Ph. D. (Physics) Entrance Examination 2026

Time : 2 Hours

Do not open this Test Booklet until you are asked to do so.

Maximum Marks : 100

Immediately fill in the particulars on this page of the Question Booklet and the Answer Sheet with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.

Name of the candidate (In Capital Letters) : _____

Roll Number (In Figure) : | | | | | | | | | | |

(In Words) : _____

Name of Examination Centre (in Capital Letters) : _____

Candidate's Signature : _____ Invigilator's Signature _____

Important Instructions :

This booklet contains 100 objective type questions. First 50 questions of Research Methodology and Second 50 questions of Subject Specific. Each having four options a, b, c, d.

1. Candidates are not allowed to carry textual material printed or written, bits of papers, pages, mobile phone, electronic device or any other material except the Admit Card inside the Examination Hall/Room.
2. The candidates should fill in the required particulars on the Test Booklet and Answer Sheet with Blue/ Black Ball Point Pen.
3. The candidate should not write their Roll Number anywhere else (except in the specified space) on the Test Booklet/Answer Sheet.
4. Out of the four options given for each question, the candidate must mark one correct option as an answer only.
5. There is no negative marking for any wrong answer.
6. Handle the Test Booklet and Answer Sheet with care, as under no circumstances (except for discrepancy in the Test Booklet Code and Answer Sheet Code), will another set be provided.
7. The candidates are not allowed to do any rough work or writing work on the Answer Sheet. All calculations/writing work are to be done in the space available in the Test Booklet itself.
8. Each candidate must show on demand her Admit Card to the Invigilator.
9. No candidate, without special permission of the Superintendent or Invigilator, should leave her seat.
10. The candidate should not leave the Examination Hall without handing over their Answer Sheet and Test Booklet to the invigilator on the duty and signing the Attendance Sheet.
11. No part of the Test Booklet and Answer Sheet shall be detached under circumstances.

NOTE : THIS BOOKLET SHALL BE RETAINED FOR SIX MONTH ONLY.

(Research Methodology)

1. A researcher has 12,000 households and wants a systematic sample of 600 households. The sampling interval should be:

A. 10
B. 15
C. 20
D. 25

2. Spearman's rank correlation is particularly appropriate when:

A. Variables are ranked/ordinal or assumptions for Pearson correlation are unsuitable
B. Both variables must be nominal
C. The researcher is comparing two means
D. The dependent variable is necessarily binary

3. The Kruskal-Wallis test is a non-parametric alternative to:

A. Independent t-test
B. Paired t-test
C. One-way ANOVA
D. Pearson correlation

4. The Mann-Whitney U test is generally used as a non-parametric alternative to:

A. Paired t-test
B. Independent-samples t-test
C. One-way ANOVA
D. Pearson correlation

5. A complete list of all elements from which a sample is actually drawn is called:

A. Population parameter
B. Research universe
C. Sample statistic
D. Sampling frame

6. Which of the following best distinguishes basic research from applied research?

A. Basic research is always quantitative, whereas applied research is qualitative
B. Basic research primarily develops knowledge/theory, whereas applied research addresses practical problems
C. Basic research uses primary data, whereas applied research uses secondary data
D. Basic research does not require hypotheses

7. A researcher obtains a p-value of 0.03 and uses a 5% significance level. What is the appropriate decision?

A. Reject H0 because $0.03 < 0.05$
B. Accept H0 because $0.03 < 0.05$
C. Reject H1 because $0.03 > 0.01$
D. No decision can be made from the p-value

8. Suppose training increases employee motivation, which subsequently increases productivity. Motivation is best described as:

A. Control variable
B. Intervening variable
C. Extraneous variable
D. Sampling-frame variable

9. A researcher changes or selectively manipulates recorded data so that the results support the hypothesis. This is:

A. Fabrication
B. Falsification
C. Peer review
D. Triangulation

10. A sample mean is 80, population standard deviation is 20 and sample size is 100. Using z=1.96, the approximate 95% confidence interval is:

A. 76.08 to 83.92
B. 78.04 to 81.96
C. 60.00 to 100.00
D. 79.60 to 80.40

11. The principal purpose of a pilot study is to:

A. Produce the final findings
B. Test and refine research procedures and instruments before the main study
C. Replace the sampling process
D. Guarantee external validity

12. Which test is most appropriate for comparing the means of two independent groups when the assumptions of a parametric test are reasonably satisfied?

A. Independent-samples t-test
B. Chi-square test
C. Wilcoxon signed-rank test
D. Kruskal-Wallis test

13. A theoretical framework primarily:

A. Specifies the computer software to be used
B. Replaces the research design
C. Determines the sample size automatically
D. Connects the research problem with relevant theories and concepts

14. A chi-square goodness-of-fit test has four categories. The degrees of freedom are:

A. 2
B. 3
C. 4
D. 5

15. A researcher invents observations that were never actually collected and enters them into the dataset. This is:

A. Plagiarism

B. Fabrication
C. Falsification
D. Self-citation

16. A population contains four strata with sizes 100, 200, 300 and 400. If a proportional sample of 100 is required, the number selected from the third stratum should be:

A. 20
B. 25
C. 30
D. 40

17. A survey records the following frequencies for four response categories: 20, 35, 25 and 20. What is the cumulative frequency after the third category?

A. 55
B. 60
C. 80
D. 100

18. A questionnaire contains 40 items. A researcher removes 8 poorly performing items. What percentage of the original items has been removed?

A. 15%
B. 20%
C. 25%
D. 32%

19. A one-way ANOVA has three groups and 45 total observations. The within-groups degrees of freedom are:

A. 2
B. 3
C. 42
D. 44

20. The primary purpose of research design is to:

A. Determine only the sample size
B. Provide a logical framework for answering the research questions
C. Eliminate the need for data analysis
D. Ensure that every hypothesis is accepted

21. Which design is strongest for establishing a causal relationship between an independent and dependent variable?

A. Descriptive design
B. Historical design
C. Cross-sectional survey
D. Experimental design

22. A sample has a mean of 50 and standard deviation of 10. If the sample size is 100, the standard error of the mean is:

A. 0.1
B. 1
C. 10

D. 100

23. A researcher observes that several studies have examined employee satisfaction but very few have investigated whether satisfaction differs between remote and hybrid employees. This observation primarily helps the researcher identify:

A. Sampling error
B. Type-I error
C. Measurement scale
D. Research gap

24. A one-way ANOVA compares four groups, each containing 10 observations. The total number of observations is 40. The between-groups degrees of freedom are:

A. 3
B. 4
C. 36
D. 39

25. In a regression equation Y=20+3X, an increase of 4 units in X is associated with a predicted increase in Y of:

A. 4
B. 7
C. 12
D. 80

26. Validity primarily concerns:

A. Consistency only
B. Whether an instrument measures what it is intended to measure
C. Sample size
D. Response rate

27. A researcher studies the reasons for unusually high employee turnover in one organisation and recommends immediate changes in its HR policies. This research is most appropriately classified as:

A. Fundamental research
B. Conceptual research
C. Historical research
D. Action research

28. Which source is generally considered a scholarly source?

A. Anonymous social-media post
B. Peer-reviewed journal article
C. Commercial advertisement
D. Unverified blog post

29. Which of the following best represents a research question?

A. Employee motivation is positively related to productivity.
B. To determine whether training improves productivity.
C. Does training intensity influence employee productivity?
D. Training intensity is the independent variable.

30. Snowball sampling is particularly useful when:

A. A complete sampling frame exists
B. The population is hidden or difficult to reach
C. Equal probability selection is mandatory
D. The population is extremely homogeneous

31. A researcher decides in advance to interview 50 male and 50 female consumers but selects participants through convenience. This is:

A. Stratified random sampling
B. Quota sampling
C. Cluster sampling
D. Systematic sampling

32. Which Boolean search string would most effectively retrieve literature concerning both employee engagement and remote work while allowing either term 'employee engagement' or 'work engagement'?

A. employee engagement OR remote work
B. employee engagement AND remote work OR work engagement
C. (employee engagement OR work engagement) AND remote work
D. employee engagement NOT remote work

33. The major conceptual difference between stratified and cluster sampling is that:

A. Stratified sampling is always non-probability sampling
B. Strata are usually internally similar, while clusters are ideally miniature representations of the population
C. Clusters are always smaller than strata
D. Stratified sampling never uses random selection

34. Cronbach's alpha is primarily associated with:

A. Sampling error
B. Internal consistency reliability
C. External validity
D. Normality testing

35. A normal distribution has mean 100 and standard deviation 15. What is the z-score for an observation of 130?

A. 1
B. 1.5
C. 2
D. 2.5

36. A researcher uses Generative AI to help draft a literature review. Which practice is most consistent with responsible research?

A. Submit AI-generated text without verification
B. Assume all AI-generated references are genuine
C. Verify sources, maintain transparency about appropriate AI use, protect confidential data and retain human responsibility for the scholarly work
D. List the AI tool as the sole author of the research paper

37. The main purpose of a research proposal is to:

A. Present only the final statistical results
B. Provide a systematic plan and justification for the proposed research
C. Replace the literature review
D. Guarantee that the hypothesis will be supported

38. In a study, 60 respondents belong to Group A, 90 to Group B and 150 to Group C. What percentage of the sample belongs to Group B?

A. 20%
B. 25%
C. 30%
D. 37.5%

39. A researcher divides employees into departments and randomly selects employees from each department. This is:

A. Cluster sampling
B. Stratified sampling
C. Snowball sampling
D. Convenience sampling

40. If the correlation coefficient between advertising expenditure and sales is r=0.80, the coefficient of determination is:

A. 0.16
B. 0.40
C. 0.64
D. 0.80

41. A questionnaire appears, on superficial inspection, to measure employee satisfaction. This is best described as:

A. Face validity
B. Criterion validity
C. Predictive validity
D. Internal consistency

42. A researcher receives 360 usable responses from 450 distributed questionnaires. The response rate is:

A. 70%
B. 75%
C. 80%
D. 85%

43. A newly developed aptitude test is compared with an established test measuring the same construct. This is evidence most closely related to:

A. Construct validity
B. Face validity
C. Sampling validity
D. Internal validity

44. Increasing sample size generally reduces:

A. Non-sampling error automatically
B. Sampling error
C. Response bias automatically
D. Measurement error automatically

45. For the data 5, 8, 12, 17 and 20, the range is:

A. 12
B. 15
C. 17
D. 20

46. Which question is most clearly open-ended?

A. Are you satisfied? Yes/No
B. Rate satisfaction from 1 to 5
C. What factors influenced your decision to leave the organisation?
D. Do you agree? Strongly agree/Agree/Neutral/Disagree/Strongly disagree

47. Which property distinguishes a ratio scale from an interval scale?

A. Ranking
B. Equal intervals
C. Meaningful absolute zero
D. Categorisation

48. If r= -0.70, the relationship between two variables is:

A. Strong positive
B. Moderate/strong negative
C. Perfect negative
D. No relationship

49. Which of the following is an example of primary data?

A. Data obtained from a published government report
B. Data collected directly by the researcher through interviews
C. Data obtained from an existing journal article
D. Data downloaded from an archival database

50. A researcher receives 270 completed questionnaires out of 360 distributed. If 30 questionnaires are rejected because of missing data, what percentage of distributed questionnaires becomes usable?

A. 60%
B. 66.67%
C. 75%
D. 83.33%

51. The Laplace transform of $t\,e^{-2t}\sin 4t$ is

(A) $\frac{-8(s+2)}{(s^2+4s+20)^2}$

(B) $\frac{-8(s+2)}{(s^2+4s+25)^2}$

(C) $\frac{8(s+2)}{(s^2+4s+25)^2}$

(D) $\frac{8(s+2)}{(s^2+4s+20)^2}$

52. The residue of $f(z) = \frac{z}{(z-a)(z-b)}$ at infinity is

(A) 1
(B) −1
(C) 0
(D) 2

53. The number of independent components of an antisymmetric tensor of rank 2 in n- dimensional space is

(A) 2n
(B) n^2
(C) $\frac{n(n+1)}{2}$
(D) $\frac{n(n-1)}{2}$

54. If f (0) = 1 and f (1) = 2.72, then the trapezoidal rule gives the approximate value of $\int_0^1 f(x)dx$ as:

(A) 3.72
(B) 1.86
(C) 1.72
(D) 0.86

55. What are the eigenvalues of the 2 x 2 Matrix A= $\begin{bmatrix}2 & 4\\4 & 2\end{bmatrix}$

(A) 2 and 4
(B) 0 and 6
(C) –2 and 6
(D) 2 and –6

56. The value of $\int_{-1}^{1} P_0(x)\,dx$ is

(A) 0
(B) 2
(C) 1
(D) −1

57. Rutherford differential scattering cross-section

(A) has the dimensions of area

(B) has the dimensions of solid angle

(C) is proportional to the square of the kinetic energy of the incident particle

(D) is inversely proportional to the $\text{cosec}^4(\theta/2)$, where θ is the angle of scattering

58. In the transformation of $Q = q\cos\alpha - p\sin\alpha$; $P = q\sin\alpha + p\cos\alpha$, for which value of α, the Poisson brackets [Q, P] and [q, p] are equal

(A) Only zero
(B) Only $\pi/6$
(C) Only $\pi/4$
(D) All values

59. The rest mass of an electron is 0.51 MeV. A moving electron has a kinetic energy of 9.69 MeV. The ratio of the mass of the moving electron to its rest mass is:

(A) 19:1
(B) 20:1
(C) 1:19
(D) 1:20

60. A particle of mass m is moving in the potential $V(x) = \frac{-ax^2}{2} + \frac{bx^4}{4}$ where a, are b positive constants. The frequency of small oscillations about a point of stable equilibrium is

(A) $\sqrt{a/m}$

(B) $\sqrt{2a/m}$

(C) $\sqrt{3a/m}$

(D) $\sqrt{6a/m}$

61. A transformation from old coordinates (q, p) to new coordinates (Q, P) is guaranteed to be canonical if it preserves

(A) The explicit value of the kinetic energy.

(B) The form of Hamilton's equations of motion.

(C) The absolute geometric distance from the origin.

(D) The alignment of the spatial coordinate axes.

62. The relation between Δ-variation and δ-variation is given by :

(A) $\Delta = \delta + \Delta t \frac{d}{dt}$

(B) $\Delta = \delta - \Delta t \frac{d}{dt}$

(C) $-\delta = \Delta - \Delta t \frac{d}{dt}$

(D) $\Delta = \delta - \delta t \frac{d}{dt}$

63. In a rotational structure of electronic bands (the transition between rotational levels of the different electronic levels) having a large rotational constant of the upper electronic level than the lower one,

(A) Band head appears in R -branch

(B) Band head appears in P -branch

(C) Band head appears in Q -branch

(D) No band head appears

64. If a molecule has centre of symmetry then

(A) Raman active vibrations are IR active

(B) Some, but not all, of the Raman active vibrations are IR active

(C) Raman active vibrations are IR inactive and vice versa

(D) All vibrations are Raman and IR active

65. The coherence length of laser light is

(A) Directly proportional to the length of active lasing medium

(B) Directly proportional to the width of the spectral line

(C) Inversely proportional to the width of the spectral line

(D) Inversely proportional to the length of active lasing medium

66. The number of permitted transition from $^2P_{3/2} \rightarrow {}^2S_{1/2}$ in presence of weak magnetic field is

(A) 4

(B) 6

(C) 3

(D) 8

67. The first absorption spectrum of $^{12}C^{16}O$ is at 3.842 cm^{-1} while that of $^{13}C^{16}O$ is at 3.673 cm^{-1}. The ratio of their moments of inertia is

(A) 1.851

(B) 1.286

(C) 1.046

(D) 1.038

68. The outermost shell of an atom of an element is $3d^3$. The spectral symbol for the ground state is:

(A) $^4D_{7/2}$

(B) $^4F_{9/2}$

(C) $^4F_{3/2}$

(D) $^4D_{1/2}$

69. The correct order of packing efficiency (%) in cell of following 3 dimensional crystals is:

(A) Simple cubic < Body-centred cubic > Face-centred cubic

(B) Simple cubic > Body-centred cubic < Face-centred cubic

(C) Simple cubic < Body-centred cubic < Face-centred cubic

(D) Simple cubic > Body-centred cubic > Face-centred cubic

70. The lattice parameters a, b, c of an orthorhombic crystal are related by a= 2b=3c. The interplanar separation between the (110) plane is

(A) $\frac{a}{\sqrt{3}}$

(B) $\frac{a}{\sqrt{14}}$

(C) $\frac{a}{2}$

(D) $\frac{a}{\sqrt{5}}$

71. In a Hall Effect experiment, the hall voltage for an intrinsic semiconductor is negative. This is because (symbols carry usual meaning)

(A) $n \approx p$

(B) $n > p$

(C) $\mu_e > \mu_h$

(D) $m_e^* > m_h^*$

72. A one dimensional lattice chain consists of periodic arrangement of atoms with lattice spacing ' a '. Each atom is represented by the potential $V(x) = AV_0\,\delta(x)$, the energy gaps between the bands in the nearly free electron approximation is

(A) $\frac{2AV_0}{a}$

(B) $\frac{AV_0}{a}$

(C) $\frac{2V_0}{a}$

(D) $\frac{V_0}{a}$

73. Consider the following statements about quasi crystals:

1. They possess long-range positional order.

2. They necessarily possess translational periodicity.

3. They can exhibit five-fold rotational symmetry.

4. Their diffraction pattern can contain sharp Bragg peaks.

Which statements are correct?

(A) 1 and 2 only

(B) 1, 3 and 4 only

(C) 2 and 3 only

(D) 1, 2, 3 and 4

74. The nucleus of the atom of $_4Be^9$ consist of

(A) 13 up quraks and 13 down quarks

(B) 13 up quraks and 14 down quarks

(C) 14 up quraks and 13 down quarks

(D) 14 up quraks and 14 down quarks

75. The thermonuclear fusion $p + p \rightarrow d + e^+ + \nu_e$ (where d is the deuteron) occurring in the core of the sun is a

(A) Electromagnetic interaction

(B) Gravitational interaction

(C) Strong interaction

(D) Weak interaction

76. A particle of rest mass m whose kinetic energy is twice its rest energy collides with a particle of equal mass at rest. The two combine into a single new particle. The rest mass of such a new particle would be

(A) 2m

(B) $2\sqrt{2}$ m

(C) $3\sqrt{2}$ m

(D) 8m

77. The reaction ${}_{1}^{1}D + {}_{1}^{2}D \rightarrow {}_{2}^{4}He + \pi^{0}$ cannot proceed via strong interactions because it violates the conservation of

(A) Angular momentum

(B) Electric charge

(C) Baryon number

(D) Isospin

78. If in a spontaneous α-decay of ${}_{92}^{232}U$ at rest, the total energy released in the reaction is Q, then the energy carried by the α - particle is

(A) $\frac{57\,Q}{58}$

(B) $\frac{Q}{57}$

(C) $\frac{Q}{58}$

(D) $\frac{23\,Q}{58}$

79. For quantum mechanical system, which statistics will be applicable to deuterons and α- particles?

(A) F-D Statistics

(B) M-B Statistics

(C) B-E Statistics

(D) None of these

80. In canonical ensemble-

(A) The energy and the temperature are constants

(B) The entropy and the energy are constants

(C) The temperature and the density are constants

(D) The density and the entropy are constants

81. A system transitions from an ordered state to a disordered state at a constant energy. According to statistical mechanics, the entropy increases because

(A) The number of microstates increases.

(B) The number of accessible microstates corresponding to that macrostate increases.

(C) The temperature of the system must rise.

(D) The partition function drops to zero.

82. A second order phase transition is characterized by

(A) A latent heat

(B) A discontinuous change in its specific heat

(C) A change in volume

(D) Irreversible behaviour during warming and cooling

83. Bose-Einstein and Fermi Dirac distribution approaches the Maxwell Boltzmann distribution when value of ratio of sections to no. of particle $(\frac{g_i}{n_i})$ is:

(A) Much greater than unity

(B) Zero

(C) Very Small as compared to unity

(D) None of the above

84. Consider black body radiation in thermal equilibrium contained in a two-dimensional box. The dependence of the energy density on the temperature T is :

(A) T

(B) T^3

(C) T^2

(D) T^4

85. If P_x and L_z are linear and angular momentums, then the value of commutator $[L_z, P_x]$ is given by :

(A) P_y

(B) $i\hbar P_y$

(C) P_z

(D) $i\hbar L_y$

86. A particle with wave function $\Psi(x) = e^{-|x|}$ in 1-D well of depth 'a', the probability of finding the particle in region $|x| \leq a$, $a > 0$ is given by:

(A) e^{-a}

(B) e^{-2a}

(C) $1 - e^{-2a}$

(D) $1 - e^{a}$

87. The Born's approximation is applicable for

(A) High energy, low atomic number for scatterer

(B) Low energy, low atomic number for scatterer

(C) High energy, high atomic number for scatterer

(D) Low energy, high atomic number for scatterer

88. A particle is confined to a one dimensional potential box with the potential

$$V(x) = 0, \quad 0 < x < a$$
$$= \infty, \quad \text{otherwise}$$

If the particle is subjected to a perturbation, within the box, $W = \beta x$, where β is a small constant, the first order correction to the ground state energy is –

(A) 0

(B) $\frac{a\beta}{8}$

(C) $\frac{a\beta}{2}$

(D) $\alpha\beta$

89. For a spin ½ particles, the expectation value of $S_zS_yS_x$, where S_x, S_y and S_z are spin operators, is-

(A) $-i\hbar^3/8$

(B) $i\hbar^3/8$

(C) $-i\hbar^3/16$

(D) $i\hbar^3/16$

90. The capacitance per unit length and the characteristics impedance of a lossless transmission line are C and Z_0 respectively. The velocity of a travelling wave on the transmission line is-

(A) Z_0C

(B) $\frac{1}{C\,Z_0}$

(C) $\frac{C}{Z_0}$

(D) $\frac{Z_0}{C}$

91. The sum of two oppositely rotating circularly polarized waves of equal amplitude will be-

(A) A circularly polarized wave

(B) An unpolarized wave

(C) An elliptically polarized wave

(D) A linearly polarized wave

92. The conductivity in plasma is imaginary; the critical frequency for propagation and maximum penetration is given by, respectively-

(A) $f_c = 9\sqrt{N}\ ;\ \delta_{max} = \frac{c}{\omega_p}$

(B) $f_c = \frac{9}{\sqrt{N}}\ ;\ \delta_{max} = \frac{c}{\omega_p}$

(C) $f_c = \frac{9}{\sqrt{N}}\ ;\ \delta_{max} = (c\ \omega_p)$

(D) $f_c = 9\sqrt{N}\ ;\ \delta_{max} = (c\ \omega_p)$

93. If an electromagnetic wave is propagated in a medium of permittivity ε and permeability μ, then ratio $\sqrt{\frac{\mu}{\varepsilon}}$ is :

(A) Refractive index of the medium

(B) Square of refractive index of the medium

(C) Intrinsic impedance of the medium

(D) Energy density of the medium

94. Transverse electric modes (TE) propagating in a rectangular wave guide with transverse dimensions 2 m × 1m driven with an angular frequency $\omega = 10^9$ rad/ s are: (A) TE_{01}, TE_{10}, TE_{20}

(B) TE_{10}, TE_{11}, TE_{20}

(C) TE_{01}, TE_{10}, TE_{11}

(D) TE_{01}, TE_{10}, TE_{22}

95. A certain op-amp has bias current of 50 μA and 49.3 μA. The input offset current is-

(A) 700 nA

(B) 99.3 μA

(C) 49.7 μA

(D) None of these

96. Which of the following statement is NOT correct for a Depletion type n -channel MOSFET

(A) Channel width can be increased

(B) Channel width can be decreased

(C) Can work with both positive and negative gate bias

(D) Initially the channel between drain and source is completely blocked by a p – region.

97. A flash ADC uses 2^n-1 comparators. If the conversion circuit is required to have 63 comparators, the maximum number of output levels and the corresponding resolution are, respectively:

(A) 63, 6-bit

(B) 64, 6-bit

(C) 64, 5-bit

(D) 128, 7-bit

98. If an AC current of frequency 1GHz is observed through a Josephson junction, then the applied dc voltage is, (Given h = 6.625×10^{-34} J.s)

(A) 2.07 μV

(B) 3.8 μV

(C) 1 μV

(D) 5.48 μV

99. When characterizing a photovoltaic solar cell under illumination, the Fill Factor is a critical performance parameter. It represents the ratio of the maximum useful power (P_{max}) to the product of which two metrics?

(A) Photon flux energy and Total surface area

(B) Short-circuit current I_{sc} and reverse breakdown voltage V_{br}

(C) Open-circuit voltage V_{oc} and Short-circuit current I_{sc}

(D) Open-circuit voltage V_{oc} and Dark saturation current I_O.

100. A student measures the displacement x from the equilibrium of a stretched spring and reports it be 100 μm with a 1% error. The spring constant k is known to be 10/Nm with 0.5% error. The percentage error in the estimate of the potential energy $V=\frac{kx^2}{2}$ is:

(A) 0.8%

(B) 3.0%

(C) 1.5%

(D) 2.5%