voice Recorder (iv) Projective mean

25. The term 'comprehensive evaluation' means

(1) Evaluation conducted at several points of time  
(2) Evaluation by a group of teachers  
(3) Several test for long duration  
(4) Evaluation of curricular & co-curricular aspects of pupil growth

26. The capacity to arrange objects serially is developed in the child when he is in

(1) Sensory motor stage  
(2) Pre-operational stage  
(3) Concrete operational stage  
(4) Formal operational stage

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27. For enhancing the ability of transfer of learning the teacher should **not**
   (1) encourage self activity
   (2) encourage the habit of rote learning
   (3) develop the habit of learning by insight
   (4) emphasise on generalization

28. When a child mispronounces a word, what will you do?
   (1) Tell, don't say like this
   (2) Tell the correct pronunciation
   (3) Rebuke the child for wrong pronunciation
   (4) Ignore

29. The basis of effective and successful leadership is
   (1) Appreciation
   (2) The interest of entire group
   (3) Service of group
   (4) Self interest

30. How the virtue of good citizen can be inculcate among students?
   (1) By lecturing them on good citizenship
   (2) By familiarising them with national heroes
   (3) By assigning them some community service work
   (4) By familiarising them with Indian Constitution
31. निम्न में से ‘गंगा’ के पद्यावाची शब्दों का समूह है?
   (1) मंदाकिनी, भारीरथी, त्रिपथगञ्ज
   (2) कृष्णा, त्रिपथगञ्ज, अरुणजा
   (3) मंदाकिनी, कालिन्दी, तरणी
   (4) सरिता, शिलाजा, तरणीगणी

32. निम्न शब्दसूची का सही अर्थ चुनिए.
   ‘लगन – लगन’
   (1) उत्साह – मुहूर्त
   (2) मुहूर्त – उत्साह
   (3) एक दैविकी अनुष्ठान – लगाव
   (4) एक तारा – निशचत समय

33. ‘पाषय’ का अर्थ है?
   (1) मार्ग का भोजन (2) मार्ग
   (3) पथ प्रस्थान (4) अनुचार

34. ‘न’ प्रलय से निर्मित शब्द चुनिए?
   (1) खून (2) चबन (3) वालन (4) पतलङ्ग

35. कौन-सा शब्द विशेषण नहीं है?
   (1) सजात (2) जल (3) जलभाग (4) जलीय

निर्देश: अनगरिलित गद्यांश को पढ़कर दिये गये प्रश्नों (प्रश्न सं 36-39) के उत्तर सबसे उचित विकल्प उनकर दीजिए:

36. ‘डुनिया’ का विवरण है?
   (1) कटिन (2) सरल (3) आश्रक्षण सुक्त (4) पीड़ा दासक

37. मनुष्य की नियति है?
   (1) दुखों में निमगन रहना
   (2) दुख व सुख दोनों का अपरिहार्यता
   (3) निरस्तर भीमते रहना
   (4) पद्मांत्रों का शिकार होना
38. ‘मंगल नाना के नाली’ से लेखक का ताल्पर्व है
(1) बहुत आश्वादी होना
(2) बहुत निराशावादी होना
(3) बहुत बैरवादी होना
(4) बहुत उत्साहित होना

39. ‘सत्य अवध समान’ का भाव है
(1) दीयों के समान
(2) सत्य दीयों के समान
(3) असल्म ऐश्वर्य गुण
(4) उपर्युक्त में से कोई नहीं

निर्देश : अध्यात्मिक पद्धति को पढ़कर दिये गये प्रश्नों (प्रश्न सं 40-44) के उत्तर बता उचित विकल्प लुकर दीजिएः

शीर्षक वसन्त के आमगन के साथ तपक उठता है, आगाद तक तो निश्चित रूप से मस्त बना रहता है। मन रम गया तो भावों में भी निर्धार फूल चल रहता है। इस प्रकार शीर्षक कलाजीय अवधुत की भीति जीवन की अस्तित्व का मनन करता करता रहता है। शीर्षक का पूरा संस्कृत साहित्य में बहुत कोमल माना गया है। शीर्षक के पूर्वों की कोमलता देखकर परिवत शब्दों के समका कि उसका सब कुछ अनुकूल है। यह भूल है। इसके फल इतने मजबूत होते हैं कि तब पूर्वों के निकल आने पर भी स्थान नहीं छोड़ते। जब तक नये फल पते मिलकर धक्कादाता उन्हें बाहर नहीं कर देते तब तक वे उड़ रहते हैं। वसन्त के आमगन के साथ जब सारी वस्त्रों रंग-पतर से मस्त होती रहती है, शीर्षक के पुराने फल बुरी तरह खड़े होते हैं। मुझे इनको देखकर उन नेताओं की बात बाद आती है, जो किसी प्रकार जमाने का रूप नहीं पहचानते और जब तक नयी पौधे के होने उन्हें धक्का मारकर निकाल नहीं देते तब तक जमे रहते हैं।

(13) P. T. O.

40. ‘जो फरा सो हरा’ में तुलसीदास ने किस और संकेत किया है?
(1) जीवन की आश्वादनता पर
(2) जीवन की निस्सातता पर
(3) जीवन की कष्टमंग्लता पर
(4) उपर्युक्त सभी पर

41. संस्कृत साहित्य में किसे कोमल माना गया है?
(1) शीर्षक के फलों को
(2) शीर्षक के पूर्वों को
(3) शीर्षक के पत्रों को
(4) शीर्षक की शाखाओं को

42. ‘नियांत’ का विलोम है
(1) अनाद (2) आवाद (3) निगाद (4) प्रागा

43. 'लेखक के अनुसार नेताओं के साथ तुलसीदास है
(1) शीर्षक के फल (2) शीर्षक के पूर्व (3) वसन्त की ऊँट (4) पताकड़ की ऊँट

44. शीर्षक पुष्क का पता लगना होता है?
(1) जैठ में (2) आश्वाद में (3) भारो में (4) वसन्त में
45. हिंदी शब्दकोश के अनुसार निम्न शब्दों का समाहरण है
   'ज्ञानिन, ज्ञाला, ज्ञेंड, जीहरी'
   (1) ज्ञाला, ज्ञानिन, ज्ञेंड, जीहरी
   (2) जीहरी, ज्ञानिन, ज्ञेंड, ज्ञाला
   (3) ज्ञेंड, ज्ञाला, जीहरी, ज्ञानिन
   (4) जीहरी, ज्ञेंड, ज्ञाला, ज्ञानिन

46. हमारे शुरू में कई सविंच तेजी से हैं: इसलिए खेल में हम सदिश जीतते हैं। रेखाकित शब्द में संज्ञा है
   (1) व्यंक्तिवाचक
   (2) भाववाचक
   (3) नामिवाचक
   (4) परिभाष वाचक

47. 'अंतु + इत्त' का सूची शब्द है
   (1) अंतिन
   (2) अंतिप
   (3) अनुष्ट
   (4) अनोष्ट

48. संयुक्त व्यंजन 'ज' की ध्वनियों है
   (1) जू + अं
   (2) जू + जू + अं
   (3) जू + अं
   (4) जू + जू + अं

49. 'प्रवचन' में उपसर्ग है
   (1) प
   (2) पः
   (3) प्र
   (4) प्रां

50. निम्न में से वर्णों की दृष्टि से पुरुष शब्द चुनिए
   (1) प्र
   (2) शम
   (3) र
   (4) प्रां

51. रति शब्द के अर्थ का सही समूह है
   (1) विष्णु, सिंह, गज
   (2) विष्णु, सिंह, बंदर
   (3) अश्व, बाल, विष्णु
   (4) विष्णु, शिव, नारद

52. 'गुरुदास' में समास है
   (1) तत्तुरूष
   (2) द्वन्द
   (3) बधुंदीहि
   (4) अवधीभाव

53. दीवे गये शब्द के लिए उचित प्रयोगवाची चुनिए
   'संरक्षने'
   (1) शारदा
   (2) वनिता
   (3) नलिनी
   (4) सुनरी

54. 'दौं काटी रोटी' मुहावरे का अर्थ है
   (1) परस्पर घनिष्ठता होती
   (2) परस्पर प्रतिस्पर्धा होती
   (3) परस्पर दूर होता
   (4) परस्पर खेल बनाता

55. कौन-सा वाक्य निश्चित साम्र नहीं है?
   (1) शोभा पुकारकी कहते हैं कि जाओ।
   (2) एक जोर देखा जो भारी भरकम था।
   (3) तुम इसलिए अच्छे हो क्योंकि तुम मेरीहती हो।
   (4) दरवाजा खुलने के कारण चोरी हो गई।

56. 'सावन हरे न भालो सूखे' लोकोक्ति का अर्थ है
   (1) परवाह ना करना
   (2) बेशम होना
   (3) हमेशा एक जैसा रहना
   (4) निलेित रहना

57. निम्न में से मूर्तिवाची वर्ण है
   (1) अ
   (2) इ
   (3) ऋ
   (4) ए

58. 'प्रशांन' का संधि-विचित्र है
   (1) प्र + उसांन
   (2) प्र + उसांलन
   (3) प + उसांन
   (4) प्र + सांह

59. 'बश्या' शब्द का बिलों चुनिए
   (1) उरर
   (2) उर्जाँ
   (3) उर्तर
   (4) उर्जाँ

60. निम्न शब्दों में से तिथि-शब्द शब्द है
   (1) पापण
   (2) लिख
   (3) प्रहरी
   (4) गुष्ठ
61. 'He hardly works.'

The underlined word means
(1) arduously  (2) mostly
(3) scarcely  (4) strenuously

62. Choose the correct word for the following phrase:
'Fear of foreigners'

(1) Hydrophobia
(2) Xenophobia
(3) Homophobia
(4) Claustrophobia

63. Give one word for 'That which can be eaten.'

(1) edible  (2) chewable
(3) palatable  (4) digestive

64. She had a headache; otherwise she ......... with me.

(1) would come
(2) would have come
(3) came
(4) will come

65. Which sentence is incorrect?
(1) I left without any one knowing.
(2) I hope you will excuse my leaving early.
(3) As he was going up the hill, he saw an old temple.
(4) I dislike your behaving in this way.

66. Complete the given sentence:
'The human body is like an engine. It requires fuel to ......'

(1) work  (2) keep it going
(3) run from  (4) keep it on action

67. He .......... not oppose me.

(1) dare  (2) dares
(3) did dare  (4) was dare

68. Choose the correct Article for the blank:
'Give me ....... yellow teapot which is on the table.'

(1) a  (2) an
(3) the  (4) Zero article

69. They told me that he ....... in Jaipur.

(1) were  (2) was
(3) will be  (4) can be
Directions: Read the passage given below and answer the questions that follow (Q. Nos. 76 to 85) by selecting the most appropriate option:

Conversation is indeed the most easily teachable of all arts. All you need to do in order to become a good conversationalist is to find a subject that interests you and your listeners. There are, for example, numberless hobbies to talk about. But the important thing is that you must talk about the other fellow’s hobby rather than your own. Therein lies the secret of your popularity. Talk to your friends about the things that interest them and you will make your reputation for good fellowship, charming wit and a brilliant mind. There is nothing that pleases people more than your interest in their interest.

It is as important to know what subject to avoid, as what subjects to select for good conversation. If you don’t want to be set down as a wet blanket or a bore, be careful to avoid certain unpleasant topics. Avoid talking about yourself, unless you are asked to do so. People are interested in their problems, not in yours. Sickness and death bore everybody. The only one who willingly listens to such talk is a doctor, but he gets paid for it. To be a good conversationalist you must know not only what to say but how to say it. Be civil and modest. Don’t overemphasize your own happiness. Be mentally quick and witty, but don’t hurt others with your wit.
Finally, try to avoid mannerism in your conversation. Don’t bite your lips, or click your tongue, or roll your eyes, or use your hands excessively as you speak.

76. The secret of your popularity lies in
   (1) cultivating good hobbies
   (2) being able to converse about what is of interest to the listener
   (3) having a knowledge about a large variety of hobbies
   (4) talking about your hobby

77. The secret of becoming a good conversationalist is
   (1) talking about problems
   (2) avoiding mannerism in conversation
   (3) using your wit
   (4) knowing what to say and how to say it

78. A doctor is the only one who readily listens to conversation about sickness because
   (1) it is his job and he earns from that
   (2) he is not interested in anything’s else
   (3) sickness and death interest everybody
   (4) he is a kind person

79. Courtesy and politeness are recommended through which word in the passage
   (1) willingly
   (2) civil
   (3) overemphasize
   (4) None of the above

80. To become a good conversationalist, you need to
   (1) find a good teacher
   (2) find an interesting subject
   (3) practice the art of conversation
   (4) converse about what you and the listener find interesting

81. You should avoid talking about yourself because
   (1) you are a bore
   (2) it will make you appear unpleasant
   (3) you don’t know how to choose the subject of a good conversation
   (4) people are not interested in you or your problems

82. ‘Mannerism’ in the passage means
   (1) not hurting others with your wit
   (2) having good manners
   (3) gesture or way of speaking typical to a person
   (4) using polite language

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83. Which word in the passage is the opposite of ‘arrogant’?
   (1) witty
   (2) mentally quick
   (3) conversationalist
   (4) modest

84. What pleases people most is
   (1) your reputation for good fellowship
   (2) your clever use of language
   (3) your taking interest in what is of interest to them
   (4) your brilliant mind

85. Which word in the passage means to strongly stress that something is particularly important?
   (1) overemphasize
   (2) mentally
   (3) excessively
   (4) mannerism

86. I am .......... after ten years in the business.
   (1) wise
   (2) wisest
   (3) more wise
   (4) wiser

87. Choose the correct Adverb for the blank:
   'The sun .......... rises in the east.'
   (1) sometimes
   (2) often
   (3) always
   (4) rarely

88. The dumb .......... not speak.
   (1) has        (2) does
   (3) is         (4) do

89. Choose the correct Phrase for the blank:
   'The craft in which I sailed rapidly .......... the open sea.'
   (1) made out
   (2) made up
   (3) made for
   (4) made off

90. He is poor, .......... he is satisfied with his situation.
   (1) yet        (2) but
   (3) so         (4) while
91. The true statement regarding β decay is that
(1) in β decay mass number of the nucleus changes by unity
(2) the energy spectrum for β rays is continuous
(3) momentum is not conserved
(4) β rays have discontinuous energy spectrum due to emission of neutrino or antineutrino

92. Two metal plates separated by a distance \( d \) forms a parallel plate capacitor of capacitance \( C_0 \). A metal plate of thickness \( t \) and same area is now inserted completely between the plates. The new capacitance of the system will be
(1) \( C_0 \left( \frac{d + t}{d} \right) \)
(2) \( C_0 \left( \frac{d}{d-t} \right) \)
(3) \( C_0 \frac{d}{t} \)
(4) \( C_0 \left( \frac{d-t}{d} \right) \)
93. Two particles with charge $Q$ and $-Q$ are fixed at the vertices of an equilateral triangle with sides of length $a$. If $k = \frac{1}{4\pi \varepsilon_0}$, the work required to move a particle with charge $q$ from one vertex to the centre of line joining $Q$ and $-Q$ is

\[ \frac{kQq}{a} \]

94. Which is the correct relation between escape velocity $V_e$ and orbital velocity $V_o$?

\[ (1) \quad V_e = 2V_o \\
(2) \quad V_e = \sqrt{2} V_o \\
(3) \quad V_o = \sqrt{2} V_e \\
(4) \quad V_o = 2V_e \]

95. A bag is dropped from a balloon that is 300 m above ground and moving up at a speed of 5 m/s. How long will the bag take to reach the ground?

\[ (1) \quad 7.82 \text{ sec.} \quad (2) \quad 6.25 \text{ sec.} \]

\[ (3) \quad 7.33 \text{ sec.} \quad (4) \quad 8.36 \text{ sec.} \]
96. If we assume that the entire polar ice of the earth melts, then the following quantity related with earth does not change
(1) moment of inertia
(2) angular velocity of rotation of earth
(3) duration of day on earth
(4) inertia of earth

97. Which of the following quantity remains unchanged when light travels from one medium to another?
(1) Wavelength (2) Amplitude
(3) Velocity (4) Frequency

98. The average kinetic energy of a gas molecule is
(1) $\frac{3}{2} kT$  (2) $\frac{1}{2} kT$
(3) $\frac{3}{2} RT$  (4) $\frac{1}{2} RT$

99. A 3 kg block attached to a spring executes simple harmonic motion according to $x = 2 \cos (50 t)$, where $x$ is in meters and $t$ is in seconds. The spring constant of the spring is
(1) 1 N/m  (2) 100 N/m
(3) 1500 N/m  (4) 7500 N/m

100. A series ac circuit has a resistance of 4Ω and reactance of 3Ω. The power factor of the circuit is
(1) $\cos^{-1}\left(\frac{4}{5}\right)$  (2) $\cos^{-1}\left(\frac{3}{5}\right)$
(3) $\cos^{-1}\left(\frac{3}{4}\right)$  (4) Zero

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P. T. O.
101. Four identical copper cylinders are painted, if they are all heated to the same temperature and left in vacuum, which will cool most rapidly?

(1) painted shiny white
(2) painted rough black
(3) painted shiny black
(4) painted rough white

102. In Rutherford model of hydrogen atom, the nucleus contains a proton (mass $m_p$, charge $e$) and an electron (mass $m_e$, charge $e$) moves around the proton in a circle of radius $R$. Let $K$ denotes the coulomb force constant \[ \frac{1}{4\pi\epsilon_0} \] and $G$ the universal gravitational constant. Then the term $[Ke^2/G m_e m_p]$ has the dimensions

(1) $M^{-2} L^{0} T^{-2} A^{2}$
(2) $M^{0} L^{0} T^{0} A^{0}$
(3) $M^{-2} L^{0} T^{2} C^{2}$
(4) $M^{-2} L^{1} T^{2} C^{2}$

103. The SI unit of radioactivity is

(1) Becquerel
(2) Curie
(3) Rutherford
(4) Rontzen
104. Out of the four curves shown in the given figure which one describe correctly the variation of resistivity of an intrinsic semiconductor with temperature.

(1) A  (2) B  (3) C  (4) D

105. The poles of a bar magnet of magnetic moment 5.0 Am² are 20 cm apart. Its pole strength is

(1) 25 Am  (2) 50 Am  (3) 2.5 Am  (4) 5.0 Am

106. The diagram shows a plot of potential energy as a function of x for a particle moving along the x axis. The points of stable equilibrium are

(1) Only A  (2) Only B  (3) Only C  (4) B, C & D
107. According to Debye theory, the lattice specific heat at low temperatures varies according to

1. $C_v \alpha T$
2. $C_v \alpha T^3$
3. $C_v \alpha T^6$
4. $C_v \alpha T^2$

108. The wave length of 10 keV electron beam is 0.1227 Å. When this beam is diffracted by a slit of width 0.55 Å, the first maximum would occur at angle $\theta$, where $\sin \theta$ is

1. 0.1116
2. 0.2232
3. 0.4464
4. 0.8928

109. The velocity of sound in air is 330 m/s. The audible range is from 20Hz to 20KHz. Then the wavelength which can be heard by normal human ear is

1. 0.001 m
2. 0.0001 m
3. 10.0 m
4. 100 m

110. A $\beta$ particle and an $\alpha$ particle having the same velocity are moving in circular trajectories in a constant magnetic field. If $r_\beta$ and $r_\alpha$ denote respectively the radii of the trajectories of $\beta$ and $\alpha$ particles, then

1. $r_\beta > r_\alpha$
2. $r_\alpha = r_\beta$
3. $r_\alpha > r_\beta$
4. nothing can be said

111. Matter waves

1. exhibit diffraction
2. travel with speed of light
3. longitudinal in nature
4. electromagnetic in nature
112. For a gas consisting of molecules of diameter $d$ each, the mean free path of a gas molecule is proportional to
   (1) $d^2$       (2) $d^2$
   (3) $d^{-1}$    (4) $d^{-1/2}$

113. A monochromatic light source used in Young's double slit experiment is replaced by another monochromatic source of comparatively low frequency but of same intensity, then the
   (1) fringe width will decrease
   (2) fringe width will increase
   (3) fringe width will remain unchanged
   (4) fringes will become less intense

114. The expression $Y = \overline{A + B}$ is true for
   (1) AND gate
   (2) OR gate
   (3) NAND gate
   (4) NOR gate

115. A dc motor
   (1) converts mechanical energy into electrical energy
   (2) converts electrical energy into mechanical energy
   (3) is based on the principle of electromagnetic induction
   (4) converts heat energy into electrical energy
116. 'Light waves are of transverse nature'. This fact is established through the phenomenon of
   (1) diffraction
   (2) polarization
   (3) interference
   (4) total internal reflection

117. The value of 'g' for earth is
   (1) more at equator than poles
   (2) more at poles than equator
   (3) Zero at poles
   (4) same both at equator and poles

118. How does Young's modulus changes with rise in temperature?
   (1) increases
   (2) decreases
   (3) remains same
   (4) none of the above

119. According to the second law of thermodynamics
   (1) heat energy cannot be completely converted into work
   (2) work cannot be completely converted into heat
   (3) for all cyclic process we have \( \frac{dQ}{T} < 0 \) \( \text{h} \)
   (4) All the above are true
120. A body of mass $m$ is moving parallel to $x$-axis with constant velocity. Its angular momentum with respect to origin is

(1) increasing  
(2) decreasing  
(3) zero  
(4) constant

121. The wavelength of an ultraviolet photon and the de-Broglie wavelength of a non-relativistic electron are same. Then, the energy of photon is

(1) greater than the kinetic energy of the electron  
(2) less than the kinetic energy of the electron  
(3) equal to kinetic energy of the electron  
(4) four times greater than the kinetic energy of the electron

122. If the diameter of earth is doubled maintaining its mass, then the weight of the body as compared to initial weight on the earth's surface will become

(1) double  
(2) four times  
(3) one fourth  
(4) eight times

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123. Which graph correctly gives the magnitude of the magnetic field along the axis of a circular loop as a function of the distance $x$ from its centre?

(1) \[ \text{Graph (1)} \]

(2) \[ \text{Graph (2)} \]

(3) \[ \text{Graph (3)} \]

(4) \[ \text{Graph (4)} \]

124. A player catches a ball of 200g moving with a speed of 20 m/s. If the time taken to complete the catch is 0.5 sec, the force exerted on the player's hand is

(1) 8 N

(2) 4 N

(3) 2 N

(4) 16 N
125. Metal pipes used to carry water sometimes burst in winter because
(1) outside of the pipe contracts more than the inside
(2) metal becomes brittle when cold
(3) ice expands when it melts
(4) water expands when it freezes

126. Which of the following statements is not correct?
(1) A body may have zero instantaneous velocity but finite acceleration
(2) A body may have zero instantaneous acceleration but finite velocity
(3) Magnitude of instantaneous velocity is equal to instantaneous speed
(4) Magnitude of average velocity is equal to average speed

127. For the circuit shown in figure given below the equivalent resistance between point 'A' and 'B' is

![Circuit Diagram]

(1) 10 Ω   (2) 5 Ω
(3) 10/3 Ω   (4) 2 Ω

128. Two notes are an 'octave' apart. The ratio of their frequencies is

(1) 8   (2) 10
(3) 2   (4) \sqrt{2}

P. T. O.
129. Vander Waals equation of state is

\[
(1) \quad \left( P + \frac{a}{V^2} \right)(V + b) = RT \\
(2) \quad \left( P - \frac{a}{V^2} \right)(V - b) = RT \\
(3) \quad \left( P + \frac{a}{V^2} \right)(V - b) = RT \\
(4) \quad \left( P - \frac{a}{V^2} \right)(V + b) = RT
\]

130. An electric dipole placed in a uniform electric field experiences, in general

(1) a force and a torque
(2) a force only
(3) a torque only
(4) neither a force nor a torque

131. If \( A \) and \( B \) be the slopes of adiabatic and isothermal curves respectively and let \( \gamma = C_p/C_v \), then the correct relation is

\[
(1) \quad A = \gamma B \\
(2) \quad A = B \\
(3) \quad A = B^\gamma \\
(4) \quad B = A^\gamma
\]

132. The root mean square speed of the molecules of a gas with density 1.2 Kg/m\(^3\) at a pressure of 10\(^5\) N/m\(^2\) is (in m/s)

\[
(1) \quad 5 \times 10^2 \\
(2) \quad 3.6 \times 10^2 \\
(3) \quad 0.5 \times 10^2 \\
(4) \quad 36 \times 10^2
\]

133. A magnetic field \( \vec{B}_o \) is applied to a diamagnetic substance. In the interior the magnetic field produced by the magnetic dipoles of the substance is

(1) greater than \( \vec{B}_o \) and in the opposite direction
(2) less than \( \vec{B}_o \) and in the opposite direction
(3) less than \( \vec{B}_o \) and in the same direction
(4) greater than \( \vec{B}_o \) and in the same direction

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134. In Germanium, the energy gap is about 0.72 eV. The maximum wave length of light which the germanium starts absorbing is about

(1) 35000 Å  (2) 17240 Å  
(3) 25000 Å  (4) 51600 Å

135. A particle of mass $m$ and charge $q$ is accelerated from rest through a potential difference of $V$ volt and then deflected by a magnetic field $B$ that is perpendicular to its velocity. The radius of the resulting particle trajectory is

(1) $\frac{2mV}{qB^2}$  (2) $\frac{2mB}{qV^2}$  
(3) $\frac{mV}{qB^2}$  (4) $\frac{2mV}{qB}$

136. The length of an organ pipe open at both ends is $L$. If the pipe is closed at one end, the fundamental frequency now

(1) gets doubled  
(2) gets halved  
(3) remains unchanged  
(4) reduces to 1/4 of its earlier value

137. The magnitude of vectors $\vec{A}$, $\vec{B}$ & $\vec{C}$ are 12, 5 and 13 units respectively. The angle between $\vec{A}$ & $\vec{B}$ is

(1) 90°  (2) 0°  
(3) 180°  (4) 45°
138. Magnetic force per unit length on a wire carrying current of 8A, making angle of 30° with magnetic field of 0.15T is

(1) 1.6 Nm^{-1}  
(2) 0.6 Nm^{-1}  
(3) \frac{0.15}{4} Nm^{-1}  
(4) 0.16 Nm^{-1}

139. One kilowatt hour is equivalent to

(1) 3.6 \times 10^6 J  
(2) 1.6 \times 10^{-19} J  
(3) 746 J  
(4) 3.6 \times 10^5 J

140. A capacitor is most likely to behave as a short circuit when connected across

(1) a Denial cell  
(2) a dry cell  
(3) an ac source of low frequency  
(4) an ac source of high frequency

141. The true statement according to Bohr's model of Hydrogen atom is

(1) the speed of electron in the orbit is inversely proportional to 'n'  
(2) the radius of a permitted orbit is proportional to \frac{1}{n^2}  
(3) the energy of electron in the orbit is proportional to \frac{1}{n^2}  
(4) while revolving in orbit, electrons do not experience electrostatic force

142. Newton's law of cooling can be derived from

(1) Wien's law  
(2) Kirchhoff's law  
(3) Planck's law  
(4) Stefan's law
143. Consider radio waves (r), visible light (v), infra red light (i), x-rays (x) and ultraviolet light (u). In order of increasing frequency they are

(1) r, v, i, x, u  
(2) r, i, v, u, x  
(3) i, r, v, u, x  
(4) i, v, r, u, x

144. A coil of resistance R and inductance L is connected to a battery of E volt emf. The final current flowing in the coil is

(1) E/R  
(2) E/L  
(3) \( E / \left( R^2 + W^2 L^2 \right)^{1/2} \)  
(4) \( E / \left( R^2 + L^2 \right)^{1/2} \)

145. The correctly matched pair is

(1) Meissner Effect  —  Superconductivity  
(2) Brewster's law  —  Diffraction  
(3) Malus's law  —  Scattering  
(4) Stefan's Law  —  Radiation pressure

146. The relation \( n_1 \sin \theta_1 = n_2 \sin \theta_2 \) which applies as a ray of light strikes an interface between two mediums, is known as

(1) Gauss's Law  
(2) Snell's Law  
(3) Cole's Law  
(4) Faraday's Law

147. A particle, starting from rest, moves with a uniform acceleration and covers x meters in the first 5 seconds. The same particle will cover the following distance in the next 5 seconds

(1) x meter  
(2) 2x meters  
(3) 3x meters  
(4) 4x meters

P. T. O.
148. A coil of copper wire is moved parallel to a uniform magnetic field, the emf induced in the coil will
(1) depend on the intensity of magnetic field
(2) depend on the velocity of coil
(3) be zero
(4) be infinite

149. An oscillator is subjected to a damping force that is proportional to its velocity. A sinusoidal force is applied to it. After a long time
(1) its amplitude is an increasing function of time
(2) its amplitude is a decreasing function of time
(3) its amplitude is constant
(4) its amplitude is a decreasing function of time only if initial amplitude is large

150. The excess pressure for two soap bubbles are in the ratio of 3 : 1. The ratio of their volume is
(1) 1 : 3
(2) 1 : 9
(3) 1 : 27
(4) 1 : 81