

DPT 4th Semester

Course Title: Exercise Physiology

Instructor:

Ahmed Hayat

Student Name: Syed Muhammad Raahim

ID: 14838

Final Term Assignment

Marks: 50

NOTE: Mention your name and roll number on the assignments.

Q1: If you lifted a 10-kilogram (Kg) weight upward over the distance of 2 meters (m), the work performed would be?

Calculate Work.

Ans:

Given data :

Mass of an object lifted upward = 10 Kg

Height = 2 meters

Acceleration due to gravity = 9.8m/sec²

Required:

Work done (W) =?

Solution :

In this case Work done = Potential energy (P.E)

$$W = P.E$$

$$\text{As } P.E = mgh$$

So putting this formula in place of P.E we get :

$$W = mgh$$

Putting values we get :

$$W = 10 \text{ kg} \cdot 9.8 \text{ m/sec}^2 \cdot 2 \text{ m}$$

$$W = 10 \cdot 9.8 \cdot 2 \text{ (kg m / sec}^2 \text{)}$$

$$W = 196.0 \text{ kg m / sec}^2$$

$$W = 196.0 \text{ joule .}$$

Q2: Enlist basic principles of the training?

Ans: Basic principles of training:

1. Overload
2. Progression
3. Recovery
4. Specificity
5. Reversibility
6. Individual response to training stimulus

Overload:

For any adaptation to take place, the human body is required to exert itself beyond the normal stress levels of training. Put simply, you need to 'suffer' in training in order to progress. This doesn't mean every single session you need to be putting yourself in the 'pain cave' but you will need to check in regularly to ensure you are pushing yourself enough for the body to reset its current fitness levels.

Progression:

I like to think of progression as a very close relation of overload. Overload refers to the stress of a single session, progression relates to the short, medium and long-term development of an athlete. In a well-periodized program, the athlete should be challenged regularly to attain new levels of fitness to ensure better performance is given. The higher the caliber of the athlete the more difficult this becomes to eli

Recovery:

The adaptation to overload occurs during rest periods. When you are pushing your limits you are in the process of breaking down your body. During the recovery phase, the body experiences a 'super-compensation' which results in the body adjusting to new levels of fitness. Remember you cannot expect to feel recovered

for every session—and if you waited for full recovery between every session you would get very little done. It is OK and normal to train tired and fatigued. Then when proper and planned phases of recovery are prescribed you can expect to feel amazing! It.

Specificity:

This put simply means that you'll get better at what you do. If you want to improve your swimming, then swim more. If you want to improve you're riding, then ride more. If you want to improve your running, then run more. There are many other modalities of exercise that will have some transfer regarding their benefit to you, but nothing beats training specifically for the disciplines you are trying to improve.

Reversibility:

This one is easy... Use it or lose it. Failure to regularly adhere to your training program will result in you going backward. So that massive training block you did 6 months ago

Individual Response to Training Stimulus:

This is probably where I see the biggest mistakes made by coaches and athletes. Unfortunately, one size does not fit all, so when one athlete has a great response

to a training program the temptation is there to try and get everyone to follow the same program. Whilst we need to consider and incorporate all the principles above, how we apply these in a practical sense is more art than science. A great coach will identify innate differences and variances within each individual athlete and work to determine.

Try to keep all this in mind when you are preparing your next training block. A fancy training program doesn't mean it is effective. Just ask Craig Alexander—he will tell you that his training sessions are often quite boring.

Q3: Describe preload and afterload in simple words.

Ans: Preload

Preload, also known as the left ventricular end-diastolic pressure (LVEDP), is the amount of ventricular stretch at the end of diastole. Think of it as the heart loading up for the next big squeeze of the ventricles during systole. Some people remember this by using an analogy of a balloon – blow air into the balloon and it stretches; the more air you blow in, the greater the stretch.

Afterload

Afterload, also known as the systemic vascular resistance (SVR), is the amount of resistance the heart must overcome to open the aortic valve and push the blood volume out into the systemic circulation. If you think about the balloon analogy, afterload is represented by the knot at the end of the balloon. To get the air out, the balloon must work against that knot.

Q4: What are the factors increasing stroke volume?

Ans: There are three factors that affect stroke volume.

1. Preload
2. Contractility
3. Afterload

The first factor we will examine is preload. Preload is the amount of ventricular muscle stretch caused by the end diastolic volume increased preload results in a greater stroke volume of 90 milliliters being ejected.

The second factor affecting stroke volume is contractility. Increased sympathetic activity increases contractility, so more blood is ejected with each contraction. This results in a lower ESV at the end of contraction. Consequently, an enhanced stroke volume is ejected with the same preload.

The third factor affecting stroke volume is afterload. In order for the ventricle to eject blood, it has to generate enough pressure to open the semilunar valve.

Q5: Differentiate between isometric, isotonic and isokinetic exercises.

Ans: Isometric:

Isometric means "same length," so that your muscles do not get longer or shorter by bending a joint.

Isotonic:

Isotonic means "same tension" so that the weight on your muscles stays the same.

Isokinetic:

Isokinetic means "same speed" so that your muscles are contracting at the same speed throughout the workout.