Question 1

Based on the main experimental designs, mark the correct alternative:

Answer	feedback
a) Cohort studies are more relevant when compared to case-control studies because they are able to infer causality	Incorrect – Based on the new scientific evidence pyramid there is no more relevant design. The best design is the one that gives the right answer to the right question
b) When conducting a preclinical study, the investigator may or may not choose to use basic research principles such as blinding and randomization.	Incorrect – Basic research principles should be employed regardless of the experimental design chosen to increase the internal validity of the findings.
c) Case-control studies are the most suitable for evaluating new drugs	Incorrect – Randomized clinical trials are the most indicated design for this purpose.
d) Evidence-based medicine is not restricted to randomized clinical trials and meta-analyses. It involves tracking the best evidence to answer our clinical questions.	Correct

Question 2

The main objective of Randomization in a Randomized Clinical Trial is:

Answer	feedback
a) Ensure that study subjects are representative of the general population	Incorrect – The step that guarantees representativeness is the sampling procedures
b) Ensuring the double-blinding of the study	Incorrect – Double blinding is conducted at the time of blinding patients and study investigators
c) Reduce selection bias in treatment allocation	Correct
d) Ensuring a balance between groups for known factors that influence treatment outcome	Incorrect - One of the main objectives of randomization is to ensure a balance between groups for known and mostly unknown factors that impact treatment outcome.

Question 3

The purpose of a double-blind study is to:

Answer	feedback
a) Provide comparability between treated and untreated patients	Incorrect – This purpose is achieved by randomization
b) Avoid observer and patient bias	Correct
c) Reduce the effects of sampling variation	Incorrect – This effect is reduced by defining a greater number of inclusion criteria for the participants.
d) Avoid patient bias and sampling variation	Incorrect – The sampling variation is reduced by defining a greater number of inclusion criteria for the participants

Question 4

An advertisement in a medical journal stated that "2000 subjects with sore throat were treated with a new drug. In 4 days, 94% were asymptomatic, confirming the effectiveness of the drug". Based on the evidence above, the statement:

Answer	feedback
a) Is correct	Incorrect – The lack of a control group does not allow inference of efficacy.
b) May be incorrect as sample size appears to be small	Incorrect – Studies with 2000 participants generally have adequate power to demonstrate significant differences.
c) May be incorrect as no statistical significance test was used	Incorrect – Even if a statistical test is performed, it is not possible to say that the drug was effective because there is no comparison/control group.
d) May be incorrect as no comparison or control group was used	Correct

Question 5

In a case-control study in patients with pancreatic cancer, 17% were found to be diabetic at the time of diagnosis, compared to 4% of an appropriately matched control group (by age, sex, ethnic group, and several other characteristics) screened for diabetes in the same period and in the same hospital that the cases were diagnosed. It is concluded that diabetes played a causal role in the establishment of pancreatic cancer. This conclusion:

Answer	feedback
a) It's correct	Incorrect – Case-control studies are not able to infer causality
b) May be incorrect as there is no comparison group	Incorrect – There is a control (comparison) group adequately matched for relevant factors
c) May be incorrect because it fails to establish the temporal sequence between the onset of diabetes and the diagnosis of pancreatic cancer	Correct
d) May be incorrect as controls were not properly selected	Incorrect – Controls were appropriately selected at the same time period, in the same hospital, and matched for important disease-related factors.

Question 06

Residents of three villages with three different types of fluoride concentrations in the water supply were invited to participate in a study to evaluate prevalence of fluorosis. All individuals residing in the 3 villages were examined and the results computed and compared. What is the correct classification for this study?

Answer	feedback
a) Cross-sectional study	Correct
b) Experimental study	Incorrect – No intervention was tested. The aim of the analysis was to assess the prevalence of fluorosis
c) Retrospective cohort study	Incorrect – for retrospective cohort studies we select a sample with and without the disease/condition and we search the exposure degree to the risk factor.
d) Prospective cohort study	Incorrect – In this study design, a sample of the population is selected, and part of them have the risk factor and other part don't. From this sample, one or more evaluations are made over time and measured how many people with the risk factor did or did not develop the disease and how many people without the risk factor did or did not develop the disease.

Question 07

In a study that began in 2002, a group of 3000 teenagers was followed to assess the relationship between energy drink consumption and tooth erosion. The occurrence of dental erosion was carried out in 2010 and 2015. This is an example of:

Answer	feedback
a) Cross-sectional study	Incorrect - Cross-sectional studies assess a group of individuals at a single point in time. They can be compared to a photograph.
b) Experimental study	Incorrect – No intervention was tested. The aim of the analysis was to assess the occurrence of dental erosion
c) Retrospective cohort study	Incorrect – for retrospective cohort studies we select a sample with and without the disease/condition and we search the exposure degree to the risk factor.
d) Prospective cohort study	Correct

Question 08

Records of dental examinations of patients seen at the Faculty of Dentistry in 1995 were examined in 2005 to verify whether there was a relationship between smoking, visible plaque and gingival bleeding. This is an example of:

Answer	feedback
a) Cross-sectional study	Incorrect - Cross-sectional studies assess a group of individuals at a single point in time. They can be compared to a photograph.
b) Experimental study	Incorrect – No intervention was tested. The aim of the analysis was to assess the relation between smoking, visible plaque and gingival bleeding. The assessment was conducted in the present with a focus on past data.
c) Retrospective cohort study	Correct
d) Prospective cohort study	Incorrect – In this study design, a sample of the population is selected, and part of them have the risk factor and other part don't. From this sample, one or more evaluations are made over time and measured how many people with the risk factor did or did not develop the disease and how many people without the risk factor did or did not develop the disease.

Question 09

Considering the systematic reviews, mark the correct alternative:

Answer	feedback
a) The I^2 is a measure of inconsistency between studies and its result refers to how much the differences between groups were due to chance.	Incorrect – The I2 statistics refers to heterogeneity which refers to the variability between studies
b) A systematic review with well-designed primary studies is still not able to change a behavior demonstrated in a clinical trial with a large sample size	Incorrect - This is precisely the ideal scenario for a change in clinical conduct: a well-designed systematic review with primary studies of good methodological quality
c) The Graph that expresses the publication bias of a systematic review is the Forrest Plot	Incorrect - The Graph that expresses the publication bias of a systematic review is the Funnel Plot
d) Publication bias stems from the fact that studies with statistically significant results are more likely to be accepted for publication. Consequently, there is a risk that the meta-analysis estimates are underestimated.	Correct