### PHYSICS

**Level: 3**  
**PGT**  
**Exam. February, 2016**  
**Sub. Code No. : 175**

**APPLICATION**  
**Roll No. (In Figures):**  
**Roll No. (In Words):**

**Name of Examination Centre:**

**Name of Candidate:**

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**INSTRUCTIONS FOR THE CANDIDATES:**

1. The OMR Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully with blue/black ball point pen only.
2. The test is of two-and-half hours duration and consists of 150 questions. There is no negative marking.
3. Use Blue/Black Ball Point Pen only for writing particulars on this page/darkening responses in the Answer Sheet. The candidate should remain careful in handling the question paper and in darkening the responses on the answer sheet. Another booklet set will not be given.
4. Also ensure that your Test Booklet Serial No. and Answer Sheet Serial No. are the same. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.

**Level-3 (For Lecturer)**

**Part-I : Child Development and Pedagogy (Q. 1 to Q. 30)**
**Part-II : Language-I (Hindi) (Q. 31 to Q. 60)**
**Part-III : Language-II (English) (Q. 61 to Q. 90)**
**Part-IV : Physics (Q. 91 to Q. 150)**

**Note:** Read other remaining instructions given on the last page of this Booklet.
FOR ROUGH WORK
1. To cooperate the adolescent it is essential to
   (1) Inspire
   (2) Indicate his mistakes
   (3) Criticise him
   (4) Do negative behaviour

2. Which of the following is not a suitable technique used by teachers for socializing the child?
   (1) Direct teaching
   (2) Identification
   (3) Democratic discipline
   (4) Over-protection

3. Which of the following is a wrong statement about emotions of an adolescent?
   (1) Emotional expressions are modified by learning.
   (2) Emotions are permanent.
   (3) Every emotion is accompanied by a feeling.
   (4) Emotions are aroused by external stimuli.

4. Inclusive education means
   (1) Meeting individual differences in general classroom.
   (2) Meeting individual differences in different classroom.
   (3) Meeting individual differences in special schools.
   (4) Meeting individual differences in home based instruction.
5. In adolescence behaviour and attitude are affected mostly by
   (1) Teacher
   (2) Parents
   (3) Peer Groups
   (4) Films

6. Moral values can be effectively inculcated among the students when the teacher
   (1) Frequently talks about values.
   (2) Himself practices them.
   (3) Tells stories of good persons.
   (4) Talks of Gods and Goddesses.

7. Critical thinking helps a person in developing abilities and skills for
   (1) providing concrete experiences.
   (2) proper interpretation, analysis, evaluation and inference.
   (3) creating and constructing something.
   (4) thinking about ways of reacting.

8. Best method of dealing with adolescent by parents and teachers is
   (1) Autocratic (2) Permissive
   (3) Democratic (4) Restrictive

9. Which of the following is not a characteristic of social development in adolescence?
   (1) Active member of their peer group
   (2) Being an attraction towards opposite sex
   (3) High decrease in friendly relationship
   (4) Extension of special interests
10. An adolescent uses her/his left hand for performing act like taking food or writing, this is developed due to
(1) Inherited behaviour
(2) Developmental behaviour
(3) Wrong behaviour
(4) All options are right

11. Discalculia is a problem related to the problem of
(1) Speaking accurately
(2) Writing without committing mistakes
(3) Listening message properly
(4) Doing mathematical calculations

12. Continuous and Comprehensive Evaluation (CCE) aims to evaluate
(1) The reasoning of child only.
(2) All aspects of development of child.
(3) The knowledge of child only.
(4) The understanding of child only.

13. Which of the following is not a trait (ability) of a creative child?
(1) Elaboration
(2) Originality
(3) Accuracy
(4) Novelty

14. Learning outcomes means
(1) Change in the behaviour of the student.
(2) Change in teaching method of the teacher.
(3) Recognition of the subject-matter.
(4) Completion of content.
15. Differentiation of emotions takes place at the time of
   (1) Birth of child
   (2) During infancy
   (3) During the period of adolescence
   (4) During adulthood

16. Which of the following provision is not suitable to meet individual differences among learners?
   (1) Their abilities should be assessed.
   (2) Adequate facilities and material should be provided.
   (3) Labelling them.
   (4) Making Individualisation necessary.

17. Working with adolescents, particularly maladjusted one, which is not appropriate?
   (1) Critical approach
   (2) Democratic approach
   (3) Collective approach
   (4) Ideal approach

18. Heredity plays most important role in the
   (1) Emotional development of the child
   (2) Social development of the child
   (3) Physical development of the child
   (4) Cultural development of the child
19. The knowledge of principles of learning is must for a good teacher, because

(1) It helps in maintaining discipline.
(2) It helps to make content interesting.
(3) It helps to understand the content by simple methods.
(4) It saves time.

20. Which of the following characteristic is not correct about objective type testing?

(1) Reliability  (2) Objectivity
(3) Validity  (4) Subjectivity

21. Which of the following is the characteristics of constructivist classroom?

(1) Students design experiments, draws conclusions and compare their findings.
(2) Knowledge is objective, universal and complete.
(3) Teacher transmits authoritative knowledge to students.
(4) Students look for the 'right' answer.

22. Which of the following is the primary law of learning propounded by Thorndike?

(1) Law of analogy
(2) Law of exercise
(3) Law of assimilation
(4) Law of disposition
23. According to Piaget the child is able to apply logical thoughts to all classes of problems, this development occurs in which of the following periods?
(1) The formal operational period
(2) The concrete operational period
(3) The pre-operational period
(4) The sensory motor period

24. A child is average on creativity, high in academic achievement, poor in social development. This is an example of
(1) Inter individual differences
(2) Intr individual differences
(3) Individual differences
(4) Measurable individual differences

25. That internal state of mind that arouses, directs and maintains behaviour is called as
(1) Interest (2) Opinion
(3) Attitude (4) Motivation

26. Some people adjust easily with new people because they have high
(1) Intelligence Quotient (I.Q.).
(2) Academic Quotient (A.Q.).
(3) Emotional Quotient (E.Q.).
(4) Spiritual Quotient (S.Q.).

27. Development generally proceeds from head to foot, this principle of development is called
(1) Bilateral to unilateral
(2) Proximodistal (Anstral to Bahr's Kt., or)
(3) General to specific
(4) Cephalo Caudal
28. A student is working hard for Board Examination, his father has promised to give him a motor cycle if he gets good marks. This is
(1) Intrinsic motivation
(2) Extrinsic motivation
(3) Mathematical motivation
(4) Intrinsic and extrinsic motivation

29. Which of the following statements is not correct about learner centred approach?
(1) It takes into account learner's capabilities, capacities and learning styles.
(2) It stresses the importance of enquiry, observation and investigation.
(3) It emphasises transmitting knowledge to the learner by the teacher.
(4) It uses methods like experiential learning, problem solving, concept mapping and creative writing.

30. A child's attitude 'I do not care' is a type of behaviour which can be called
(1) Aggression
(2) Defence
(3) Denial
(4) Retrogression

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P. T. O.
31. अध्याय विकल्प को पहचानिए
   (1) विकालमित्र = विकाल + मित्र
   (2) मूलसागर = मूलस + सागर
   (3) सम्भव = सम + हवा
   (4) दीनानाथ = दीन + नाथ

32. ‘शान्ति’ शब्द में कौन-सा प्रत्यय लगा है?
   (1) य
   (2) एव
   (3) इ
   (4) अप

33. ‘वह जिस पर हमला किया गया हो’ – के लिए
   एक शब्द चुनें
   (1) आरम्भ
   (2) आघात
   (3) आकर्षण
   (4) आकार्ण

34. ‘जो नायिका अपने प्रेमी से मिलने स्वयं आये के लिए एक शब्द है
   (1) दुहिता
   (2) अभिवाक्या
   (3) प्रस्तावनात्मका
   (4) स्वयंगत्ता

35. निम्न शब्दों में से कौन-सा शब्द ‘शुद्ध’ है?
   (1) भाषा
   (2) विशालत्व
   (3) लमोदर
   (4) पंकज

36. “यदि तुम आते तो मैं भी तुम्हारे साथ चलता।”
   इस वाक्य हेतु सही काल है
   (1) आसन भूतकाल
   (2) हेतुहेतुमूलक भूतकाल
   (3) सादिर्घ्य भूतकाल
   (4) अपूर्ण भूतकाल

37. ‘तिस्करा जन्म अचानक जन्म के गर्म से हुआ हो’ – के लिए शब्द शब्द है
   (1) उन्मुक्त
   (2) कम्पन
   (3) अवध वृत्त
   (4) कुमारीसूत

38. किस शब्द में समास की लृद्धि से विभक्ति का
   लोप नहीं, अपितु विभक्ति सहित प्रयोग किया
   गया है?
   (1) सरसिन
   (2) कृत्ति
   (3) स्वदेश
   (4) स्वर्णकार

39. किस शब्द में ‘दी’ प्रत्यय का प्रयोग शुद्ध रूप से नहीं हुआ है?
   (1) ऊर्जेती
   (2) साथी
   (3) तपस्वी
   (4) मायाबी
40. ‘में खाना खा चुका हूँ।’ इस वाक्य में भूतकालिक भेद िलित कीजिए
(1) पूर्ण भूत
(2) सामान्य भूत
(3) आसान भूत
(4) संदर्भ भूत

41. व्यक्तिरण की दृष्टि से ‘प्रेम’ शब्द क्या है?
(1) अन्य
(2) भावावधाक संज्ञा
(3) विशेषण
(4) शुद्धता

42. कीन-सा शब्द ‘चनुप’ का पर्यायवाची नहीं है?
(1) कोदमंड
(2) विशिष्टता
(3) चाप
(4) विशिष्ट

43. ‘गोरख’ शब्द की सही व्युत्पत्ति है?
(1) गुरु + व
(2) गुरु + अ
(3) गुरु + आ
(4) गोर + व

44. ‘शोभीता’ शब्द का संवचन संबंधविहै भोगा?
(1) शोभा + इश्वर
(2) योगी + इश्वर
(3) योगी + श्वर
(4) शोभीत + इश्वर

45. हिंदी की ‘क’ ध्वनि व्यक्तिरण की दृष्टि में है?
(1) अल्पप्राप्त-संघोष
(2) महाप्राप्त-संघोष
(3) अल्पप्राप्त-अघोष
(4) महाप्राप्त-अघोष

46. ‘यज्ञालिक’ शब्द में उपयुक्त समास का उपयोग करें?
(1) ह्रतीयता तथ्युप
(2) दतीयता तथ्युप
(3) शशी तत्क्षण
(4) थारूर्थ तत्क्षण

47. ‘जूल गड़ लगा आई शूल गए छहड़ी, तीन चीज़ँ आई नून, तेल, लकड़ी’ – लोकोक्ति के लिए सब अन्य का चयन कीजिए?
(1) महेंद्र में आग की विवशा
(2) गूँ, तेल, लकड़ी के बिना संसार अवूरा है
(3) अत्यन्त बन्दुओं से ही प्रेम
(4) गुनधी के चक्कर में फॉंज जाना

48. उपस्थित रहित शब्द है?
(1) सुरेश
(2) सुरोग
(3) अन्यों
(4) विशेष

49. अनुसूच विकल्प की चुनौती?
(1) आयो-आनार्य
(2) उद्दल-समुद्रधत
(3) उमीलन-निमीलन
(4) अर्थ-गहरण

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P. T. O.
50. ‘किताब’ किस भाषा का शब्द है?
(1) अरबी
(2) फारसी
(3) अंग्रेजी
(4) हिंदी

51. ‘बंदूक एक उपयोगी .......... है।’ रिक्त स्थान के लिए उचित शब्द का चयन करें
(1) अरब
(2) शरन
(3) रक्षक
(4) आधार

52. किस शब्द में कर्मवातरण समाज का प्रयोग नहीं हुआ है?
(1) कदाचार
(2) जायमान्द
(3) कीर्तिमिन्द
(4) कर्मवाक्तव्य

53. ‘नेत्रा’ शब्द का पुर्लिंग क्या होगा?
(1) नेतान
(2) नेतू
(3) नेता
(4) अभिनेता

54. किस शब्द में निम्मा साध्य का प्रयोग नहीं हुआ है?
(1) नियामकत्व
(2) निरोगनार्य
(3) निम्मात्मक
(4) सर्वोच्चमुखी

55. अष्टुद्ध वर्तनी बला शब्द छोटेप
(1) व्यवसायिक
(2) कार्यक
(3) सांपातिक
(4) शास्त्रिक

निर्देश:- निम्नलिखित गद्यांश को पढ़कर उस पर आधारित प्रश्नों (प्रश्न संख्या 56 से 60) के उत्तर दीजिए:
भारत में परंपरा के प्रवर्तक और आदर्श को लेकर के अतिरिक्तवादी और परंपरा घोर विरोधी स्वर अकसर सुनाई पड़ते हैं। एक स्तर पर जो परंपरा है, जो अलग के प्रथम दिन को परंपरा मानने की जिद फड़ते हैं और दूसरे स्तर पर जो ‘आधुनिक’ हैं जो देश के प्रथम आदित्य को सदृश की दृष्टि से देखते हैं और परंपरा के आधुनिक राष्ट्र के निर्माण में उसे बाया की ताल्लुक पाते हैं।
भारतीय सभ्यता ने परंपरा को महत्त्व तो सदैव किया है परंतु इसे उचित ही प्रस्तावित और तदनुसार परिवर्तित भी किया है। भारतीय समाज के एक परंपरावादी समाज के स्तर में अभिवृद्धि किया जाता है जिससे कुछ लोग यह शोका खा जाते हैं कि प्राचीनतम समय से बहुत कुछ नहीं बदलता है। परंपरा के साथ परिवर्तन ही भारतीय समाज की सूची हैं।
बैदिक संहिताओं की लेखन वालों के विरोध उपनिषदों में ही होगा जो कि बैदिक वाङ्मय के ही भाग थे। महाभारत रामायंग वीद तुम उस वर्ण व्यवस्था का विरोध किया जिसमें वे स्वयं ही जन्मे थे। बैदिक धर्म की नितांत नीति इसने हीन्यात परंपरा का विरोध महायान संप्रदाय के स्तर में सामान्य आया और महायान संप्रदाय ने गुमनितक परिचय का नहीं दार्शनिक नितांत रचना जिसका गौतम बुद्ध सदैव विरोध करते रहे थे। जब पारस्को एवं शरीर से संसार हुआ तो उनका क्षेत्र-महायान का दंगा भारत की राजनीतिक शक्ति का हिस्सा बन गया। गांधार कला का शिल्प शास्त्र हम
57. गीतम कुद्र विरोधी थे:
(i) हीनान्यान सम्राष्ट्र के 
(ii) महानान्यान सम्राष्ट्र के 
(iii) वन्य व्यवस्था के 
(iv) सूर्य-विस्तार परिक्रमण के 
उत्तर उनका विकल्प को निर्णय करिए:
(1) (i) एवं (iv)
(2) (iii) एवं (iv)
(3) केवल (iii)
(4) केवल (ii)

58. भारत के राजनीतिक प्रधानल को अवदान दिया
(1) श्री ने (2) यूनानियों ने 
(3) कुमानो ने (4) बीतो ने 

59. पिटापण से भावांतर है
(1) दोहराव 
(2) पिसाई 
(3) व्याख्या 
(4) महिमा मंडन 

60. स्वातंत्र्यता भारत में वैदिक विलास है
(1) आनुविधित 
(2) परंपरा का अवग्रहान 
(3) अतीत को कटार में खड़ा करना 
(4) धरोहर और चिह्न
Direction: Answer the following questions by selecting the most appropriate option.

61. Choose the correct passive form of the verb in bracket in the given sentence:
I suddenly realized I (watch).  
(1) am being watched  
(2) have been watched  
(3) am watched  
(4) was being watched

62. I must finish this.  
The underlined word in the above sentence indicates  
(1) Necessity  
(2) Determination  
(3) Wish  
(4) Habit

63. Choose the correct suffix to form the word. The meaning of the word is given:  
Copi... = Plentiful  
(1) ous  
(2) some  
(3) ose  
(4) ful

64. 'I don't enjoy going to the dentist.'  
The word 'going' in the above sentence is a/an  
(1) Present participle  
(2) Infinitive  
(3) Perfect participle  
(4) Gerund

65. Choose the correct indirect speech of the given sentence:  
Mother said, "Don't go to the park."  
(1) Mother asked us not to go to the park.  
(2) Mother told us not to go to the park.  
(3) Mother said us not to go to the park.  
(4) Mother said to us to not to go to the park.

66. Which of the following expression means 'extremely happy' ?  
(1) be a basket case  
(2) fall off your perch  
(3) be off your trolley  
(4) on cloud nine
67. Choose the correct passive construction of the sentence:
Auctioneers will sell the painting at auction.
(1) The painting would be sold at auction.
(2) The painting will be sold by the auctioneers at auction.
(3) The painting will be sold at auction.
(4) The painting will be selling at auction.

68. Identify the figure of speech in the following sentence:
I must be cruel, only to be kind.
(1) Epigram
(2) Paradox
(3) Analogy
(4) Metaphor

69. Which of the following words is misspelt?
(1) incongruous
(2) chronological
(3) synchronous
(4) sympathetic

Direction: (Q. Nos. 70 to 74): Select the sentence that is grammatically correct:

70. (1) My brother is the student in Mayo College.
(2) My brother is student of Mayo College.
(3) My brother is a student in the Mayo College.
(4) My brother is a student in Mayo College.

71. (1) Neither of them were present there.
(2) Neither of them was present there.
(3) Neither of them present there.
(4) Neither of them are present there.

72. (1) The roses smell sweet.
(2) The roses smell sweetly.
(3) The roses are smelling sweetly.
(4) The roses are sweetly smelling.
73. (1) You certainly did not ought to do it.
(2) You certainly ought not to have done it.
(3) You certainly did not ought to have done it.
(4) You certainly ought not to have been done it.

74. (1) Who was the book given to?
(2) Who the book was given to?
(3) The book was given to who?
(4) Whom was the book given to?

75. Choose the **correct** phonetic transcription of the word 'Locate'.

(1) /luket/
(2) /lokeit/
(3) /lou'keit/
(4) /lauket/

76. Choose the **correct** direct speech of the given reported speech:
He said I'd better go because it was late.
(1) He said, "You'd better go because it's late."
(2) He said, "I'd better go because it was late."
(3) He said, "You'd better be gone because it was late."
(4) He said, "You'd better go because it was late."

77. Which of the following is **spelt correctly**?
(1) Pediatrician
(2) Padritician
(3) Pedaitrician
(4) Pidiatrician

78. In which of the following sentences do we need to insert the definite article 'the'?

(1) They are all busy growing things.
(2) We do not generally speak of farmers 'growing animals'.
(3) Why do people work?
(4) They are different from rest.
79. Which of the following sentences is correct?

(1) My father's foot was put down when I said I wanted a car for my seventeenth birthday. He said I was too young.

(2) My father put the foot when I said I wanted a car for my seventeenth birthday. He said I am too young.

(3) My father put his foot down when I said I wanted a car for my seventeenth birthday. He said I was too young.

(4) All options are wrong

80. Since you were not there, I left a message with your sister.
The underlined group of words in the above sentence is a/an

(1) Noun Clause
(2) Adverb Clause of place
(3) Adverb Clause of time
(4) Adverb Clause of reason

Direction: (Q. Nos. 81 to 85): Read the following passage and answer the questions by choosing most appropriate option:

Common sense is a rare and enviable quality. It may be truly said that 'its price is above rubies'. How many learned men, how many wits, how many geniuses, how many dull and ignorant people, how many cunning knaves, how many well-meaning fools are without it! How few have it, how little do they or others know of it, except from the infallible results — for one of its first requisites is the utter absence of all pretension.

The vulgar laugh at the pedants and enthusiast for the want of it, while they themselves mistake bigotry and narrow minded notions for it. It is not one of the sciences, but has been well pronounced to be 'fairly worth the seven'. It is a kind of mental instinct, that feels the air of truth and propriety as the fingers feel objects of touch. It does not consist with ignorance for we cannot pronounce on what we do not know; and on the other hand, the laying in of a stock of knowledge, or mastering any art or science seems to destroy that native simplicity and to warp and trammel the unbiased freedom of mind which is necessary to its receiving and giving their due weight to ordinary and casual impressions.

81. Common sense is a rare and enviable quality because

(1) Its price is above rubies
(2) All learned men have it
(3) All men are without it
(4) Very few have it

P. T. O.
82. What is not a requisite of common sense?
   (1) the utter absence of all pretension
   (2) bigotry and narrow-minded notions
   (3) truth and propriety
   (4) an unbiased freedom of mind

83. Which of the following is not stated by the writer in the passage?
   (1) Affectation destroys common sense.
   (2) Common sense requires the utmost simplicity and sincerity.
   (3) Common sense feels the air of truth and propriety as the fingers feel objects of touch.
   (4) Common sense destroys the native simplicity and warps and trammels the freedom of mind.

84. Fill in the blank with the most appropriate word:
   Common sense has been well pronounced to be 'fairly worth the seven' .................
   (1) Notions   (2) Sciences   (3) Talents   (4) Wits

85. Which is not a synonym of the word pedant?
   (1) dogmatist
   (2) formalist
   (3) perfectionist
   (4) down-to-earth

86. .......... child should learn to read and write.
   (1) All   (2) Every   (3) Whole   (4) Both

87. Can I ask your .......... do you think TV violence is harmful?
   (1) opinion   (2) favour   (3) question   (4) advice

88. Where is my wallet? I left it .......... the kitchen table.
   (1) at   (2) in   (3) on   (4) by

89. Take some medicine and the pain will go .......... 
   (1) back   (2) off   (3) out   (4) away

90. The walkers finally arrived at their destination. They .......... all day, and they certainly needed a rest. They .......... thirty miles.
   (1) had been walking; had walked
   (2) had walked; had been walking
   (3) walked; walked
   (4) have been walking; had walked
91. If the frequency of alternating current is 50 Hz, then the time taken by current to rise from zero to maximum, is

(1) $\frac{1}{200}$ sec.  (2) $\frac{1}{100}$ sec. 
(3) $\frac{1}{50}$ sec.  (4) $\frac{1}{400}$ sec.

92. For which of the following waves, the diffraction, using an obstacle of 1 cm size, can be observed?

(1) X-rays  (2) Gamma rays  (3) Light waves  (4) Ultrasonic waves

93. The rotational analogue of momentum in translatory motion is

(1) angular acceleration  (2) angular momentum  (3) torque  (4) moment of inertia
96. The velocity of water at the surface of a river is 36 km/hr. If the depth of river is 5 meter, then find the shearing stress between the horizontal layers of water (Coefficient of viscosity of water $= 10^{-2}$ poise).

\[
(1) \quad 10^{-3} N/m^2 \\
(2) \quad 10^{-4} N/m^2 \\
(3) \quad 2 \times 10^{-3} N/m^2 \\
(4) \quad 2 \times 10^{-2} N/m^2
\]

97. An electron enters a magnetic field along perpendicular direction, then which of the following quantities related to electron will remain constant:

(1) Momentum (2) Kinetic energy (3) Velocity (4) Acceleration

98. An object is placed at a distance of 20 cm in front of a concave mirror of focal length 10 cm. The image produced is

(1) virtual and inverted
(2) real and erect
(3) real, inverted and diminished
(4) real, inverted and of the same size as the object

99. Which of these particles has the minimum De-Broglie wavelength, when the kinetic energy of all the particle is same?

(1) Electron (2) Photon (3) Neutron (4) Alpha particle

100. If a wire having resistance 80 Ω is stretched to double the length, its resistance becomes

(1) 80 Ω \\
(2) 160 Ω \\
(3) 320 Ω \\
(4) 640 Ω

Level-3/175
101. \( L \) लम्बाई की एक लम्बी परिमाणिका का स्वाभाविक निर्माण में से किसके समानुपाती होता है?
(1) \( l^2 \)  (2) \( l \)  
(3) \( \frac{1}{l} \)  (4) \( \frac{1}{l^2} \)

102. X-किरणों का स्पेक्ट्रम होता है
(1) संतत  (2) रैखिक  
(3) संतत एवं रैखिक (4) बैंड  

103. निर्वात में ऊष्मा का संचरण होता है
(1) चलन द्वारा  (2) संवलन द्वारा  
(3) विकिरण द्वारा  (4) विसारण द्वारा  

104. 1 kg व्रत्याचार की एक वस्तु 2 m ऊँचाई से एक उच्चांक निलगिर पर गिरती है, जिससे सिंगर संपीडित हो जाती है। यदि सिंगर नियततः \( K = 200 \) N/m हो, तो सिंगर में संपीडन होना \( (g = 10 \text{ m/s}^2 \text{ तीज़}) \)
(1) 0.5 m  (2) 0.4 m  
(3) \( \frac{1}{\sqrt{5}} \) m  (4) \( \frac{1}{5} \) m  

105. एक p-n सदिध डायोड में अवक्ष्य परत होती है
(1) केवल तब जबकि वह बायसित ना हो  
(2) केवल तब जबकि वह अधिविशिक्ष बायसित हो  
(3) केवल तब जबकि वह पश्चिमविशिक्ष बायसित हो  
(4) कोई फर्द नहीं पड़ता कि डायोड बायसित है या नहीं  

101. The self-inductance of a long solenoid of length \( l \) is proportional to
(1) \( l^2 \)  (2) \( l \)  
(3) \( \frac{1}{l} \)  (4) \( \frac{1}{l^2} \)

102. Spectrum of X-rays is
(1) continuous  (2) linear  
(3) continuous and linear (4) band  

103. Heat propagates in vacuum by
(1) conduction  (2) convection  
(3) radiation  (4) diffusion  

104. An object of mass 1 kg falls on a vertical spring from a height of 2 m, and spring gets compressed. If spring constant \( K = 200 \) N/m, then the compression in the spring is (take \( g = 10 \text{ m/s}^2 \))
(1) 0.5 m  (2) 0.4 m  
(3) \( \frac{1}{\sqrt{5}} \) m  (4) \( \frac{1}{5} \) m  

105. A p-n junction diode contains a depletion layer
(1) only if it is unbiased  (2) only if it is forward bias  
(3) only if it is reverse bias  
(4) irrespective of whether it is biased or unbiased  

Level-3/175  
P. T. O.
106. A sound source and an observer are stationary. If the velocity of sound is changed, then the frequency of sound source heard by observer will
(1) increase
(2) decrease
(3) remain same
(4) increase if the velocity of sound is increased

107. The wave function in ground state of Hydrogen atom is given as
$$\psi = \frac{1}{\pi a^3} e^{-\frac{r}{a}}$$
The average value of $r$ is
(1) 0
(2) $\frac{3}{2}a$
(3) $\frac{1}{2}a$
(4) $\frac{5}{2}a$

108. The ratio of nuclear volume to the atomic volume is
(1) $10^5$
(2) $10^{-5}$
(3) $10^{15}$
(4) $10^{-15}$

109. There is no vertical component of earth's magnetic field at
(1) Equator
(2) Magnetic poles
(3) North pole
(4) $45^\circ$ latitude

110. The Boolean expression:
$$B \cdot (A + B) + A \cdot (\overline{B} + A)$$
can be realized using minimum number of
(1) 1 AND gate
(2) 2 AND gate
(3) 1 OR gate
(4) 2 OR gate
111. \( V_1 \) विद्युत विभव के क्षेत्र में गति करता हुआ एक इलेक्ट्रॉन अधिक विद्युत विभव \( V_2 \) के क्षेत्र में प्रवेश करता है, तो इलेक्ट्रॉन की गतिज ऊर्जा में परिवर्तन निम्न में से किसके समानुपाती होगा?

(1) \( \sqrt{V_2 - V_1} \)  
(2) \( V_2 - V_1 \)  
(3) \( (V_2 - V_1)^2 \)  
(4) \( \frac{1}{\sqrt{V_2 - V_1}} \)

112. जब गतिज ऊर्जा में 300% वृद्धि होती है, तब वस्तु का स्वरूप बदलता है

(1) 20%  
(2) 50%  
(3) 100%  
(4) 200%

113. दो नामिकों के द्रव्यमान संख्या का अनुपात 1 : 3 है, उनके नामिकीय घनत्व का अनुपात होगा

(1) 1 : 3  
(2) 3 : 1  
(3) \( (3)^{1/2} : 1 \)  
(4) 1 : 1

114. इलेक्ट्रॉन की तरंग प्रकृति को निम्न में से किसके द्वारा समझा जा सकता है?

(1) प्रकाश-विद्युत प्रभाव द्वारा  
(2) कृष्णकिक विकिरण द्वारा  
(3) कॉम्पटन प्रभाव द्वारा  
(4) क्रिस्टल विकिरण द्वारा

115. हॉल युक्ति का मानक है

(1) \( V m^3 A^{-1} wb^{-1} \)  
(2) \( V m^2 A wb^{-1} \)  
(3) \( V m^3 A^{-1} wb^{-1} \)  
(4) \( V m^2 A^{-2} wb \)

Level-3/175
116. The colour code strips on a carbon resistance starting from one end are brown, green, orange and silver. The value of resistance is

(1) $15 \times 10^3 \Omega$
(2) $1.5 \times 10^3 \Omega$
(3) $150 \Omega$
(4) $15 \times 10^4 \Omega$

117. If a wire is stretched to double its length, its Young's modulus of elasticity will be

(1) doubled
(2) halved
(3) unchanged
(4) four times

118. In Young's double slit experiment fringe width is $\beta$ and the intensity of central bright fringe is $I_o$. Intensity of light on the screen at a distance $x$ from the central bright fringe will be

(1) $I_o \cos \left( \frac{x}{\beta} \right)$
(2) $I_o \cos^2 \left( \frac{x}{\beta} \right)$
(3) $I_o \cos^2 \left( \frac{\pi x}{\beta} \right)$
(4) $I_o \cos^2 \left( \frac{\pi \beta}{x} \right)$

119. Two points $P$ and $Q$ are maintained at the potentials of $10 \text{ V}$ & $-4 \text{ V}$ respectively. The work done in moving 100 electrons from point $P$ to $Q$ is

(1) $9.60 \times 10^{-17} \text{ J}$
(2) $-2.24 \times 10^{-16} \text{ J}$
(3) $2.24 \times 10^{-16} \text{ J}$
(4) $-9.60 \times 10^{-17} \text{ J}$
120. Two particles on a string are 20 cm apart. If the frequency and speed of a wave propagating on string are 200 Hz and 100 m/sec respectively, the phase difference of oscillation of these particles in radian is

(1) 0.4 π  (2) 0.8 π
(3) 0.2 π  (4) 0.6 π

121. Holes are present in
(1) valence band
(2) conduction band
(3) forbidden energy gap
(4) both in conduction and valence band

122. Numerical aperture of a microscope is 0.12. The resolution limit of the microscope for 6000 Å light is

(1) 30.5×10⁻⁷ m  (2) 30.5×10⁻⁴ m
(3) 61×10⁻⁷ m  (4) 61×10⁻⁴ m

123. The excess pressure for two soap bubbles are in ratio of 3 : 1. The ratio of their volumes is

(1) 1 : 3  (2) 3 : 1
(3) 1 : 27  (4) 1 : 9

124. The radius of first orbit of hydrogen atom is 0.5×10⁻¹⁰ m. The radius of 4th orbit is

(1) 2×10⁻¹⁰ m  (2) 4×10⁻¹⁰ m
(3) 8×10⁻¹⁰ m  (4) 2×10⁻⁹ m

125. At 0 K temperature the general expression of Fermi energy is

(1) 3.65×10⁻¹⁹ n²/₃eV  (2) 3.65×10⁻¹⁹ n²/₃eV
(3) 3.65×10⁻¹⁹ n¹/₃eV  (4) 3.65×10⁻¹⁹ n²/₃eV
126. On increasing temperature of a gas contained in a closed container by $1^\circ C$ its pressure increases by 0.4%. The initial temperature of the gas is

(1) 400 K  
(2) 250 K  
(3) 2500 K  
(4) 4000 K

127. Two satellites are orbiting the earth in circular orbits of radii in the ratio 4 : 1. The ratio of their orbital speed is

(1) 16 : 1  
(2) 1 : 16  
(3) 2 : 1  
(4) 1 : 2

128. A current $i$ is flowing in a square coil of side $a$. The value of magnetic field at the centre of the coil is

(1) $\frac{2\sqrt{2} \mu_0 i}{\pi a}$  
(2) $\frac{2\sqrt{2} \mu_0 i}{a}$  
(3) $\frac{\sqrt{2} \mu_0 i}{\pi a}$  
(4) $\frac{\sqrt{2} \mu_0 i}{a}$

129. When the wavelength of incident light in photoelectric effect decreases, then photoelectron's

(1) number increases  
(2) maximum kinetic energy decreases  
(3) number decreases  
(4) maximum kinetic energy increases

130. If current in a bulb is decreased by 5%, then power will be decreased by

(1) 20%  
(2) 10%  
(3) 5%  
(4) 2.5%

131. The radius of a ball is $(5.2 \pm 0.2)$ cm. The percentage error in the volume of the ball is

(1) 11%  
(2) 4%  
(3) 7%  
(4) 9%
132. For a ferromagnetic material the \( \mu \) and \( H \) are related as:

\[
\mu = \left[ \frac{0.4}{H} + 12 \times 10^{-4} \right] \text{henry/meter}
\]

For \( B \) to be 1 tesla, the value of \( H \) should be

(1) 240 amp/m  (2) 48 amp/m  
(3) 124 amp/m  (4) 500 amp/m

133. A series LCR circuit contains \( L = 1 \text{ mH, } C = 10 \mu \text{F and } R = 500 \Omega \) and \( B = 500 \Omega \). If the inductive and capacitive reactance are equal, then the value of the reactance is

(1) 10 \( \Omega \)  (2) 50 \( \Omega \)  
(3) 100 \( \Omega \)  (4) 5 \( \Omega \)

134. The weight of a person in a lift accelerating upwards

(1) is zero  
(2) increases  
(3) decreases  
(4) remains constant

135. To write the decimal number 37 in binary number system, how many binary digits are required?

(1) 4  (2) 5  
(3) 6  (4) 7

136. The potential difference across a given resistance measured with potentiometer in comparison to the one measured by voltmeter is

(1) always less  
(2) equal  
(3) always more  
(4) may be less or more

Level-3/175

P. T. O.
137. \((A + B)\) तथा \((A - B)\) के बीच कोण हो सकता है

(1) केवल 0°
(2) केवल 90°
(3) केवल 180°
(4) 0° तथा 180° के बीच

138. सुरंगन प्रभाव से समझाया जा सकता है

(1) α-शय (2) β-शय (3) γ-शय (4) नूट्रॉन शय

139. गैलीय आवेगित चालक तल के आंतरिक हिन्दुओं के लिए निम्न में से कोन-सा सत्य है?

(1) \( E = 0, V = 0 \)
(2) \( E = 0, V \neq 0 \)
(3) \( E \neq 0, V \neq 0 \)
(4) \( E \neq 0, V = 0 \)

140. एक लेंस हवा में अभिमारी एवं पानी में अपसारी लेंस की भौतिक व्यवहार करता है। लेंस के पदार्थ का अपवर्तनांक है

(1) हवा के अपवर्तनांक से कम
(2) हवा व पानी दोनों के अपवर्तनांक से ज्यादा
(3) हवा के अपवर्तनांक से ज्यादा किन्तु पानी के अपवर्तनांक से कम
(4) पानी के अपवर्तनांक के बराबर

141. किसी भी विक्षण क्रिया में विक्षण उत्पाद का द्रव्यमान मूल नाभिक का द्रव्यमान के अनुपात

(1) एक से ज्यादा होता है
(2) एक से कम होता है
(3) एक के बराबर होता है
(4) मूल नाभिक के द्रव्यमान पर निर्भर करता है

Level-3/175

137. What can be angle between \((A + B)\) and \((A - B)\)?

(1) 0° only
(2) 90° only
(3) 180° only
(4) Between 0° to 180°

138. Tunnel effect is used to explain

(1) α-decay (2) β-decay (3) γ-decay (4) Neutron decay

139. Which of the following is true for the internal points of a spherical charged conducting surface?

(1) \( E = 0, V = 0 \)
(2) \( E = 0, V \neq 0 \)
(3) \( E \neq 0, V \neq 0 \)
(4) \( E \neq 0, V = 0 \)

140. A lens is behaving as a converging lens in air and diverging in water. The refractive index of the material of lens is

(1) smaller than that of air
(2) greater than that of both air and water
(3) greater than that of air but less than water
(4) equal to that of water

141. In any fission process the ratio

mass of fission products

mass of parent nucleus

is

(1) greater than one
(2) less than one
(3) equal to one
(4) depends on the mass of parent nucleus
142. A particle of mass \( m \) is moving in a circular path of constant radius \( r \) such that its centripetal acceleration \( a_c \) is changing with time \( t \) as \( a_c = k^2 r^2 t \), where \( k \) is constant. The power delivered to the particle by the force acting on it is

\[(1) \frac{mk^2r^2t}{m} \quad (2) \frac{k^2r^2t}{m} \quad (3) \frac{mk^2r^2t}{3} \quad (4) \frac{mk^2r^3t}{3}\]

143. If only 2% of main current is to be passed through a galvanometer of resistance \( G \), then the resistance of the shunt will be

\[(1) \frac{G}{50} \quad (2) 50 G \quad (3) \frac{G}{49} \quad (4) 49 G \]

144. A capacitor of 100 \( \mu \)F is charged to 200 V and then it is discharged through a 2 ohm resistance. The total heat generated in the resistance is

\[(1) 20 J \quad (2) 200 J \quad (3) 10 J \quad (4) 2 J \]

145. Which of the following waves cannot travel through vacuum?

(1) X-rays
(2) Ultrasonic waves
(3) Infrared waves
(4) All options are wrong

146. A coil of resistance 300 ohm and inductance 1.0 Henry is connected across an alternating voltage source of frequency \( \frac{300}{2\pi} \) Hz. The value of phase difference between voltage and current will be

\[(1) 0^\circ \quad (2) 45^\circ \quad (3) 60^\circ \quad (4) 90^\circ \]
147. The moment of inertia of a disc of radius $R$ about a diametric axis is 25 kg m². Its moment of inertia about a parallel axis to diameter at a distance $\frac{R}{2}$ from the centre will be

(1) 37.5 kg m²  (2) 75 kg m²  
(3) 31.25 kg m²  (4) 50 kg m²

148. Four similar charges of each value $Q$ are placed at the corners of square of side $a$. The work needed to bring a unit positive charge from infinite to the centre of the square is

(1) Zero  (2) $\frac{\sqrt{2}Q}{4\pi \varepsilon_0 a}$  
(3) $\frac{\sqrt{2}Q}{\pi \varepsilon_0 a}$  (4) $\frac{2\sqrt{2}Q}{\pi \varepsilon_0 a}$

149. If conduction current is same as displacement current, then source is

(1) only a.c.  (2) only d.c.  
(3) both a.c. and d.c.  (4) neither a.c. nor d.c.

150. A Carnot engine works as a refrigerator in between 250 K and 300 K. It acquires 750 calories from heat source at low temperature, then the heat generated at higher temperature (in calories) will be

(1) 900  (2) 625  
(3) 750  (4) 1000
रफ कार्य के लिए / FOR ROUGH WORK
6. Answers to questions in answer sheet are to be given by darkening complete circle using Black/Blue ball point pen as shown below:

![Circle](https://www.examcompetition.com/)

The answer will be treated wrong, if it is marked, as given below:

![Wrong Mark](https://www.examcompetition.com/)

If you fill more than one circle it will be treated as a wrong answer.

7. Rough work should be done only in the space provided in the Test Booklet for the same.

8. The answers are to be recorded on the OMR Answer Sheet only. Mark your responses carefully. No whiterener (white fluid) is allowed for changing answers.

9. Out of the four alternatives for each question, only one circle for the most appropriate answer is to be darkened completely with Blue/Black Ball Point Pen on the OMR Answer Sheet. The answer once marked is not allowed to be changed.

10. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Answer Sheet.

11. Handle the Test Booklet and Answer Sheet with care, as under no circumstances (except for discrepancy in Test Booklet and Answer Sheet Serial No.), a set of Test Booklet will not be provided.

12. The candidates will write the correct Number as given in the Test Booklet/Answer Sheet in the Attendance Sheet.

13. Candidates are not allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, electronic device or any other material except the Admit Card inside the examination hall/room.

14. Each candidate must show on demand his/her Admit Card (Roll No.) to the Invigilator.

15. No candidate, without special permission of the Superintendent or Invigilator, should leave his/her seat.

16. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign the Attendance Sheet twice. Cases where a candidate has not signed the Attendance Sheet second time will be deemed not to have handed over the Answer Sheet and dealt with as an unfair means case. Female candidates have to affix right hand thumb impression whereas male candidates have to affix left hand thumb impression on the OMR answer sheet at the place specified which should be properly inked i.e. they should not be either over inked or dried in nature.

17. Use of Electronic/Manual Calculators is prohibited.

18. The candidates are governed by Guidelines/Procedure given in the Information bulletin, all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.

19. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.

20. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator in the Room/Hall. The candidates are allowed to take away this Test Booklet with them.