

DPT 4th Semester

Course Title: Exercise Physiology

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Final Term Assignment

Marks: 50

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

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

Data:

$$m=10\text{kg}$$

$$d=2\text{m}$$

$$w=?$$

Formula:

$$\text{Work} = \text{force} * \text{distance}$$

$$\text{Force}=?$$

To find force :

$$F=mg \quad \sim g=9.8\text{ms}^{-2}$$

$$F=10(\text{kg}) * 9.8\text{ms}^{-2}$$

$$F=98\text{N}$$

$$W=f*d$$

$$W=98\text{N}*2\text{m}$$

$$W=196\text{J}$$

2- Enlist basic principles of the training.

Answer: Basic principles of training :

1. Individuality
2. Specificity
3. Progress
4. Overload
5. Adaptation
6. Recovery
7. Reversibility

3- Describe preload and afterload in simple words.

Answer:

Preload: Preload also known as the left ventricular end diastole. Think of it as the heart loading up for the next squeeze of the ventricle during systole. Some people remember this by using an analogy of a balloon e.g. blow air into the balloon and it stretches , the more air you blow in , the greater the stretch.

Afterload: : Afterload , is also known as the systemic vascular resistance (SVR) , is the amount of resistance the heart must over come to open the aortic valve and push the blood volume out into the systemic circulation.

If you think about the balloon analogy , afterload is presented by the knot at end of the balloon . To get the air out , the balloon must work against the knot.

4- What are the factors increasing stroke volume.

Answer:

Stroke volume index: Stroke volume index is the volume of blood pumped by the heart with each beat(in milliliters) divide by the body surface area (square meter). This allow direct comparison of the stroke volume index of large and small patients.

Stroke volume index is determined by three factors:

- Period: The filling pressure of the heart at the end of diastole.
- Contractility: The inherent vigor of contraction of the heart muscles during systole.

- Afterload: The pressure against which the heart must work to eject the blood during systole

Starling's law is the relationship between the preload and stroke volume.

The Frank-Starling law of the heart represents the relationship between stroke volume and end diastolic volume. The law states that the stroke volume of the heart increases in response to an increase in the volume of blood in the ventricle, before contracting. When all other factors remain constant.

5. Differentiate between isometric, isotonic and isokinetic exercises.

Isometric Exercises: It is the type of low-impact exercises that involves straining your muscles without moving or bending your joints. A prime example is holding your body in a plank position. You stay at the top of push up without bending your elbow.

Isometric exercises are good for maintaining your strength and stability. For instance, if you train by doing a plank pose, it can help you hold a plank position for an extended period of time, but won't necessarily help you do more push ups. Isometric is often recommended for the people who are recovering from an injury or who suffer from joint pain like arthritis. Evidence is growing that isometric exercises may help lower blood pressure.

Isotonic Exercises: It involves putting a constant amount of weight or tension on your body while moving your joints to a full range of motion.

An example is bench pressing, as the amount of the weight remains the same and your joints bend and straighten all the way. Squats are another form of isotonic exercises, using your body weight to tense the muscles and moving your knees through their full range of motion.

Isotonic exercises can help strengthen and build muscles so that they can move through all kinds of motion with great ease.

"This type of training is what most people do in the gym and has benefits for preserving strength as we age," says smart.

Isokinetic Exercises: Isokinetic exercises is a type of workout that involves specialized machines and it is not used by average person. “It is mostly used to train the athletes to improve their running or throwing by improving the speed at which they can move their limbs / body or a weight ” Smart says.

The equipment used for isokinetic exercises, known as an isokinetic dynamometer , keeps your muscles moving at a consistent speed , which can then be raised with ongoing training. This can help athletes like baseball pitchers or javelin throwers learn to use their maximum for at higher speeds, Smart says.

Isokinetic exercise can also be use to assess the muscles function of athletes or people with specific injuries.