

National Testing Agency

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Biomechanics

Group Number : 1
Group Id : 90958235
Group Maximum Duration : 0
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Break time: 0
Group Marks: 100

Biomechanics

Section Id : 90958235
Section Number : 1
Section type : Online
Mandatory or Optional: Mandatory
Number of Questions: 100
Number of Questions to be attempted: 100
Section Marks: 100
Display Number Panel: Yes
Group All Questions: No

Sub-Section Number: 1
Sub-Section Id: 90958237
Question Shuffling Allowed : Yes

Question Number : 1 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Under normal forward bending (flexion), the spinal cord experiences

- Tension on the posterior side and compression on the other side.
- Tension on the anterior side and compression on the other side.
- Shear stress on the posterior side and normal stress on the other side.
- Bending moment on the anterior side and tension on the other side.

Options :

1. A
2. B
3. C
4. D

Question Number : 2 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A gymnast on a balance beam quickly squats to regain his balance, what could be his biomechanical strategies?

- a. to increase momentum by changing momentary body mass
- b. to increase impact by changing the motion direction
- c. to decrease the moment of inertia by changing the location of the center of mass
- d. to decrease base of support by changing body configuration

Options :

1. A
2. B
3. C
4. D

Question Number : 3 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The creep phenomenon of a ligament indicates that _____.

- a. the deformation increases quickly at first as the amount of the load remains constant over a period of time
- b. the load decreases as time increases if the deformation keeps the same
- c. the energy absorbed by the tendon on a loading and unloading cycle.
- d. the ultimate tensile strength of a ligament on the stress-strain curve.

Options :

1. A
2. B
3. C
4. D

Question Number : 4 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Endoskeleton involves

- a. Covering of skin, hair, nails
- b. Bones and cartilages
- c. Bones only
- d. None of the above.

Options :

1. A
2. B
3. C
4. D

Question Number : 5 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A ballet dancer rotates his body in the air with his arm by sides at a certain rotational velocity (ω) and the moment of inertia is equal to I . If he wants to reduce his rotational velocity by half ($\omega/2$), what should he do?

- a. to flex his hips up
- b. to lift his arms out
- c. to bend his knees
- d. to put his hand on the head

Options :

1. A
2. B
3. C
4. D

Question Number : 6 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The strength of a collagen fiber is defined as

- a. the stress which the fiber can sustain before failure
- b. the strain which the fiber can sustain before failure
- c. the energy which the fiber can store before failure
- d. all of the above

Options :

1. A
2. B
3. C
4. D

Question Number : 7 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

By comparing the mechanical properties of bone and collagen fibers, which of the following statements is *NOT TRUE*?

- a. Both bone and collagen fibers increase in strength and stiffness with an increased speed of loading
- b. Both bone and collagen fibers remodel in response to the mechanical demands placed upon it.
- c. Both bone and collagen fibers withstand high tensile loads more than compression loads.
- d. Both bone and collagen fibers behave like a viscoelastic material.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 8 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Exoskeleton involves

- a. Covering of skin, hair nails
- b. Bones and cartilages
- c. Long bones only
- d. Short bones only

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 9 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The yield point of a bone indicates

- a. the slope of the stress-strain curve in the elastic region
- b. the transition point from the elastic region to the plastic region
- c. the point that the bone can sustain before failure
- d. all of the above

Options :

- 1. A
- 2. B
- 3. C

4. D

Question Number : 10 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

'Neck joint' is an example of

- a. Pivot joint
- b. Hinge joint
- c. Saddle joint
- d. Condyloid joint.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 11 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

'Trapezius' muscles help in

- a. Pushing the neck backward
- b. Punching
- c. Raising the leg forward
- d. None of the above.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 12 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Study of joints is called

- a. Kinesiology
- b. Biology
- c. Anthropometry
- d. Anthology.

Options :

- 1. A
- 2. B
- 3. C

4. D

Question Number : 13 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Assume a leg has 12m shaft of bone with an average cross sectional area of 3 cm². What is the amount of shortening when all of the body weight 700 N is supported on this leg? (Young modulus of bone = 1.8 X 10¹⁰ N/m²)

- a. 0.15 mm
- b. 1.5 mm
- c. 0.51 mm
- d. 5.1 mm

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 14 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The load from head to pelvis is conveyed by ...

- a. chest bone
- b. spinal column
- c. femur
- d. shoulder

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 15 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Collagen acts like a mechanical

- a. Lever
- b. spring
- c. load
- d. actuator

Options :

- 1. A

2. B
3. C
4. D

Question Number : 16 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

'Hunch back' is also known as

- a. Back pain
- b. scoliosis
- c. lordosis
- d. kyphosis.

Options :

1. A
2. B
3. C
4. D

Question Number : 17 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Failure of implants, devices or prostheses may be due to which of the following factors?

- a. The interface may deteriorate
- b. Changes to tissues at the implant interface
- c. Mismatch of biomechanics at the tissue–implant interface
- d. All a, b, c

Options :

1. A
2. B
3. C
4. D

Question Number : 18 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The microstructure of a metal affects its mechanical strength in which of the following ways?

- a. Yield strength (σ yield) decreases as grain size (D) increases.
- b. Yield strength (σ yield) increases as grain size (D) decreases.
- c. A metal with large grains will bend more easily than a metal with small grains.
- d. All a, b, c are possible ways

Options :

1. A

2. B
3. C
4. D

Question Number : 19 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ultimate tensile strength for a Ti alloy (Ti_6-Al_4-V) has what value?

- a. 900 MPa
- b. 3000 MPa
- c. 6000 MPa
- d. 9000 MPa

Options :

1. A
2. B
3. C
4. D

Question Number : 20 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Side ward curvature of the spine is called

- a. knock knee
- b. kyphosis
- c. Scoliosis
- d. lordosis.

Options :

1. A
2. B
3. C
4. D

Question Number : 21 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A shape memory effect alloy may be used for which of the following medical applications?

- a. Artificial kidney pump
- b. Total hip prosthesis
- c. Brain electrodes
- d. None of these

Options :

1. A
2. B
3. C
4. D

Question Number : 22 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Applying a bioactive or porous coating to a titanium alloy implant may heat the metal to 800 °C. Which of the following may result?

- a. The grain size decreases.
- b. The yield strength decreases.
- c. The yield strength increases.
- d. The modulus of elasticity increases.

Options :

1. A
2. B
3. C
4. D

Question Number : 23 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements related to corrosion of metallic implants are NOT correct?

- a. Corrosion of metals can release harmful elements, such as chromium into the body.
- b. Body fluids have the same effect on metallic corrosion as distilled water.
- c. Stainless steel screws should not be used with a titanium bone plate due to galvanic corrosion.
- d. Chloride and hydrogen ions accelerate corrosion of most metal alloys.

Options :

1. A
2. B
3. C
4. D

Question Number : 24 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The path of an object project projected into free air space is known as

- a. Speed
- b. abnormal curve
- c. Velocity
- d. parabola.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 25 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The stress–strain curve for an alumina bioceramic differs from Ti metal alloy (Ti6–Al4–V) in which of the following ways?

- a. Higher strain to failure
- b. Lower strain to failure
- c. Both a & b are true
- d. Both a & b are false

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 26 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A bioactive ceramic did not have which of the following characteristics in the body?

- a. Very high strength
- b. Interfacial bonding to living tissues
- c. Controlled rates of surface reactions
- d. Able to be used as powders, coatings or scaffolds

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 27 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which has the LEAST structural order?

- a. Al_2O_3 polycrystalline ceramic
- b. Al_2O_3 single crystal ceramic
- c. $\text{SiO}_2\text{--CaO--Na}_2\text{O--P}_2\text{O}_5$ glass
- d. Glass-ceramic

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 28 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Boxer's muscles are

- a. trapezius
- b. sterno cliedo mastoid
- c. Abdominal
- d. Deltoid

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 29 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Increased crystallinity in polymers increases which of the following property?

- a. Diffusion of water
- b. Creep
- c. Strain to fracture
- d. Non-linear viscoelasticity

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 30 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which methods *cannot* be used to make a thermoplastic polymer into a special shape?

- a. Melt casting
- b. Compression moulding
- c. Extrusion
- d. Injection moulding

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 31 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is not a design objective for composite?

- a. Obtain properties not available for single phase materials
- b. Tailor strength and stiffness to meet specific clinical requirements
- c. Reduce processing costs of single phase materials, such as glasses, metals or ceramics
- d. Achieve anisotropic properties

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 32 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

'Neck joint' is an example of

- a. Pivot joint
- b. Hinge joint
- c. Saddle joint
- d. Condyloid joint.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 33 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which material has an elastic modulus and strength similar to cortical bone?

- a. Alumina
- b. Stainless steel
- c. Hydroxyapatite (HA)
- d. BG/PS composite

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 34 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A quality index (Iq) for a bone replacement composite is based upon what properties?

- a. Elastic modulus
- b. Bioactivity
- c. Fracture toughness
- d. All of the above

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 35 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which inert ceramic composites based upon carbon fibres have been tested with clinical failures?

- a. Bone plates for fixation
- b. Pancreas prostheses
- c. Total knee prostheses
- d. Soft tissue augmentation in non-load bearing sites

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 36 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The largest bone in the human body is

- a. Femur
- b. Hummers
- c. Tibia
- d. Fibula

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 37 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

How do biocomposites rank in clinical importance to metals, ceramics and polymers?

- a. High
- b. Medium
- c. Low
- d. Very low

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 38 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Histogram Equalization is used for.

- a. Noise Reduction.
- b. Image Smoothing.
- c. Image Enhancement.
- d. Object Segmentation.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 39 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

To detect temporal changes in an image one would use.

- a. Histogram Modification.
- b. Image Warping.
- c. Image Interpolation.
- d. Image arithmetic.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 40 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Strongest ligament of the hip joint is

- a. pub femoral
- b. Ileo femoral
- c. Ischio femoral
- d. None of the above.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 41 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An image whose FFT has two peaks displaced horizontally is

- a. A horizontal bar pattern.
- b. Convolution kernal.
- c. A deconvolution kernal.
- d. A vertical bar pattern.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 42 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Spatial frequency domain data is represented as

- a. rgb values
- b. complex pixels
- c. a binary image
- d. grey-levels

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 43 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If f is convolved with a kernel g , f may be recovered by convolving with

- a. the inverse FT of the reciprocal of the FT of g .
- b. the inverse FT of the kernel FT.
- c. the FT of the kernel.
- d. the FT of the original image.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 44 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which type of lever is most effective in sport movements?

- a. Third class
- b. Second class
- c. First class
- d. None of the above.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 45 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Blurring in images can often be undone using

- a. deconvolution.
- b. image transformation.
- c. histogram modification.
- d. median filtering.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 46 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The node where pacemaker cells are there known as

- a. AV node
- b. SA node
- c. cathode
- d. anode.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 47 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

_____ are used to provide the contractile mechanism of muscles

- a. Structural proteins
- b. Lipids
- c. Globular proteins
- d. Cytoplasm

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 48 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which muscle is involved in the elevation of arm?

- a. Deltoid
- b. Biceps
- c. Triceps
- d. Quadriceps.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 49 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What type of electrodes is more often employed in EMG work?

- a. Suction electrodes
- b. Surface electrodes
- c. Floating electrodes
- d. Limb electrodes

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 50 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Blood behaves as

- a. a Newtonian fluid
- b. non Newtonian fluid
- c. Newtonian at low shear rate and non Newtonian at high shear rate
- d. non-Newtonian fluid at low shear rate and Newtonian fluid at high shear rate

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 51 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following directly defines the transportation of oxygen?

- a. hemoglobin
- b. oxyhemoglobin
- c. reduced hemoglobin
- d. red cell count

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 52 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is an example of bi-axial joint?

- a. Hinge
- b. Pivot
- c. Both (a) and (b)
- d. None of the above.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 53 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Stress and strain are:

- a. Zero order tensor
- b. Second-order tensor
- c. First order tensor
- d. Vectors

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 54 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Maximum and minimum normal stresses at a material point are:

- a. Shear stress
- b. In plane maximum shear stress
- c. Absolute shear stress
- d. Principal stresses

Options :

1. A
2. B
3. C
4. D

Question Number : 55 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Planes with normal collinear with the directions of the maximum and minimum normal stresses are known as:

- a. Shear plane
- b. Normal plane
- c. Principal planes
- d. Oblique plane

Options :

1. A
2. B
3. C
4. D

Question Number : 56 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Number of bones in the axial skeleton is

- a. 60
- b. 80
- c. 40
- d. 20

Options :

1. A
2. B
3. C
4. D

Question Number : 57 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The stress at which the fatigue curve levels are off is known as:

- a. Proportional limit
- b. Creep
- c. Breaking point
- d. Endurance limit

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 58 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Fracture which occurs suddenly without exhibiting considerable plastic deformation is:

- a. Transverse fracture
- b. Ductile fracture
- c. Brittle fracture
- d. Comminuted fracture

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 59 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Elastic materials show time-independent material behavior. Elastic materials deform_____ when they are subjected to externally applied loads:

- a. Gradually
- b. Instantaneously
- c. Continuously
- d. None of these

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 60 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Number of bones in the appendicle skeleton is

- a. 120
- b. 180
- c. 126
- d. 116

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 61 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Time-dependent material behavior is known as:

- a. Viscoelasticity
- b. Elasticity
- c. Plasticity
- d. None of the above

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 62 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A viscoelastic material is not only a function of strain, but also a function of:

- a. Area of cross section
- b. Flow of the fluid
- c. Strain rate or time
- d. None of these

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 63 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A viscoelastic model consists of a spring and a dashpot connected in a parallel arrangement is:

- a. Kelvin–Voight model
- b. Standard solid model
- c. Maxwell model
- d. None of these

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 64 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A test conducted by straining the material at a level and maintaining the strain at a constant level while observing the stress response of the material is known as:

- a. Stress relaxation test
- b. Fatigue test
- c. Endurance limit test
- d. None of the above

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 65 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Living tissues have characteristics that are very different than engineering materials. For example, they are _____ and _____.

- a. flexible and elastic
- b. brittle and hard
- c. tough and self-adaptive
- d. Self-repairing & Self-adapting

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 66 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Most important and abundant mechanical fibre affecting the overall mechanical behavior of the tissues in which they appear:

- a. Collagen
- b. Elastin
- c. Proteoglycans
- d. None of These

Options :

1. A
2. B
3. C
4. D

Question Number : 67 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The functional partners of bone is:

- a. Tendon
- b. Skeletal muscle
- c. Ligament
- d. Fasciae

Options :

1. A
2. B
3. C
4. D

Question Number : 68 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The structure that connects muscles to bones is:

- a. Aponeurosis
- b. Fascicle
- c. Tendon
- d. Ligament

Options :

1. A
2. B
3. C
4. D

Question Number : 69 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What are the actin and myosin filaments in muscle composed of?

- a. Nucleic acids
- b. Proteins
- c. Fatty acids
- d. Carbohydrate

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 70 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In children and adolescents, what is the epiphyseal plate composed of?

- a. Bone
- b. Hyaline cartilage
- c. Collagen fibers
- d. Elastic fiber, Collagen fibers, and Elastic cartilage

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 71 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is the most accurate definition of "bone remodeling"?

- a. Bone that develops during fetal development and stays with us for life
- b. Removal of old bone by osteoclasts and making of new bone by osteoblasts
- c. The construction of bone around blood vessels for a Haversian canal
- d. The laying out of new bone in a fracture site

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 72 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the process of bone remodeling, old bone is removed by:

- a. Osteocytes
- b. Osteoblasts
- c. Osteoclasts
- d. Remodeling osteoprogenitor cells

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 73 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A spiral fracture of a bone most often is the result of a bone:

- a. weakened by disease
- b. that has been crushed
- c. that has been twisted
- d. that has been compressed

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 74 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The term "calcium homeostasis" refers to which of the following:

- a. balance of calcium between the bone and the cartilage
- b. reation of calcium by bones
- c. balance of calcium between the blood and the bones
- d. movement of calcium to and from cartilage and bone

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 75 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Osteoporosis most often occurs in:

- a. older men
- b. older women
- c. teenage women
- d. teenage males and female

Options :

1. A
2. B
3. C
4. D

Question Number : 76 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In regard to bone cell development, which of the following sequences is correct?

- a. osteoblasts → osteoclasts → osteocyte
- b. osteogenic cells → osteoclasts → osteocytes
- c. osteogenic cells → osteocyte → osteoclast
- d. osteogenic cells → osteoblasts → osteocyte

Options :

1. A
2. B
3. C
4. D

Question Number : 77 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Lamellar bone is bone that

- a. arises out of cartilage
- b. arises out of collagen and elastic fibers
- c. replaces worn out and fractured bone
- d. is mature and is organized into thin sheets or layers.

Options :

1. A
2. B
3. C
4. D

Question Number : 78 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following combinations of treatments would be the most appropriate for treatment of osteoporosis?

- a. running, hiking, and drinking 3 liters of water per day
- b. walking, adding calcium to the diet and, perhaps, taking estrogen-replacement therapy
- c. walking, taking phosphorus tablets, and drinking 3 liters or more of water a day
- d. running, taking mineral tablets each day, drinking more water, and taking testosterone therapy.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 79 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of these bone types is NOT matched with the correct example?

- a. long bone-humerus
- b. flat bone-scapula
- c. short bone-clavicle
- d. irregular bone-vertebrae

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 80 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of these connective tissue types has proteoglycans in its matrix?

- a. Cartilage
- b. Ligaments
- c. Tendons
- d. Both B and C

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 81 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Hydrogen ions are pumped across the ruffled border, producing an acid environment. This describes the activity of

- Osteoblasts
- Osteocytes
- Osteoclasts
- None of these

Options :

- A
- B
- C
- D

Question Number : 82 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Given these passageways:

- canaliculi
- central (Haversian) canal
- blood vessels in periosteum
- perforating (Volkmann) canal

Which of these represents the correct order as nutrients pass from outside the bone to the osteocytes?

- 1,2,3,4
- 2,4,1,3
- 3,4,2,1
- 4,3,2,1

Options :

- A
- B
- C
- D

Question Number : 83 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which type of bone growth is responsible for an increase in the diameter of bones?

- Appositional growth
- Interstitial growth
- Trabecular growth
- Intramembranous growth

Options :

- A
- B
- C
- D

Question Number : 84 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Carpal joint is the example of:

- a. Pivot joint
- b. Condylloid joint
- c. Hinge joint
- d. Ball and socket joint

Options :

1. A
2. B
3. C
4. D

Question Number : 85 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Main bones in forearm are

- a. hummers-femur
- b. radius-ulna
- c. ulna-phalanges
- d. Wrist bones-phalanges.

Options :

1. A
2. B
3. C
4. D

Question Number : 86 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Cortical bone strength is highest under compressive loading in the _____ direction (direction of osteon orientation) and lowest under tensile loading in the _____ direction (direction perpendicular to the longitudinal direction).

- a. Medial, Lateral
- b. Lateral, Medial
- c. Longitudinal, Transverse
- d. Transverse, Longitudinal

Options :

1. A
2. B
3. C
4. D

Question Number : 87 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The chemical compositions of cortical and cancellous bone tissues are similar. The distinguishing characteristic of the cancellous bone is its _____.

- a. Porosity
- b. Permeability
- c. Collagen Percentage
- d. Elastin fibres

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 88 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

_____ tension is the force produced by the contractile elements of the muscle and is a result of voluntary muscle contraction, and _____ tension is the force developed within the connective muscle tissue when the muscle length surpasses its resting length.

- a. Passive, active
- b. Elastic, Plastic
- c. Active, passive
- d. Plastic-Elastic

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 89 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is no available in animal cells?

- a. Plastid
- b. Lysosomes
- c. Centrosomes
- d. Mitochondria

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 90 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Microfilaments are made of:

- a. RNA
- b. Protein
- c. DNA
- d. Enzyme

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 91 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The size of actin filament in diameter is nearly:

- a. 7-9 nm
- b. 12-14 nm
- c. 18-20 nm
- d. 24- 30 nm

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 92 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Cilia and Flagella of Eukaryotic cell is made up of:

- a. Keratin
- b. Tubulin
- c. Lamin
- d. Dasmin

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 93 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Extracellular Matrix (ECM) does not contain:

- a. Collagen
- b. Fatty Acid
- c. Proteoglycans
- d. Hyaluronan

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 94 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Integrins are

- a. Intercellular Protein
- b. G-protein
- c. Transmembrane Proteins
- d. Hyaluronan

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 95 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Mechanical integrity and scaffolding for cells is provided by

- a. Proteoglycans
- b. Hyaluronan
- c. Collagen and Elastin
- d. Integrin

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 96 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Atomic Force Microscopy uses:

- a. Plasma Beam
- b. Laser Beam
- c. Ultrasound
- d. Magnetic Field

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 97 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Atomic Force Microscopy uses:

- a. Cantilever Arm
- b. Indenter
- c. Overhanging Arm
- d. Sonicator Probe

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 98 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Beads used in optical trapping/magnetic bead microrheometry are usually coated with:

- a. Actin
- b. Prostaglandin
- c. G-protein
- d. Fibronectin

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 99 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Magnetic Bead Microrheometry produces force in a range of:

- a. 10–10,000 kN range.
- b. 100–10,000 pN range.
- c. 10–10,000 nN range
- d. 1–10,000 MN range.

Options :

- 1. A
- 2. B
- 3. C
- 4. D

Question Number : 100 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about G proteins is false?

- a. They are involved in signal cascades
- b. They bind to and are regulated by guanine nucleotides
- c. They become activated when bound to GDP
- d. They must be active before the cell can make needed camp

Options :

- 1. A
- 2. B
- 3. C
- 4. D