Modern Physics, Final Exam

Allowed time: 2 hr Max score: 60%

I. Write "True" if the statement is true and "False" is the statement is false on the space provided.

- Microscopic particles such as electrons display only particle property while large objects such as a tennis ball display both particle and wave properties.
- The Twin Paradox predicts the presence of time difference between two twins when one is kept on earth and the other moves to a distant star with speed close to speed of light.
- The magnitude of speed of light in vacuum may be greater than 3×10⁴m/s depending on the inertial frame of reference we are measuring in.
- The blackbody radiation was one of experimental observations whose explanations was able to be well explained using classical mechanics.
- 5. Light will travel at a faster speed when emitted from a forward moving object.

II. Choose the best answer and write the letter of your choice on the space provided.

6. The collision between a photon and a free electron was first explained by which of the following experiments?

A. Compton effect

B. Davisson-Germer experiment

C. Louis de Broglie

D. J.J. Thomson

An electron traveling at 0.980c has a total energy of

A. 0.245 MeV B. 0.511 MeV

C. 0.756 MeV D. 2.55 MeV

8. The correct expression relating the energy E of a particle to its rest mass m₀, its momentum p, and the speed of light c is?

 $E^2 = p^2c^2 + m_ic^2$

B. $E^2 = p^2 c^2 + (m_0 c)^2$

 $E^2 = p^2c + (m_0c^2)^2$

 $D_{c} E^{2} = p^{2}c^{2} + (m_{o}c^{2})^{2}$

- A particle moves in such a way that its kinetic energy just equals its rest energy. The velocity
 of this particle is.
 A. 0.866c
 B. c/4
 C. c
 D. c/2
- 10. X-rays of wavelength 10 pm are scattered from a target. The wavelength of the x-rays scattered through 45° is?

A. 8pm B 10.7pm

C. 4.2pm

D. 2.426pm

 "It is impossible to know both the exact position and exact momentum of an object at the same time." This is the statement of

A. Pauli exclusion principle

B. Aufbau principle

- C. Heisenberg's uncertainty principle
- D. momentum conservation principle
- In quantum mechanical description of an observable, the wavefunction Ψ has no physical interpretation but the square of its absolute magnitude |Ψ|² represents

A. mass B. energy of the body at that time C. momentum of the body at that time D. probability of finding the body there at that time

Gra10 Physics Final Exam Paper

Calvin S. Kalman, Mark Lattery

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developing standardized measurement instruments for science education research Science education researchers both beginning and experienced may use this book as a reference for locating available and developing new measurement instruments when conducting a research study Ntsikelelo's Dream Catcher Ntsikelelo Goodman Ndesi, 2020-01-01 This is an inspirational true story extolling the power of a dream The perception of the world with its endless possibilities Regardless of the circumstances and the challenges honest living accomplishes the truest most well deserved victory Identification of self worth is key to a peaceful approach to life and perseverance and the practise of patience can prove to be **Research in Education** .1971 very rewarding Time rewards tons in the presence of the future Achievement of Senior High School Students in Canada Lenora Perry Fagan, Dana Spurrell, 1995 In Canada today there is a clear move toward a more outcomes based education system. This report examines the state of high school student assessment and reviews standards and accountability strategies It reports on the policies programs and initiatives in all provincial ministries or departments of education and a sample of school boards across the country Data were derived from a telephone survey of departmental ministerial representatives from all 10 provinces and the 2 territories and from a questionnaire that was mailed to 279 school boards A total of 140 boards responded a 50 percent response rate Data show that both boards and ministries are putting more emphasis on the development of comprehensive policies to cover all aspects of student evaluation. There is some movement away from relying on paper and pencil testing as the sole means of evaluation. the use of more authentic performance based approaches and a greater variety of assessment techniques are being promoted Some of the best practices in high school evaluation involve use of a broad range of assessment methods introduction of or improvements to provincial examinations greater use of summative and formative evaluations greater emphasis on modifying evaluation for special needs students use of performance based assessment and more reporting to parents and the public Thirteen tables are included Appendices contain copies of the two questionnaires and selected school board material Contains 19 references LMI Education and Professional Employment in the U.S.S.R. Nicholas De Witt, National Science Foundation (U.S.), 1961 15 PGT Math Test Papers EMRS Mocktime Publication, EMRS Exam Teachers PGT Math Test Papers 15 Practice Papers Tier 1 Eklavya Model Residential Schools as per Official Exam Pattern and Syllabus

English Medium Instruction in Secondary Education Jack Pun,2024-04-19 Jack Pun presents best practices in pedagogy and teaching to facilitate effective content subject learning at the secondary school level Increasingly parents are sending their children to English Medium Instruction EMI secondary schools in their home countries to prepare them for full immersion in EMI in English native speaking countries The book explores the teaching and learning processes in EMI senior secondary science classrooms based in thirty secondary schools in Hong Kong Conducting analyses of classroom teacher and student perception data the author discusses the issues of teaching science through the medium of English in secondary schools the implications and applications for professional development of science teachers and other content subject

teachers and suggests strategies for teaching science in different EMI contexts This volume is highly relevant to scholars in the field of educational linguistics particularly in English language teaching content based instruction content and language integrated learning and English as a medium of instruction It is also useful to education policymakers school teachers research students English and education majors Report of the Annual Meeting of the South African Association for Bilingual Education and Language Policy in the Global South Jo Arthur the Advancement of Science ,2005 Shoba, Feliciano Chimbutane, 2013-07-18 This volume considers a range of ways in which bilingual programs can make a contribution to aspects of human and economic development in the global South The authors examine the consequences of different policies programs and pedagogies for learners and local communities through recent ethnographic research on these topics The revitalization of minority languages and local cultural practices management of linguistic and cultural diversity and promotion of equal opportunities both social and economic are all explored in this light **Development of** Student Understanding: Focus on Science Education Calvin S. Kalman, Mark Lattery, 2020-01-21 The Discursive Construction of Intercultural Understanding in China Wang Xi,2015-11-11 This book represents an ethnographic study of an International Baccalaureate Diploma Program in a school in mainland China serving Chinese students and staffed by teachers from a variety of origins It offers in depth descriptions of the way in which students teachers and managers interact and communicate with one another in a variety of school activities Through the communication process cultural experiences and understandings are negotiated constantly among school participants. The ethnographic study also has a critical intention Going beyond description the author discusses the extent to which networks of social relationships in the case are imbued by asymmetries in power and how this leads to people s inability unwillingness and unawareness to interact with those from different cultural backgrounds As research findings reveal where the construction of meaning is less equally available to each participant prejudice and exclusiveness are more likely to be assumed impeding individuals intercultural learning The key is to empower those less privileged giving them legitimacy to come to voice in an institutional context on the one hand and protecting their reflections on hegemonic discourse meticulously on the other hand Since the research explores the complexities and subtleties of the communication process that are bound to particular contexts like most ethnographic studies it aims at adding a body of experience and humanistic understanding of cultures rather than testing theories Although the IB Program being studied can hardly be representative of the overall development of international education in China the detailed description of contextual issues of the case and the research procedures could facilitate the readers to vicariously experience these events thus they can make their own decisions about the transferability of the research to their own unique situations Research in Education ,1971 Who's the New Kid in Chemistry? John D. Butler,2013-12-12 Who s the New Kid in Chemistry offers an unprecedented look at student engagement and teacher best practices through the eves of an educational researcher enrolled as a public high school student Over the course of seventy nine consecutive days

John D Butler participates in and observes Rhode Island 2013 Teacher of the Year Jessica M Waters s high school chemistry class documenting his experiences as they unfold Who s the New Kid in Chemistry is a compelling example of what can be accomplished when an educational researcher and teacher collaborate in the classroom This work includes a discussion on flexible homework assignments data driven instruction and thirty teacher best practices This book is an invaluable resource for teachers across all content areas masters and doctoral research method classes and future Teachers of the Year

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