

# Assignment 1

The due date for submitting this assignment has passed.

**Due on 2021-02-24, 23:59 IST.**

Assignment submitted on 2021-02-24, 15:05 IST

**More than one option may be correct. Partial marks will be awarded only if some of the correct options are selected and none of the incorrect options are selected.**

Please see the National Education Policy (NEP) 2020 document at: [https://www.education.gov.in/sites/upload\\_files/mhrd/files/NEP\\_Final\\_English\\_0.pdf](https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf)  
Answer the questions below based on this document.

**1 point**

The document has been put together and released by:

- ☐ The Ministry presently known as the Ministry of Education
- ☐ The Ministry previously known as the Ministry of Human Resource Development
- ☐ Ministry of Colleges and Schools
- ☐ Ministry of Skill Development

Yes, the answer is correct.

Score: 1

Accepted Answers:

*The Ministry presently known as the Ministry of Education*

*The Ministry previously known as the Ministry of Human Resource Development*

**1 point**

The document has sections the focus on:

- ☐ School education
- ☐ College education
- ☐ Adult education
- ☐ Early Childhood education

Yes, the answer is correct.

Score: 1

Accepted Answers:

*School education*

*College education*

*Adult education*

*Early Childhood education*

**1 point**

ECCE includes

- ☐ Play –based learning
- ☐ Early training for exams
- ☐ Inquiry based learning
- ☐ Visual arts

Yes, the answer is correct.  
Score: 1

Accepted Answers:  
*Play –based learning*  
*Inquiry based learning*  
*Visual arts*

**1 point**

The fraction of students in elementary school who can read, write, add and subtract is

- ☐ All
- ☐ None
- ☐ Large
- ☐ Small

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Small*

**1 point**

The goals of the Schooling system must be:

- ☐ Decreasing dropout rates
- ☐ To see that students are enrolled in and are attending school
- ☐ Remove poor performing students from schools so that the pass percentage is good
- ☐ Provide effective infrastructure in schools

Partially Correct.  
Score: 0.66

Accepted Answers:  
*Decreasing dropout rates*  
*To see that students are enrolled in and are attending school*  
*Provide effective infrastructure in schools*

**1 point**

Students in schools will have the opportunity to examine:

- ☐ Doing what is right
- ☐ Knowledge of India
- ☐ Constitutional values
- ☐ The original stories of the Panchatantra

Partially Correct.  
Score: 0.5

Accepted Answers:  
*Doing what is right*  
*Knowledge of India*  
*Constitutional values*  
*The original stories of the Panchatantra*

**1 point**

Which of the following statements is/are true

- ☐ India has a long tradition of holistic learning
- ☐ The idea that all branches of human endeavour should be considered as Arts, has an Indian origin

- ☐ Knowledge of “many arts” is the kind of education that will be required in the 21st century
- ☐ Multidisciplinary education should be avoided at the undergraduate level

No, the answer is incorrect.

Score: 0

Accepted Answers:

*India has a long tradition of holistic learning*

*The idea that all branches of human endeavour should be considered as Arts, has an Indian origin*

*Knowledge of “many arts” is the kind of education that will be required in the 21st century*

**1 point**

Undergraduate education that includes Humanities and Arts along with STEM results in

- ☐ Ineffective usage of time
- ☐ Lack of concentration
- ☐ Decrease in focus on studies due to increased distractions
- ☐ Result in increased creativity and innovation

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Result in increased creativity and innovation*

**1 point**

Adult education should include

- ☐ Numeracy
- ☐ Financial literacy
- ☐ Vocational skills
- ☐ Use of different teaching learning methods than those used for children

Partially Correct.

Score: 0.75

Accepted Answers:

*Numeracy*

*Financial literacy*

*Vocational skills*

*Use of different teaching learning methods than those used for children*

**1 point**

In the context of online education:

- ☐ It is important to increase equity using the digital India campaign
- ☐ It is important to make computing devices more affordable
- ☐ There are challenges in online exams such as limitations on the types of questions
- ☐ There is a need to create an interoperable, evolvable, public digital infrastructure

Partially Correct.

Score: 0.5

Accepted Answers:

*It is important to increase equity using the digital India campaign*

*It is important to make computing devices more affordable*

*There are challenges in online exams such as limitations on the types of questions*

*There is a need to create an interoperable, evolvable, public digital infrastructure*

## Assignment submitted on 2021-03-02, 09:04 IST

More than one option may be right. Partial marks are awarded if only some of the correct options are selected. No marks awarded if even one of the wrong options is selected.

### 1 point

Which of the following is a recommended criterion to pick a reference article for inclusion in a publication?

- ☐ The article is authored by likely reviewers
- ☐ The article is a prior work directly relating to the topic
- ☐ The article is authored by someone well known in that topic
- ☐ The article appeared in a well known journal

No, the answer is incorrect.

Score: 0

Accepted Answers:

*The article is a prior work directly relating to the topic*

### 1 point

Which of the following indices is considered as a measure of the impact of a particular article in its area of specialization?

- ☐ Number of likes
- ☐ Number of views
- ☐ Number of downloads
- ☐ Number of articles referring to it

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Number of articles referring to it*

### 1 point

Which of the following bibliographic details is necessary to retrieve all other details of a digitally published article?

- ☐ ISSN
- ☐ ISBN
- ☐ DOI
- ☐ URL

No, the answer is incorrect.

Score: 0

Accepted Answers:

*DOI*

### 1 point

Literature review is an activity that typically needs to be carried out

- ☐ Only at the start of the research
- ☐ Only at the end of the research
- ☐ Only while publishing a paper
- ☐ Throughout the research process

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Throughout the research process*

**1 point**

Compared to peer reviewed journals, websites are

- ☐ More likely to be reliable
- ☐ Equally reliable
- ☐ Less likely to be reliable
- ☐ Completely incorrect

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Less likely to be reliable*

**1 point**

Which of the bibliographic fields are generally allowed for use without subscription by publishers?

- ☐ Title, Authors, Volume, Issue, Page number and DOI
- ☐ Title, Volume, Issue, Page number, Abstract and Full text
- ☐ Title, Authors, Issue, Page number, Abstract and References
- ☐ Title, Authors, Volume, Issue, Page number and Abstract

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Title, Authors, Volume, Issue, Page number and DOI*

**1 point**

Which of the following is the best way to refer to the internet location of a published article?

- ☐ URL of the website of publisher
- ☐ URL of the author of the article
- ☐ URL of the journal
- ☐ DOI link of the article

No, the answer is incorrect.

Score: 0

Accepted Answers:

*DOI link of the article*

**1 point**

Which of the following is a sufficient piece of information to retrieve rest of the bibliographic details of an article?

- ☐ DOI link
- ☐ Author and Journal
- ☐ Journal, Volume and Year
- ☐ Author and Year

No, the answer is incorrect.

Score: 0

Accepted Answers:

[DOI link](#)

**1 point**

Consider you are authoring a scientific document. One of the articles you are referring to has been retracted just before your article went to press and is thus not available any longer. You have come to know of it before uploading the final version of the manuscript for publication. What is the most recommended way to address the missing reference?

- ☐ Add a note in the reference that it has been retracted
- ☐ Remove the retracted reference and modify the text and citations accordingly
- ☐ Ignore the retraction and leave it to publisher to address
- ☐ Replace the reference with another article of same author

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Remove the retracted reference and modify the text and citations accordingly*

**1 point**

You have received an invitation to submit an article for publication in a journal. Which of the following options best describes the possibility that the journal is fake.

- ☐ The journal has page charges for the articles it publishes
- ☐ The journal does not have an editorial board or review process
- ☐ The name of the journal is similar to of another reputed journal in the same domain
- ☐ The articles of the journal are available for free on internet

No, the answer is incorrect.

Score: 0

Accepted Answers:

*The journal does not have an editorial board or review process*

## Assignment 3

The due date for submitting this assignment has passed.

**Due on 2021-03-10, 23:59 IST.**

Assignment submitted on 2021-03-10, 20:05 IST

More than one option may be correct. Partial marks will be awarded only if some of the correct options are selected and none of the incorrect options are selected.

**1 point**

Which of the following is/ are example/s of exploratory data analysis

- ☐ Testing that the average salary in an age group is SoSo (specified value)
- ☐ Searching for trends or outliers in a data set
- ☐ Histogram analysis of runs scored by a player in cricket
- ☐ Analyzing the relationship between variables using linear regression.

No, the answer is incorrect.  
Score: 0

Accepted Answers:

*Searching for trends or outliers in a data set*

*Histogram analysis of runs scored by a player in cricket*

*Analyzing the relationship between variables using linear regression.*

**1 point**

Identify the correct statement/s below

- ☐ Any deterministic signal can be accurately predicted given sufficient history.
- ☐ A stochastic signal always keeps randomly alternating between positive and negative values
- ☐ Measurements of steps by the best smart phone of an active individual are deterministic.
- ☐ Probability that a batsman, in cricket, will get out on any ball is 0.5.

No, the answer is incorrect.  
Score: 0

Accepted Answers:

*Any deterministic signal can be accurately predicted given sufficient history.*

**1 point**

Which of the following functions is / are linear in time  $t$ ?

- ☐ A sinusoidal signal  $y(t) = A \sin(\omega_0 t)$
- ☐ The signal  $x(t) = t \exp(c_0 t) + \beta$  when  $c_0 = 0$
- ☐ Distance travelled by a car travelling with uniform velocity between  $t = t_1$  and  $t = t_2$ .
- ☐ The instantaneous frequency of a linear chirp  $x(t) = \cos(2\pi(\alpha t + f_0)t)$ , where  $\alpha, f_0$  are positive constants.

Partially Correct.  
Score: 0.5

Accepted Answers:

*Distance travelled by a car travelling with uniform velocity between  $t = t_1$  and  $t = t_2$ .*

*The instantaneous frequency of a linear chirp  $x(t) = \cos(2\pi(\alpha t + f_0)t)$ , where  $\alpha, f_0$  are positive constants.*

**1 point**

An estimator is said to be most efficient when

- ☐ The parameters can be estimated accurately with the smallest sample size.
- ☐ It estimates parameters with the lowest variability / highest precision.
- ☐ It is able to handle at least 10% of missing data.
- ☐ Among all the estimators (of a parameter) it estimates with lowest standard error.

No, the answer is incorrect.  
Score: 0

Accepted Answers:

*It estimates parameters with the lowest variability / highest precision.*

*Among all the estimators (of a parameter) it estimates with lowest standard error.*

**1 point**

Identify the correct statement(s) among the following.

- ☐ Bias in an estimate implies it is different from the true value by exactly a constant.
- ☐ A statistic and estimator are both mathematical functions of the observed data.
- ☐ Precision and accuracy of an estimator are very closely related to each other.
- ☐ Two variables with identical correlation in two different data sets have the same linear model.

No, the answer is incorrect.

Score: 0

Accepted Answers:

*A statistic and estimator are both mathematical functions of the observed data.*

**1 point**

Identify the correct statement among the following:

- ☐ Data visualization is useful because it gives us an idea of any anomalies and trends in the data.
- ☐ Robust methods of estimation are meant to handle outliers in the data set.
- ☐ Errors in estimates of the order  $10^{-3}$  can be always treated as insignificant.
- ☐ Input excitation can greatly influence the ability to estimate parameters uniquely.

Partially Correct.

Score: 0.67

Accepted Answers:

*Data visualization is useful because it gives us an idea of any anomalies and trends in the data.*

*Robust methods of estimation are meant to handle outliers in the data set.*

*Input excitation can greatly influence the ability to estimate parameters uniquely.*

**1 point**

Which of the following is true concerning a parameter estimate?

- ☐ It can never equal to the true value even if the data is identical to the ensemble.
- ☐ When averaged across five hundred data sets, the error in estimate is five hundred times lower than from a single data set.
- ☐ Increase in sample size will always increase its value.
- ☐ The most efficient estimate is not necessarily the most accurate.

No, the answer is incorrect.

Score: 0

Accepted Answers:

*The most efficient estimate is not necessarily the most accurate.*

**1 point**

Which of the following is true w.r.t. in data-driven modelling?

- ☐ Overfitting generally implies that more time has been spent in fitting the model.
- ☐ Models that are underfit are less complex than those that are overfit.



- ☐ Overfit models generally perform poorly on fresh data sets.
- ☐ Overfitting occurs whenever the sample size used is more than necessary to obtain a good estimate.

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Models that are underfit are less complex than those that are overfit.*

*Overfit models generally perform poorly on fresh data sets.*

**1 point**

While working with acids in laboratories:

- ☐ Acid storage must be done with secondary containment
- ☐ Acids and bases must be separated
- ☐ Acid wastes must be washed down the sink
- ☐ Acid containing bottles must be clearly labelled

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Acid storage must be done with secondary containment*

*Acids and bases must be separated*

*Acid containing bottles must be clearly labelled*

**1 point**

Gas bottles in laboratories should be:

- ☐ Transported by rolling on the floor
- ☐ Secured with a chain that is high enough to prevent toppling
- ☐ Stored with regulators removed
- ☐ stored with the regulators fixed on the bottles

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Secured with a chain that is high enough to prevent toppling*

*Stored with regulators removed*

## Assignment 4

The due date for submitting this assignment has passed.

**Due on 2021-03-17, 23:59 IST.**

Assignment submitted on 2021-03-16, 14:15 IST

More than one option may be right. Partial marks are awarded if only some of the correct options are selected and none of the incorrect options are selected.

**1 point**

An outline of a talk helps the audience

- ☐ Understand your educational background
- ☐ Note the main points you will be covering in the talk
- ☐ Decide the sections of the talk they are interested in
- ☐ Understand the importance of your professional accomplishments

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Note the main points you will be covering in the talk*

*Decide the sections of the talk they are interested in*

**1 point**

The features of a journal paper are:

- ☐ It changes based on the audience
- ☐ It is a one-time activity with respect to a given set of data
- ☐ It is peer reviewed
- ☐ Generally interactive with the reader

Yes, the answer is correct.

Score: 1

Accepted Answers:

*It is a one-time activity with respect to a given set of data*

*It is peer reviewed*

**1 point**

The features of a Technical presentation are:

- ☐ It changes based on the audience
- ☐ It is a one-time activity with respect to a given set of data
- ☐ It is peer reviewed
- ☐ Generally interactive with the audience

Yes, the answer is correct.

Score: 1

Accepted Answers:

*It changes based on the audience*

*Generally interactive with the audience*

**1 point**

Knowing who your audience is, is important in a technical presentation because:

- ☐ Your audience may have popular people
- ☐ You will be able to gauge their background knowledge
- ☐ You can tailor your talk accordingly
- ☐ You can understand why they are watching your talk

Yes, the answer is correct.

Score: 1

Accepted Answers:

*You will be able to gauge their background knowledge*

*You can tailor your talk accordingly*

*You can understand why they are watching your talk*

**1 point**

Illustration and data in a presentation

- ☐ Must complete fill the slide from end to end
- ☐ Must be presented with sufficient open spaces in between
- ☐ Must typically help the audience focus on a specific idea in each slide
- ☐ Must always be in colour

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Must be presented with sufficient open spaces in between*

*Must typically help the audience focus on a specific idea in each slide*

**1 point**

Steps involved in publishing a journal paper typically include:

- ☐ Writing the paper as per journal constraints
- ☐ Submitting the paper to a journal which will then send it to reviewers for their comments
- ☐ Responding to the comments of the reviewers
- ☐ Publication of the paper as long as it less than 7 pages long

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Writing the paper as per journal constraints*

*Submitting the paper to a journal which will then send it to reviewers for their comments*

*Responding to the comments of the reviewers*

**1 point**

Any given journal, will typically accept for review:

- ☐ Papers in any area of research
- ☐ Papers in any area of research as long as it is new
- ☐ Papers only from a relatively narrow area of research
- ☐ Papers that have been peer reviewed and published in other journals since this will help save time.

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Papers only from a relatively narrow area of research*

**1 point**

A technical paper and a science fiction novel:

- ☐ Have the same style of presentation
- ☐ Have very different styles of presentation
- ☐ Both aim to surprise the reader in the end
- ☐ Both aim to make every reader read till the end in a thrilling manner

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Have very different styles of presentation*

**1 point**

Most students typically find their initial technical papers difficult to write because:

- ☐ They are accustomed to poor examples of technical writing
- ☐ They have high expectations of the first draft
- ☐ They often do not understand why they are being asked to make specific changes to their document
- ☐ They do not understand their work

Yes, the answer is correct.

Score: 1

Accepted Answers:

*They are accustomed to poor examples of technical writing*

*They have high expectations of the first draft*

*They often do not understand why they are being asked to make specific changes to their document*

**1 point**

The purpose of technical writing includes

- ☐ Informing the reader
- ☐ Persuade the reader to a certain point of view
- ☐ To convey the ideas efficiently
- ☐ Being sarcastic at different places in the technical document

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Informing the reader*

*Persuade the reader to a certain point of view*

*To convey the ideas efficiently*

## Assignment 5

The due date for submitting this assignment has passed.

**Due on 2021-03-24, 23:59 IST.**

Assignment submitted on 2021-03-24, 21:37 IST

More than one option may be right. Partial marks are awarded if only some of the correct options are selected and none of the wrong options are selected.

**1 point**

A creative person:

- ☐ Accurately repeats work done by others
- ☐ Will likely find a new approach to solve a problem that others may not have considered
- ☐ Usually does not like to conform to pre-existing notions of what is possible
- ☐ Can be in almost any field

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Will likely find a new approach to solve a problem that others may not have considered*

*Usually does not like to conform to pre-existing notions of what is possible*

*Can be in almost any field*

**1 point**

According to the Nobel Laureate, Herbert Simon, it takes:

- ☐ 10,000 hours of effort to be an expert in an area
- ☐ Approximately 4-5 years of working 8 hours a day in an area, to become an expert in the area
- ☐ A Bachelor's degree, to become an expert in an area
- ☐ Regular reading of newspapers to become an expert in a scientific area

Yes, the answer is correct.

Score: 1

Accepted Answers:

*10,000 hours of effort to be an expert in an area*

*Approximately 4-5 years of working 8 hours a day in an area, to become an expert in the area*

**1 point**

According to Edward de Bono, the most complex activity is:

- ☐ Teaching
- ☐ Reading
- ☐ To simplify
- ☐ To complicate things further

No, the answer is incorrect.

Score: 0

Accepted Answers:

*To simplify*

**1 point**

Traits of a creative Engineer include

- ☐ High motivation
- ☐ Low self esteem
- ☐ Self Confidence
- ☐ Knowledge of fundamentals

Yes, the answer is correct.

Score: 1

Accepted Answers:

*High motivation*

*Self Confidence*

*Knowledge of fundamentals*

**1 point**

With respect to being creative in research

- ☐ Young researchers are generally more creative since they have less prior baggage of work to confine themselves to
- ☐ Researchers who have spent 20 years in a field are generally less creative due to familiarity with the field
- ☐ Ignorance of basic education enhances creativity in formal research
- ☐ Researchers who have spent 20 years in a field are generally more creative due to familiarity with the field

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Young researchers are generally more creative since they have less prior baggage of work to confine themselves to*

*Researchers who have spent 20 years in a field are generally less creative due to familiarity with the field*

**1 point**

According to flow theory, a person performs best when:

- ☐ Challenge is much lower than the skill
- ☐ Challenge is equal to the skill
- ☐ Challenge is much higher than the skill
- ☐ Challenge is unrelated to the skill

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Challenge is equal to the skill*

**1 point**

Some examples of creativity include

- ☐ Taking a problem/nuisance and converting it into a useful product
- ☐ Taking a poorly performing product and converting it into a new product line that takes advantage of its poor performance to do something not possible earlier
- ☐ Products that deviate from conventional wisdom
- ☐ Copying products that already exist, since the market for such products is established

Partially Correct.

Score: 0.66

Accepted Answers:

*Taking a problem/nuisance and converting it into a useful product*

*Taking a poorly performing product and converting it into a new product line that takes advantage of its poor performance to do something not possible earlier*

*Products that deviate from conventional wisdom*

**1 point**

While publishing a paper it is

- ☐ Important to be sure that the experiments were conducted correctly
- ☐ Important to ensure that references are properly cited
- ☐ Important to ensure that only people involved in the research work are acknowledged as authors
- ☐ Important to have an agreement with a colleague to include his/her name in your publications, and your name in their publications, even if not directly involved in the work, so that the number of publications increase for both of you

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Important to be sure that the experiments were conducted correctly*

*Important to ensure that references are properly cited*

*Important to ensure that only people involved in the research work are acknowledged as authors*

**1 point**

Unethical behaviour in scientific research includes:

- ☐ Copying from other papers
- ☐ Directly changing the data if it is not as expected
- ☐ Listing all the authors while writing a paper

☐ Accusing other researchers so that you become prominent

Partially Correct.

Score: 0.66

Accepted Answers:

*Copying from other papers*

*Directly changing the data if it is not as expected*

*Accusing other researchers so that you become prominent*

**1 point**

Some of the reasons for researchers adopting unethical practices include

☐ Pressure to become famous

☐ Intention to have a quick career growth

☐ Pressure to get funding

☐ The need to teach well

Partially Correct.

Score: 0.67

Accepted Answers:

*Pressure to become famous*

*Intention to have a quick career growth*

*Pressure to get funding*

## Assignment 6

The due date for submitting this assignment has passed.

**Due on 2021-03-31, 23:59 IST.**

### Assignment submitted on 2021-03-31, 21:12 IST

More than one option may be right. Partial marks are awarded if only some of the correct options are selected and **none** of the wrong options are selected

**1 point**

Which of the following is true?

Statement 1: A patent is protected for 20 years from the date of application.

Statement 2: Infringement means violation of an intellectual property right.

☐ Statement 1 is true, Statement 2 is false.

☐ Statement 1 is false, Statement 2 is true.

☐ Both Statement 1 and Statement 2 are true.

☐ Both Statement 1 and Statement 2 are false.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Both Statement 1 and Statement 2 are true.*

**1 point**

Which of the following is true?

Statement 1: Limited life intellectual property can go to public domain.

Statement 2: Intellectual property is same as real property.

☐ Statement 1 is true, Statement 2 is false.

- ☐ Statement 1 is false, Statement 2 is true.
- ☐ Both Statement 1 and Statement 2 are true.
- ☐ Both Statement 1 and Statement 2 are false.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Statement 1 is true, Statement 2 is false.*

**1 point**

Which of the following is true?

Statement 1: Intellectual property rights are non-exclusive set of rights.

Statement 2: Intellectual property rights are rights which protect products of human creative labour.

- ☐ Statement 1 is true, Statement 2 is false.
- ☐ Statement 1 is false, Statement 2 is true.
- ☐ Both Statement 1 and Statement 2 are true.
- ☐ Both Statement 1 and Statement 2 are false.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Statement 1 is false, Statement 2 is true.*

**1 point**

Which of the following is true?

Statement 1: A trademark is granted for a period of 15 years and can be renewed thereafter.

Statement 2: Intellectual property rights first came up during the green revolution.

- ☐ Statement 1 is true, Statement 2 is false.
- ☐ Statement 1 is false, Statement 2 is true.
- ☐ Both Statement 1 and Statement 2 are true.
- ☐ Both Statement 1 and Statement 2 are false.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Both Statement 1 and Statement 2 are false.*

**1 point**

Which of the following are the two types of property?

- ☐ Public
- ☐ Government
- ☐ Private
- ☐ Lawful

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Public*

*Private*

**1 point**

What is the duration of copyright in India?



- ☐ Life of author + 20 Years
- ☐ Life of author + 40 Years
- ☐ Life of author + 60 Years
- ☐ Life of author + 80 Years

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Life of author + 60 Years*

**1 point**

Which of the intellectual property rights helps in identifying the company?

- ☐ Copyright
- ☐ Geographical Indication
- ☐ Patent
- ☐ Trademark

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Trademark*

**1 point**

Which of the following is an example of real property?

- ☐ Invention
- ☐ House
- ☐ Trademark
- ☐ Car

Yes, the answer is correct.

Score: 1

Accepted Answers:

*House*

*Car*

**1 point**

Which of the following are common characteristics of intellectual property rights?

- ☐ It is protectable by law
- ☐ It is intangible in nature
- ☐ It cannot be easily replicated
- ☐ It has commercial value.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*It is protectable by law*

*It is intangible in nature*

*It has commercial value.*

**1 point**

A book written by Prof Feroz can be protected by which of the following IP rights?

- ☐ Trademark
- ☐ Patent
- ☐ Copyright
- ☐ Design

Yes, the answer is correct.

Score: 1

Accepted Answers:

Copyright

## Assignment 7

The due date for submitting this assignment has passed.

**Due on 2021-04-07, 23:59 IST.**

Assignment submitted on 2021-04-07, 21:28 IST

**More than one option may be right. Partial marks are awarded if only some of the correct options are selected and none of the wrong options are selected.**

100 numbers forming an arithmetic progression with starting value  $a=5$  and difference  $=3$  are taken. The mean value of this collection of 100 numbers is \_\_\_\_\_.

Yes, the answer is correct.

Score: 1

Accepted Answers:

(Type: Numeric) 153.5

**1 point**

**1 point**

Identify the TRUE statement(s) from the following

- ☐ In a collection of positive numbers, the arithmetic mean can become negative
- ☐ Two collections containing different sets of numbers may have the same mean but different standard deviations
- ☐ Standard deviation of a collection of negative numbers is negative
- ☐ When a fictitious population comprises of exactly one number, say 10, the standard deviation of this population is undefined

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Two collections containing different sets of numbers may have the same mean but different standard deviations*

**1 point**

Consider the sample consisting of the following nine results :

2.3, 7.2, 3.7, 4.6, 5.0, 7.0, 3.7, 4.9, 4.2.

The second quartile of this data collection will be equal to

- ☐ the mean
- ☐ the median

☐ twice the mean

☐ 0.5

Yes, the answer is correct.

Score: 1

Accepted Answers:

*the median*

The permitted values of a discrete distribution of numbers are 1,2,3,4 and 5. Their associated probability values are given below

$p(1) = 0.321$ ,  $p(2) = 0.421$ ,  $p(3) = 0.209$ ,  $p(4) = 0.049$

Find the mean and variance of this probability distribution.

Find the mean of this probability distribution.

Yes, the answer is correct.

Score: 0.5

Accepted Answers:

*(Type: Range) 1.98, 1.99*

**0.5 points**

Find the variance of this probability distribution.

Yes, the answer is correct.

Score: 0.5

Accepted Answers:

*(Type: Range) 0.72, 0.73*

**0.5 points**

**1 point**

Identify the TRUE statement(s) from the following

A continuous probability distribution is given by the function  $f(x)$ . Irrespective of the form  $f(x)$  then

☐

$$\int_{-\infty}^{\infty} f(x) dx = 1, \int_{-\infty}^{\infty} f(x) dx = 1$$

☐

$$\int_{-\infty}^{\infty} (x - \mu)^2 f(x) dx = \sigma^2, \int_{-\infty}^{\infty} (x - \mu)^2 f(x) dx = \sigma^2 \quad \text{where } \mu \text{ is mean and } \sigma^2 \text{ is variance}$$

☐

$$\int_{-\infty}^{\infty} a f(x) dx = 0, \int_{-\infty}^{\infty} a f(x) dx = 0 \quad \text{where } a \text{ is a constant } > 0$$

☐

$$\int_{-\infty}^{\infty} (x - \mu) f(x) dx = 0, \int_{-\infty}^{\infty} (x - \mu) f(x) dx = 0$$

Partially Correct.

Score: 0.25

Accepted Answers:

$$\int_{-\infty}^{\infty} f(x) dx = 1, \int_{-\infty}^{\infty} f(x) dx = 1$$

$$\int_{-\infty}^{\infty} (x - \mu)^2 f(x) dx = \sigma^2, \int_{-\infty}^{\infty} (x - \mu)^2 f(x) dx = \sigma^2 \quad \text{where } \mu \text{ is mean and } \sigma^2 \text{ is variance}$$

$$\int_{-\infty}^{\infty} a f(x) dx = 0, \int_{-\infty}^{\infty} a f(x) dx = 0 \quad \text{where } a \text{ is a constant } > 0$$

$$\int_{-\infty}^{\infty} (x - \mu) f(x) dx = 0, \int_{-\infty}^{\infty} (x - \mu) f(x) dx = 0$$

A probability density function is given by:

$$f(x) = 0 \quad \text{for } x < 0$$

$$f(x) = P x^2 \quad \text{for } 0 < x < 2$$

$$f(x) = 0 \quad \text{for } x > 2$$

The value of PP such that  $f(x)$  is a legitimate probability distribution function is \_\_\_\_\_

Yes, the answer is correct.

Score: 1

Accepted Answers:

(Type: Numeric) 0.375

**1 point**

The numerical values of mean and variance of the above probability distribution (given in problem 7 after finding numerical value of P) are

a) Mean = \_\_\_\_\_

Yes, the answer is correct.

Score: 0.5

Accepted Answers:

(Type: Numeric) 1.5

**0.5 points**

b) Variance = \_\_\_\_\_

Yes, the answer is correct.

Score: 0.5

Accepted Answers:

(Type: Numeric) 0.15

**0.5 points**

If the probability distribution is normal with mean 0 and variance 1, and the probability of finding the standard normal variable Z between  $\pm 0.76$  is 0.553, what is the probability  $P(Z < -0.76)$ ? Round off to 3 decimal places.

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0.224

**1 point**

The population standard deviation of measurements of an engine part is 0.50 mm. What minimum sample size is required if the sample standard deviation must be 0.125 mm?

Yes, the answer is correct.

Score: 1

Accepted Answers:

(Type: Numeric) 16

**1 point**

**1 point**

Pick the False statement(s) from the following

Central Limit Theorem is very useful in statistical analysis. Assume in all the cases that the samples are truly random

According to this theorem

- ☐ If the parent distribution is normal, the sampling distribution is not normal if sample size is  $< 30$
- ☐ If the parent distribution is normal, the sampling distribution is not normal if sample size is  $> 30$
- ☐ If the parent distribution is not normal, the sampling distribution is normal if sample size is  $< 30$
- ☐ If the parent distribution is not normal, the sampling distribution is also not normal irrespective of the sample size

Yes, the answer is correct.

Score: 1

Accepted Answers:

*If the parent distribution is normal, the sampling distribution is not normal if sample size is  $< 30$*

*If the parent distribution is normal, the sampling distribution is not normal if sample size is  $> 30$*

*If the parent distribution is not normal, the sampling distribution is normal if sample size is  $< 30$*

*If the parent distribution is not normal, the sampling distribution is also not normal irrespective of the sample size*

## Assignment 8

The due date for submitting this assignment has passed.

**Due on 2021-04-14, 23:59 IST.**

Assignment submitted on 2021-04-14, 22:35 IST

More than one option may be right. Partial marks are awarded if only some of the correct options are selected and none of the wrong options are selected.

Based on the article at: [https://en.wikipedia.org/wiki/History\\_of\\_the\\_camera](https://en.wikipedia.org/wiki/History_of_the_camera), answer the questions below.

**1 point**

Camera obscura helped determine:

- ☐ Light travels in straight lines
- ☐ Light bends around corners
- ☐ Light travels faster than sound
- ☐ Nothing can travel faster than light

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Light travels in straight lines*

**1 point**

Before the advent of films, images were recorded by

- ☐ LCD screens
- ☐ Printing on oil paper
- ☐ Printing on cloth
- ☐ Tracing the outline

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Tracing the outline*

**1 point**

The first permanent photograph needed an exposure of

- ☐ 1 second
- ☐ 8 seconds
- ☐ 8 minutes
- ☐ 8 hours

Yes, the answer is correct.

Score: 1

Accepted Answers:

*8 hours*

**1 point**

The first commercial photographing camera

- ☐ Was based on a single box design
- ☐ Was based on a double box design
- ☐ Used a ground glass focusing screen
- ☐ Used a 35 mm film roll

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Was based on a double box design*

*Used a ground glass focusing screen*

**1 point**

Which of the following is/are true:

- ☐ The use of photographic film was pioneered by George Eastman
- ☐ George Eastman created a camera called Kodak
- ☐ Kodak had a single lens of fixed focus
- ☐ Kodak had a single shutter speed

Yes, the answer is correct.

Score: 1

Accepted Answers:

*The use of photographic film was pioneered by George Eastman*

*George Eastman created a camera called Kodak*

*Kodak had a single lens of fixed focus*

*Kodak had a single shutter speed*

**1 point**

35 mm film cameras were first popularized by companies such as

- ☐ Leica
- ☐ Contax
- ☐ Panasonic
- ☐ Sony

Yes, the answer is correct.

Score: 1

Accepted Answers:

Leica  
Contax

**1 point**

The pentaprism enabled

- ☐ Eye level viewfinders
- ☐ Waist level focusing screens
- ☐ Viewfinder less cameras
- ☐ Focus free cameras

No, the answer is incorrect.

Score: 0

Accepted Answers:  
*Eye level viewfinders*

**1 point**

Through the lens metering become most commonly used on

- ☐ SLRs
- ☐ TLRs
- ☐ Poloroids
- ☐ Obscuras

Yes, the answer is correct.

Score: 1

Accepted Answers:  
*SLRs*

**1 point**

Digital camera image sensors is/are based on or related to

- ☐ MOSFETs
- ☐ Metal oxide semiconductor technology
- ☐ CCD
- ☐ CMOS

Yes, the answer is correct.

Score: 1

Accepted Answers:  
*MOSFETs*  
*Metal oxide semiconductor technology*  
*CCD*  
*CMOS*

**1 point**

The first major camera manufacturer, to build a digital SLR from the ground up, was

- ☐ Canon
- ☐ Nikon
- ☐ Minolta
- ☐ Ricoh

No, the answer is incorrect.

Score: 0

Accepted Answers: *Nikon*





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## Unit 5 - Week 2: Literature Survey, Experimental skills

### Course outline

How to access the portal

Week 1: Group Discussion on Research

Week 1: Overview of Research

Week 2: Literature Survey, Experimental skills

☐ Overview of Literature Survey

☐ Literature Survey using Web of Science

☐ Literature Survey using Scopus

☐ Writing Up

☐ Tutorial on using BibTeX with LaTeX to add references to a document

☐ Tutorial on using Microsoft Word with Bibliographic Sources

### Assignment 2

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2018-09-05, 23:59 IST.** assignment.

1) Consider that you have collected the following resources towards your research: (1) A **1 point** reference in a journal article that you have not referred yet (2) A link to the website of a professional society (3) A published article with journal, year, volume and page number (4) An article from a newly launched journal with volume number, page number but year and ISSN number are due (5) A newly accepted journal article with DOI link, (6) A book with an ISBN number available. Which of the following can be considered as archival references for inclusion in a publication?

- ☐ Only 1, 2 and 3
- ☐ Only 3, 5 and 6
- ☐ Only 3, 4 and 6
- ☐ Only 1, 2 and 5

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Only 3, 5 and 6*

2) Which of the following methods of searching for literature is suitable to identify the earliest **1 point** contributor of a scientific outcome?

- ☐ Keyword based search followed by sorting by year of publication
- ☐ Citation based search followed by sorting by year of publication
- ☐ Keyword based search followed by sorting by citations
- ☐ Back reference based search following a keyword based search

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Back reference based search following a keyword based search*

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Assignment 2

WEEK 2 -  
FEEDBACK -  
Introduction to  
research

Week 3

Week 4

Week 5

Week 6-  
Intellectual  
property

Week 7- Design  
of Experiments

Week 8-  
Department  
specific  
discussions

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Journal, Year, Issue

No, the answer is incorrect.

Score: 0

Accepted Answers:

Book, Author, Publisher, Year, ISBN, Page number

4) Which of the following is an acceptable reference in a publication? **1 point**

- ☐ An article in a local edition of a popular news paper
- ☐ A doctoral thesis with an active DOI link
- ☐ A journal article which is out of print
- ☐ A private website describing the concept correctly

No, the answer is incorrect.

Score: 0

Accepted Answers:

A doctoral thesis with an active DOI link

5) Which of the following bibliographic details is a sufficient and unique piece of information to locate an article in an archival journal? **1 point**

- ☐ ISSN
- ☐ DOI
- ☐ Page Number
- ☐ Volume Number

No, the answer is incorrect.

Score: 0

Accepted Answers:

DOI

6) Bibliographic information can be stored in the following formatting options: (1) BibTeX (2) RIS (3) CSV (4) XML (5) Plain Unformatted Text. Which of the following options is a recommended set of formats to save the bibliographic data as a file on your computer? **1 point**

- ☐ Option 4 only
- ☐ Options 4 and 5
- ☐ Options 1, 2 and 4
- ☐ Option3 and 5

No, the answer is incorrect.

Score: 0

Accepted Answers:

Options 1, 2 and 4

7) Which of the following indices is considered as a measure of the activity in a particular research topic? **1 point**

- ☐ Number of subscriptions to journals that publish articles in that topic
- ☐ Number of articles in that topic being published
- ☐ Number of views of articles in that topic on the journal website
- ☐ Number of downloads of articles in that topic from the journal website

No, the answer is incorrect.

Score: 0

**Accepted Answers:***Number of articles in that topic being published*

8) While writing an article for publication in an archival journal, which of the following is necessary at the end of the article? **1 point**

- ☐ List of books in that topic
- ☐ List of all archival bibliographic items referred in the article
- ☐ List of all the bibliographic items relevant to the subject
- ☐ List of all websites referred to

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:***List of all archival bibliographic items referred in the article*

9) Which of the following is not an acceptable reference in a publication? **1 point**

- ☐ Private communication with an established scientist
- ☐ English translation of an article which in its original language is out of print
- ☐ A private website describing the concept correctly
- ☐ A doctoral thesis describing the concept correctly

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:***A private website describing the concept correctly*

10) You have read a white paper published by an organization in their website and would like to refer to it in a journal article you are writing. Which of the following describes an acceptable way to refer? **1 point**

- ☐ Author, title of the article, organization
- ☐ Author, title of the article, website containing the article, last accessed date
- ☐ Title of the article, organization, website
- ☐ Author, title of the article, website of the organization

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:***Author, title of the article, website containing the article, last accessed date*

Previous Page

End



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## Unit 6 - Week 3

### Course outline

How to access the portal

Week 1: Group Discussion on Research

Week 1: Overview of Research

Week 2: Literature Survey, Experimental skills

### Week 3

☐ Data analysis Part 1☐ Data analysis Part 2☐ Modelling skills Part 1☐ Modelling skills Part 2☐ Text file of data analysis☐ Safety in laboratory☐ Quiz : Assignment 3☐ WEEK 3 - FEEDBACK -

### Assignment 3

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2018-09-05, 23:59 IST.** assignment.

1) Identify the correct statement.

1 point

- ☐ A deterministic process always reaches a steady-state.
- ☐ Stochastic processes can sometimes not produce any outcome.
- ☐ Sinusoidal wave sensed with a sensor can be considered stochastic.
- ☐ A student's score on this assignment can be a random variable.

**No, the answer is incorrect.****Score: 0****Accepted Answers:***Sinusoidal wave sensed with a sensor can be considered stochastic.**A student's score on this assignment can be a random variable.*

2) Which of the following can be treated as deterministic signals?

1 point

- ☐ Measurements of atmospheric temperature.
- ☐ A sine wave corrupted by a rectangular pulse.
- ☐ Estimates of signals from measurements.
- ☐ None of the above.

**No, the answer is incorrect.****Score: 0****Accepted Answers:***A sine wave corrupted by a rectangular pulse.*

3) Which of the following statistics is used to quantify errors in parameter estimates?

1 point

- ☐ Mode
- ☐ Skewness

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4) Which of the following is true in data-driven analysis?

1 point

- ☐ An estimate is essentially a mathematical function of observations.
- ☐ A statistic is also a random variable.
- ☐ Estimates can never converge to the truth, even with infinite sample size.
- ☐ The value of estimate can be non-zero even if the true parameter is zero.

**No, the answer is incorrect.****Score: 0****Accepted Answers:***An estimate is essentially a mathematical function of observations.**A statistic is also a random variable.**The value of estimate can be non-zero even if the true parameter is zero.*5) Which of the following transforms are used to detect periodic (oscillatory) components in a signal? **1 point**

- ☐ Hilbert transform.
- ☐ z-transform.
- ☐ Fourier transform.
- ☐ All of the above.

**No, the answer is incorrect.****Score: 0****Accepted Answers:***Fourier transform.*6) Which of the following is true concerning a parameter estimate? **1 point**

- ☐ It is in general close to the true value with high probability.
- ☐ When averaged across a million experimental records under same operating conditions, the estimate equals the true value.
- ☐ Least squares method always gives the estimate with lowest error.
- ☐ It is a mathematical function of the observations

**No, the answer is incorrect.****Score: 0****Accepted Answers:***It is a mathematical function of the observations*7) Identify the incorrect statement(s) among the following w.r.t. non-linear models. **1 point**

- ☐ Linearization involves mere discarding of the non-linear terms in a model.
- ☐ The standard Taylor's series-based linearized model changes with the nominal point of linearization.
- ☐ A non-linear model can never yield a zero-valued output to a non-zero input.
- ☐ Estimates of linear models have smaller errors than those of non-linear models.

**No, the answer is incorrect.****Score: 0****Accepted Answers:***Linearization involves mere discarding of the non-linear terms in a model.**A non-linear model can never yield a zero-valued output to a non-zero input.**Estimates of linear models have smaller errors than those of non-linear models.*8) Which of the following is true concerning empirical (data-driven) and first-principles **1 point**

models?

- ☐ First-principles models are always non-linear, whereas data-driven models can be linear or non-linear.
- ☐ An empirical model can be sometimes used for extrapolation.
- ☐ Data-driven models can accommodate some prior knowledge of the physics underlying the process.
- ☐ First-principles models can carry a few parameters that are determined experimentally.

**No, the answer is incorrect.****Score: 0****Accepted Answers:***An empirical model can be sometimes used for extrapolation.**Data-driven models can accommodate some prior knowledge of the physics underlying the process.**First-principles models can carry a few parameters that are determined experimentally.*

9) The ratio of errors in parameter estimates of a model from two data sets with SNR 9 and 100 is **1 point**

- ☐ 3:10
- ☐ 5:1
- ☐ 10:3
- ☐ 10:0.9

**No, the answer is incorrect.****Score: 0****Accepted Answers:***10:3*

10) Identify, among the following models, the linear dynamic model(s) for a generic (discrete-time) process with input  $u[k]$  and output  $y[k]$ : **1 point**

- ☐  $y[k] = 0.75u[k-1] + u[k-10]$
- ☐  $y[k] = 2.5u^2[k-1] + 3$
- ☐  $y[k] = 2.1u[k]$
- ☐  $y[k] = u[k-1] - 2u[k-2]$ .

**No, the answer is incorrect.****Score: 0****Accepted Answers:** *$y[k] = 0.75u[k-1] + u[k-10]$*  *$y[k] = u[k-1] - 2u[k-2]$ .*

Previous Page

End





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## Unit 7 - Week 4

### Course outline

[How to access the portal](#)[Week 1: Group Discussion on Research](#)[Week 1: Overview of Research](#)[Week 2: Literature Survey, Experimental skills](#)[Week 3](#)[Week 4](#)☐ [How to make Technical presentation](#)☐ [Technical Writing](#)☐ [Discussion Activity: Learner Contributions](#)☐ [Quiz : Assignment 4](#)☐ [WEEK 4 - FEEDBACK - Introduction to research](#)

### Assignment 4

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2018-09-12, 23:59 IST.** assignment.

Indicate if the following statements are True or false

1) The title of a paper should indicate the area of work as well as what is unique about the work. **1 point**

☐ True☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**True**

2) "Pouring rain results in clogged drains, and slippery roads. These clogged drains spill further water on to the roads." Use of the word 'these' in the previous sentence is ambiguous. **1 point**

☐ True☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**False**

3) In images, high magnification is less important compared to high resolution. **1 point**

☐ True☐ False

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No, the answer is incorrect.

Score: 0

Accepted Answers:

False

5) While presenting data it is important to pay attention to the number of significant digits. 1 point

☐ True☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

6) A reasonable pace for presentation is 10 slides a minute 1 point

☐ True☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

False

7) Highlighting the presence of wires close to the engine in a photograph of a car engine, distracts from the discussion on the capacity of the car engine. 1 point

☐ True☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

8) In scientific documents sentences should be relatively short and to the point. 1 point

☐ True☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

9) Even if you know the result, it is not acceptable to state it in a scientific document using "It is obvious that..." 1 point

☐ True☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

10 Scientific documents and science fiction have the same style of writing since they both discuss science and are intended to interest the audience. 1 point

☐

True

☐

False

No, the answer is incorrect.

Score: 0

Accepted Answers:

False

Previous Page

End

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## Unit 10 - Week 7- Design of Experiments

### Course outline

How to access the portal

Week 1: Group Discussion on Research

Week 1: Overview of Research

Week 2: Literature Survey, Experimental skills

Week 3

Week 4

Week 5

Week 6- Intellectual property

Week 7- Design of Experiments

☐ DOE Part 1

☐ DOE part 2

☐ DOE part 3

☐ DOE part 4

☐ DOE part 5

### Assignment 7

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-09-26, 23:59 IST.**

1) Experiments are conducted in laboratories to

1 point

- ☐ verify scientific predictions
- ☐ obtain trends when theory is not known
- ☐ Find effect of different variables on the desired response
- ☐ All of the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*All of the above*

2) Even well planned and conducted experiments with properly calibrated instruments performed repeatedly fail to usually give identical responses because of

1 point

- ☐ Systematic effects caused by environmental factors
- ☐ random effects on which the experimenter has no control of
- ☐ system properties fluctuate wildly
- ☐ none of the above

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*random effects on which the experimenter has no control of*

3) When you do experiments repeatedly you should analyse

1 point

- ☐ the average value of the responses only
- ☐ the variability in the responses only

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4) The average estimated from a data collection is 50 cm. The quantity (quantities) which has **1 point** the same units of the data is(are)

- ☐ Standard deviation
- ☐ median
- ☐ mode
- ☐ All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

5) Data for Problems 5 and 6

1 point

Sample collected from an instrument giving binary data has the following values

{1,-1,-1,1,1,-1}

Mean of the above data set is

- ☐ -1
- ☐ 0
- ☐ 1
- ☐ 3

No, the answer is incorrect.

Score: 0

Accepted Answers:

0

6) Sample standard deviation (s) of the above data set is

1 point

- ☐ -1
- ☐ 0
- ☐ 1.095
- ☐ 1.200

No, the answer is incorrect.

Score: 0

Accepted Answers:

1.095

7)

1 point

Data for Problems 7 and 8

The probability density function for Residence Time Distribution (RTD) is defined as follows

$$f(\theta) = \frac{1}{\tau} e^{-t/\tau}$$

The given equation  $f(\theta)$  serves the necessary and sufficient condition for a continuous probability distribution because

- ☐  $\int_0^{\infty} f(\theta) = 0$
- ☐  $\int_0^{\infty} f(\theta) = \infty$
- ☐  $\int_0^{\infty} f(\theta) = 1$

☐  $\int_0^{\infty} f(\theta) = \tau$

No, the answer is incorrect.

Score: 0

Accepted Answers:

☐  $\int_0^{\infty} f(\theta) = 1$

8) The mean value of the distribution, is

1 point

☐  $\tau$

☐ 0

☐  $\infty$

☐  $\tau/2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

☐  $\tau$

9) In a normal distribution with parameter  $\mu$  and  $\sigma^2$ , the

1 point

☐ mean  $\neq$  median  $\neq$  mode

☐ distribution is not symmetric about the mean

☐ mean is always zero

☐ None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

None of the above

10) ONE of the following is ALWAYS correct, where  $\bar{x}$  is the sample mean and n is the sample size

1 point

☐  $\sum_{i=1}^n (x_i - \bar{x}) = 0$

☐  $\sum_{i=1}^n (x_i - \bar{x})^2 = 0$

☐  $\sum_{i=1}^n |x_i - \bar{x}| = 0$

☐  $\sum_{i=1}^n (x_i - \bar{x})^{0.5} = 0$

No, the answer is incorrect.

Score: 0

Accepted Answers:

☐  $\sum_{i=1}^n (x_i - \bar{x}) = 0$

Previous Page

End



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## Unit 3 - Week 1: Group Discussion on Research

[Register for Certification exam](#)

### Course outline

[How to access the portal](#)[Pre-requisite Assignment](#)[Week 1: Group Discussion on Research](#)[Part 1](#)[Part 2](#)[Part 3](#)[Part 4](#)[Quiz : Assignment 1](#)[WEEK 1 FEEDBACK - Introduction to Research](#)[Week 1: Overview of Research](#)[Week 2: Literature Survey, Experimental skills](#)[Week 3](#)

### Assignment 1

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-03-13, 23:59 IST.**

Read the passage below and answer the questions that follow:

#### Engineers and Scientists:

We live in a world that is filled with a wide range of technologies that we use and we take for granted. The speed with which new technologies appear and disappear is constantly increasing. These days many of the gadgets we buy get outdated in a time frame of two to three years. This is a short time frame since many of the technologies in use are robust enough to physically last several years. However, in terms of features and utility, they get outdated much sooner than that. This is also a short time frame relative to how long technologies were used two or three decades ago. An example is the media used to store music. While gramophone records and cassettes lasted decades, DVDs have fast disappeared. Almost any mobile phone or computer purchased these days become obsolete in two to three years.

Behind this vast moving world of technologies, is a worldwide army of scientists and engineers. They are constantly on the prowl for making advances to existing technologies. Many industries, companies, and educational institutions are filled with scientists and engineers. While there may be some similarities in the tasks they are involved in, there are also some differences.

An engineer in an industry setting usually faces several technical trouble shooting challenges. Such challenges, with stiff timelines, require substantial familiarity with information databases, and characterization techniques, to be successfully addressed. Addressing trouble shooting challenges are often based on the selection and use of the best available resources and substitutes. The types of questions the engineer is faced with include questions of the sort:

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<p><b>Week 7- Design of Experiments</b></p> <hr/> <p><b>Week 8- Department specific discussions</b></p> <hr/> <p><b>DOWNLOAD VIDEOS</b></p> <hr/> <p><b>TEXT TRANSLATION</b></p> <hr/> <p><b>TEXT TRANSCRIPTS</b></p> <hr/> <p><b>Interaction Session</b></p>	<p>customers at lower costs and with greater reliability.</p> <p>A scientist in a university or laboratory setting faces a different kind of challenge. The questions the scientist wishes to answer are:</p> <ol style="list-style-type: none"> <li>1) Why is the value of any specific property of a material what it is?</li> <li>2) What is the fundamental science behind the property?</li> <li>3) What are the limits, if any, to this property?</li> </ol> <p>Answers to such questions enable one to design new materials and to push the capabilities of existing materials.</p> <p>Based on the professional setting a materials specialist ends up in, he/she will likely get pulled into one of the above types of activities. However having both - a good feel for the fundamental sciences, as well as an understanding of the engineering approach to relate to the real world, can greatly enhance the value of a materials scientist/engineer to his or her organization.</p> <p>At the same time, it usually takes considerable experience to fully understand, appreciate, and make use of the linkages between fundamental science and the world of engineering. Experience and systematic studies provide us with the insight to make the connections between the real world inventions and the science behind them. Such insight helps us truly appreciate the contributions of the scientist as well as the engineer in shaping our interactions with the world around us. Such insight, also enables us to take our technical pursuits to greater heights and wider reaches, and hence is desirable.</p> <p>1) Technologies in use today have life span of decades <span style="float: right;">1 point</span></p> <p><input type="radio"/> True <input type="radio"/> False</p> <p><b>No, the answer is incorrect.</b> <b>Score: 0</b> <b>Accepted Answers:</b> <i>False</i></p> <p>2) Engineers aim to reduce the number of parts in a product <span style="float: right;">1 point</span></p> <p><input type="radio"/> True <input type="radio"/> False</p> <p><b>No, the answer is incorrect.</b> <b>Score: 0</b> <b>Accepted Answers:</b> <i>True</i></p> <p>3) Industry aims to satisfy its customers with respect to cost and reliability <span style="float: right;">1 point</span></p> <p><input type="radio"/> True <input type="radio"/> False</p> <p><b>No, the answer is incorrect.</b> <b>Score: 0</b> <b>Accepted Answers:</b> <i>True</i></p>
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4) Reproducibility of parts is an important target in industries

1 point

- ☐ True  
☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True



5) Scientists try to determine the root cause of a property of a material 1 point



- ☐ True  
☐ False



No, the answer is incorrect.

Score: 0

Accepted Answers:

True



6) Engineers cannot do scientific work

1 point

- ☐ True  
☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

False

7) Scientists cannot do engineering

1 point

- ☐ True  
☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

False

8) It is useful to have both a good feel for the fundamental sciences, as well as an understanding of the engineering approach 1 point

- ☐ True  
☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True

9) Typically, anyone can quickly and easily understand the relationship between science and engineering 1 point

- ☐ True  
☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

False

10) Understanding the relationship between fundamental science and applied engineering is typically useless in most fields **1 point**

- ☐ True  
☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*False*



Previous Page

End



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## Unit 7 - Week 4

[Register for Certification exam](#)

### Course outline

[How to access the portal](#)[Pre-requisite Assignment](#)[Week 1: Group Discussion on Research](#)[Week 1: Overview of Research](#)[Week 2: Literature Survey, Experimental skills](#)[Week 3](#)[Week 4](#)☐ [How to make Technical presentation](#)☐ [Experimental skills](#)☐ [Technical Writing](#)☐ [Safety in laboratory](#)☐ [Quiz](#)

### Assignment 4

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-03-27, 23:59 IST.**

1) Wet hands is a safety hazard while running any experiment or operating any equipment that uses electricity **1 point**

- ☐ True  
☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**True**

2) While using pressurised gas bottles, it is necessary to secure them using a chain, close to the base of the bottle, in order to prevent toppling **1 point**

- ☐ True  
☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**False**

3) Eye protection requires shatter resistant glasses that also provide shielding to the sides of the eyes **1 point**

- ☐ True  
☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**True**

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Week 6- Intellectual property	Score: 0 Accepted Answers: False	
Week 7- Design of Experiments	5) The language used in technical documents must aim to avoid ambiguity.	1 point
Week 8- Department specific discussions	<input type="radio"/> True <input type="radio"/> False No, the answer is incorrect. Score: 0 Accepted Answers: True	  
DOWNLOAD VIDEOS		
TEXT TRANSLATION	6) It is useful to use phrases such as "It is obvious..." to help emphasize the results.	1 point
TEXT TRANSCRIPTS	<input type="radio"/> True <input type="radio"/> False No, the answer is incorrect. Score: 0 Accepted Answers: False	
Interaction Session	7) A good scientific presentation does not require to be modified for different audiences	1 point
	<input type="radio"/> True <input type="radio"/> False No, the answer is incorrect. Score: 0 Accepted Answers: False	
	8) Scientific documents aim to inform the readers in an efficient manner	1 point
	<input type="radio"/> True <input type="radio"/> False No, the answer is incorrect. Score: 0 Accepted Answers: True	
	9) The pace of the presentation, both in terms of number of slides per minute as well as the pace of talking, must allow the audience enough time to absorb the details of the work being presented	1 point
	<input type="radio"/> True <input type="radio"/> False No, the answer is incorrect. Score: 0 Accepted Answers: True	
	10) It is important to complete a technical presentation with a summary	1 point

of the main points of the presentation

- ☐ True
- ☐ False

No, the answer is incorrect.

Score: 0

Accepted Answers:

True



Previous Page

End



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[Courses » Introduction to Research](#)[Announcements](#)[Course](#)[Ask a Question](#)[Progress](#)[FAQ](#)

## Unit 8 - Week 5

[Register for  
Certification exam](#)

### Course outline

[How to access  
the portal](#)[Pre-requisite  
Assignment](#)[Week 1: Group  
Discussion on  
Research](#)[Week 1:  
Overview of  
Research](#)[Week 2:  
Literature  
Survey,  
Experimental  
skills](#)[Week 3](#)[Week 4](#)[Week 5](#)

- ☐ Creativity in Research Part 1
- ☐ Creativity in research Part 2
- ☐ Creativity in research Part 3
- ☐ Ethics in

### Assignment 5

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-04-03, 23:59 IST.**

1) There is limited scope for creativity in Science fiction, since it is based on science **1 point**

- ☐ True  
☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**False**

2) Getting a PhD means you gain broad knowledge over a wide range of topics **1 point**

- ☐ True  
☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**False**

3) People who can accurately copy other people's work, are generally considered creative - **1 point**

- ☐ True  
☐ False

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**False**

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Week 6- Intellectual property	Accepted Answers: True	5) A common factor across most successful people is hard work	1 point
Week 7- Design of Experiments		<input type="radio"/> True <input type="radio"/> False	
Week 8- Department specific discussions	No, the answer is incorrect. Score: 0 Accepted Answers: True		 
DOWNLOAD VIDEOS		6) Great work does not always need a conducive environment	1 point
TEXT TRANSLATION		<input type="radio"/> True <input type="radio"/> False	 
TEXT TRANSCRIPTS	No, the answer is incorrect. Score: 0 Accepted Answers: True		
Interaction Session		7) Quality of a researcher is based on recognition by the local neighbourhood of the researcher	1 point
		<input type="radio"/> True <input type="radio"/> False	
	No, the answer is incorrect. Score: 0 Accepted Answers: False		
		8) Confidentiality is a very important aspect associated with the ethics concerning data from people	1 point
		<input type="radio"/> True <input type="radio"/> False	
	No, the answer is incorrect. Score: 0 Accepted Answers: True		
		9) Informed consent is not necessary for testing medicines on patients when the likely benefit to society is high	1 point
		<input type="radio"/> True <input type="radio"/> False	
	No, the answer is incorrect. Score: 0 Accepted Answers: False		
		10) It is believed that 10,000 hours of practise is required to become an expert in any field	1 point
		<input type="radio"/> True <input type="radio"/> False	



No, the answer is incorrect.

Score: 0

Accepted Answers:

*True*

Previous Page

End



सहायता

सहायता

Unit 4 - Week 2: Literature Survey, Experimental skills

Course outline

How to access the portal

Week 1: Group Discussion on Research

Week 1: Overview of Research

Week 2: Literature Survey, Experimental skills

- Overview of Literature Survey
- Literature Survey using WebofScience
- Literature Survey using Scopus
- Writing Up
- Tutorial on using BibTeX with LaTeX to add references to a document
- Tutorial on using Microsoft Word with Bibliographic Sources
- Tutorial on using Microsoft Word with endnote entries
- Experimental skills
- Quiz : Assignment 2
- Introduction to Research : Week 2 Feedback form

Week 3

Peer Review Assignment - Week 3

Week 4

Week 5

Week 6- Intellectual property

Week 7- Design of Experiments

Week 8- Department specific discussions

Text Transcripts

Transcripts Book

VIDEO DOWNLOAD

Assignment 2

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

Due on 2019-09-11, 23:59 IST.

- 1) Literature survey is important because

1 point
- It helps in getting a summary of work that has been done till date in some particular research area
- It is helpful in ensuring that a research work is not getting repeated
- It is helpful is understanding the approaches taken by scientists and what are the gaps in the processes
- It is helpful in clarifying the controversial results that one can get

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
It helps in getting a summary of work that has been done till date in some particular research area  
It is helpful in ensuring that a research work is not getting repeated  
It is helpful is understanding the approaches taken by scientists and what are the gaps in the processes  
It is helpful in clarifying the controversial results that one can get

- 2) A research document should contain the following to be used as a reference in a publication

1 point
- International standard book number (ISBN)
- International standard serial number (ISSN)
- Wikipedia link
- Digital Object Identifier(DOI) number: online publication

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
International standard book number (ISBN)  
International standard serial number (ISSN)  
Digital Object Identifier(DOI) number: online publication

- 3) The following are categorized as primary source for literature survey

1 point
- Periodicals & research reports
- Conference proceedings & official publications
- Compilations & reviews
- Directories & year books

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Periodicals & research reports  
Conference proceedings & official publications

- 4) Which one of the following methods will be most helpful during searching literature to know the earliest publication in that area?

1 point
- Back reference based search following a keyword based search
- Citation based search followed by sorting by location of publication
- Keyword based search followed by sorting by year of publication
- Keyword based search followed by sorting by citations

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Back reference based search following a keyword based search

- 5) Experimental data generated from a setup must validate the theoretical predictions or models designed for that setup

1 point
- True
- False
- Sometimes
- Never

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Sometimes

- 6) The readings of electronic display mounted over the laboratory equipment are reliable information to carry out calculations

1 point
- True
- False

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
False

- 7) Which of the following can be used to store the bibliographic information while saving as a file in your computer?

1 point
- XML format
- End note format
- BibTex format
- None of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
XML format  
End note format  
BibTex format

- 8) H-index primarily refers to

1 point
- How many times a journal paper has been read by other journals
- How many times an author's paper has been cited
- How many times a journal paper has been cited by research in same journal
- A tool to compare the impact factor of journals

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
How many times an author's paper has been cited

- 9) The abstracting databases for systematic manual searches include

1 point
- INSPEC and COMPENDEX
- PubMed
- Wikipedia
- Chemical Abstract (CA) service

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
INSPEC and COMPENDEX  
PubMed  
Chemical Abstract (CA) service

- 10)While writing an article for a publication the following information must be taken care of

1 point
- List of all the text books and references from Google links
- All the websites that were referred during literature survey
- Wikipedia links for the information included in the article from Wikipedia
- The article must include all the bibliographic details at the end

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
The article must include all the bibliographic details at the end







