PROVISIONAL ANSWER KEY
NAME OF THE POST: Assistant Professor, Biomedical Engineering
(AOS-A) (Advt. No. : 90/2015-16) Class II
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SUBJECT : Concerned Subject: (Que.101 to 200)

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Note : Candidate must ensure the complaince to send all suggestion in the given format with reference to this paper with provisional answer key only. Any non compliance shall not be treated.

101. Which of the following medical imaging techniques includes an inherent artifact called speckle?

(A) MRI
(B) Ultrasound
(C) X-Ray
(D) CT

102. Under what conditions a Weiner filter reduces to inverse filter?

(A) In presence of noise.
(B) In absence of noise.
(C) Both in presence and absence of noise.
(D) None of the above.

103. Which of the following is not true about discrete wavelet transform?
(A) Blocking artifact is present.
(B) Allows good localization in time domain and frequency domain.
(C) Multi-resolution analysis is possible.
(D) The basis function is fixed.

104. Which of the following is false about properties of Region of convergence -
(A) ROC may include poles.
(B) ROC lies on the interior of the circle.
(C) ROC lies on the exterior of the circle.
(D) All of the above .

105. N-point DFT of u(n)- u(n-1) is:

(A) $X(k) = \begin{cases} 0 \ for, k \neq 0 \\ N \ for, k = 0 \end{cases}$

(B) *X(k)=0, for all k.*

(C) *X(k)=N, for all k.*

(D) $X(k) = \begin{cases} N \ for, k \neq 0 \\ 0 \ for, k = 0 \end{cases}$

106. Current magnitude for Perception threshold of the skin for light finger contact is .....
(A) 500μA
(B) 300 μA
(C) 5000 μA
(D) 3000 μA

107. Visual Cortex is associated with which lobe of brain?
(A) Prefrontal lobe
(B) Occipital lobe
(C) Temporal lobe
(D) Frontal lobe

108. Liquid-column principle is used as which type of transducer?
(A) Pressure transducer
(B) Force transducer
(C) Flow transducer
(D) Current transducer

109. The output from a multiplier can be expressed in term of its frequency by which of the following relationship?

(A) $\Delta u \Delta H \sin^2 \omega t = \frac{\Delta u \Delta H}{2} - \frac{\Delta u \Delta H}{2} \cos 2\omega t$

(B) $\Delta u \Delta H \sin \omega t = \frac{\Delta u \Delta H}{2} - \frac{\Delta u \Delta H}{2} \cos \omega t$

(C) $\Delta u \Delta H \sin \omega t = \frac{\Delta u \Delta H}{2} - \frac{\Delta u \Delta H}{2} \cos 2\omega t$

(D) $\Delta u \Delta H \sin^2 \omega t = \frac{\Delta u \Delta H}{2} - \frac{\Delta u \Delta H}{2} \cos \omega t$

110. Closed- loop eigen values of the closed loop transfer function is represented by which of the following expression?

(A) $G_c(s) = \dfrac{H(s)}{1 - H(s)G(s)}$ (B) $G_c(s) = \dfrac{G(s)}{1 - H(s)G(s)}$

(C) $G_c(s) = \dfrac{H(s)}{1 + G(s)H(s)}$ (D) $G_c(s) = \dfrac{G(s)}{1 + G(s)H(s)}$

111. If the output of a spectral composition with cubic nonlinear with single and dual inputs is $o(t) = (A\cos\omega t)^3$, then single corresponding unit is:

(A) $i(t) = A\cos\omega t$ (B) $i(t) = A\sin\omega t$

(C) $i(t) = A\cos^2\omega t$ (D) $i(t) = A\sin^2\omega t$

112. Euclidean distance in cluster-seeking method can be expressed as:

(A) $D_E^2 = \sum_{i=1}^{n+1}(x_i - z_i)^2$ (B) $D_E^2 = \sum_{i=1}^{n}(x_i - z_i)^2$

(C) $D_E^2 = \sum_{i=0}^{n}(x_i - z_i)^2$ (D) $D_E^2 = \sum_{i=0}^{n+1}(x_i - z_i)^2$

113. Let $s(t)$ denote the delta function, the value of the integral $\int_{-\infty}^{\infty}\delta(t)\cos\left(\frac{3t}{2}\right)dt$ is

(A) E (B) $E/2$

(C) $2E$ (D) $4E$

114. The autocorrelation function $R_x(\tau)$ satisfied which one of the following properties?

(A) $R_x(\tau) = -R_x(-\tau)$ (B) $R_x(\tau) = R_x(-\tau)$

(C) $R_x(\tau) \geq R_x(0)$ (D) $R_x(\tau) \geq 1$

115. A piezoelectric sensor has $c = 500pF$. The sensor leakage resistance is $10G\Omega$. The amplifier input impedance is $5M\Omega$. What is the low-corner frequency?

(A) 60 Hz (B) 64 Hz

(C) 72 Hz (D) 78 Hz

116. Calculate the approximate area of the aortic valve for the patient with the aortic and left ventricular pressure have following features: -

Ejection period = 0.31s

Average pressure drop = 7.33 kPa

Cardiac output = 6400ml/min

Heart rate = 78 beats/min

Blood density = 1060kg/m^3

(A) 83 mm^2 (B) 81 mm^2

(C) 85 mm^2 (D) 87 mm^2

117. Duration of ST segment is ..... sec.

(A) 0.12 to 0.20 (B) 0.35 to 0.44

(C) 0.05 to 0.15 (D) 0.01 to 0.20

118. The relation between Osmotic Work and concentration change for a given substance is given by which of the following equation?

(A) $W_{min} = NRT\ log\frac{c_2}{c_1}$ (B) $W_{min} = NRT\ ln\frac{c_1}{c_2}$

(C) $W_{min} = NRT\ ln\frac{c_2}{c_1}$ (D) $W_{min} = NRT\ log\frac{c_1}{c_2}$

119. Which radioisotope of Iodine is used for diagnosing Thyroid disorder?

(A) I^{131} (B) I^{132}

(C) I^{133} (D) I^{130}

120. Which of the following mechanism is not classified as active transport in biological membrane?

(A) Na^+ movement in nerve

(B) Cl^- movement in nerve

(C) Cation pumps of R.B.C.

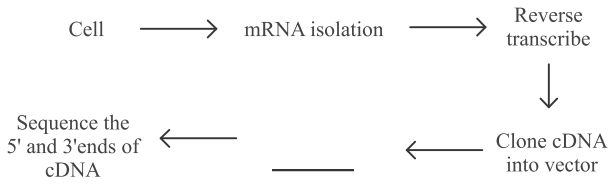
(D) Secretion of H^+ by gastric oxyntic cells

121. Maps which are capable of directly measuring distances between genomic elements or that use cloned DNA fragments to directly order elements are known as ..... map.

(A) Transcripts Maps (B) Physical Maps

(C) Integrated Maps (D) Radiation Hybrid Maps

122. Fill the below sequence with appropriate element: -



(A) mRNA clone
(B) cRNA vector
(C) cDNA clone
(D) cDNA vector

123. For a given ADC0848, if $V_{ref} = 2.56V$. Calculate the D0-D7 output if the analog input is 2.1V.

(A) 11001010
(B) 10101011
(C) 11010010
(D) 10110010

124. If $f = 100\ pN$ at the maximum extension in the first cycle of loading on tenascin and if the original diameter is on the order of 10 nm, how does the stress compare with that in tissue?

(A) *10 MPa*
(B) *2 MPa*
(C) *1 MPa*
(D) *20 MPa*

125. Relationship between Womersley number 'α' and viscosity of fluid 'μ' flowing through a narrow channel is given by which of the following expression?

(A) $\alpha = a\sqrt{\frac{\mu^2\rho}{\omega}}$
(B) $\alpha = a\sqrt{\frac{\mu\rho}{\omega}}$
(C) $\alpha = a\sqrt{\frac{\omega\mu}{\rho}}$
(D) $\alpha = a\sqrt{\frac{\omega\rho}{\mu}}$

126. Within a Spatially Invarian model, if the impulse response of horizontal motion is $\frac{1}{\alpha_0} rect\left(\frac{x}{\alpha_0} - \frac{1}{2}\right)\delta(y)$, then, what will be corresponding frequency response?

(A) $\alpha\beta \sin c(\alpha\beta_1) \sin c(\xi_1\xi_2)$

(B) $\frac{1}{\alpha^2}\exp\left[\frac{-\pi(\xi_1^2 + \xi_2^2)}{\alpha^2}\right]$

(C) $e^{-j\pi\xi_1\alpha_0} \sin c(\xi_1, \alpha_0)$

(D) $\sum_{k,l=-1}^{1}\sum \alpha_{k,l}\exp[-j2\pi\Delta(\xi_1 k + \xi_2 l)]$

127. The electro-osmotic flow speed of biological fluid across nanaporous structures is given by:

(A) $V = \frac{\eta \psi_s E}{\varepsilon}$

(B) $V = \frac{\varepsilon \psi_s E}{\eta}$

(C) $V = -\frac{\varepsilon \psi_s E}{\eta}$

(D) $V = -\frac{\eta \psi_s E}{\varepsilon}$

128. The free energy change in the synthesis or hydrolysis of one ATP is given by

(A) $\Delta G = \Delta G_0 - K_B T \, ln \frac{[ATP]}{[ADP][P_i]}$

(B) $\Delta G = \Delta G_0 - K_B T \, ln \frac{[ADP]}{[ATP][P_i]}$

(C) $\Delta G = \Delta G_0 - K_B T \, ln \frac{[P_i]}{[ADP][ATP]}$

(D) $\Delta G = \Delta G_0 - K_B T \, ln \frac{[P_i][ATP]}{[ADP]}$

129. Fowler - Nordheim equation to represent the process of electron emission of carbon nanotube is given by: -

(A) $J \alpha F \exp\left(-\frac{\phi^{3/2}}{\beta F}\right)$

(B) $J \alpha F^2 \exp\left(-\frac{\phi^{3/2}}{\beta F}\right)$

(C) $J \alpha F^2 \exp\left(-\frac{\phi^{2/3}}{\beta F}\right)$

(D) $J \alpha F \exp\left(-\frac{\phi^{2/3}}{\beta F}\right)$

130. The slope(m) of eigen vector fit line segment to detect edges of an image is given by which of the equation?

(A) $m + \frac{1}{m} = \frac{\sigma_y^2 - \sigma_x^2}{\sigma_{xy}}$

(B) $m - \frac{1}{m} = \frac{\sigma_y - \sigma_x}{\sigma_{xy}}$

(C) $m - \frac{1}{m} = \frac{\sigma_y^2 - \sigma_x^2}{\sigma_{xy}}$

(D) $m + \frac{1}{m} = \frac{\sigma_y - \sigma_x}{\sigma_{xy}}$

131. For a spherical/circular feature in a continuous image, the dimensionless measure of shape equals to:

(A) *12.57*

(B) *6.29*

(C) *25.14*

(D) *19.21*

132. An ejection fraction image $EF(x, y)$ can be defined at each pixel to be its maximum gray level $g_{max}(x, y)$ and minimum gray level $g_{min}(x, y)$ by the following relationship:

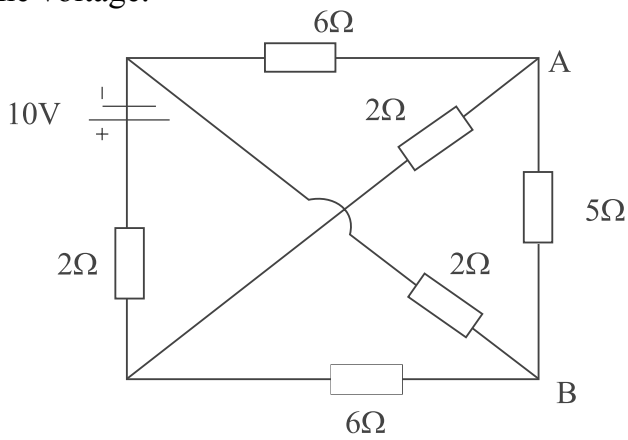
(A) $EF(x, y) = \dfrac{g_{max}(x, y)}{g_{max}(x, y) - g_{min}(x, y)}$

(B) $EF(x, y) = \dfrac{g_{max}(x, y) - g_{min}(x, y)}{g_{min}(x, y)}$

(C) $EF(x, y) = \dfrac{g_{max}(x, y) - g_{min}(x, y)}{g_{max}(x, y)}$

(D) $EF(x, y) = \dfrac{g_{min}(x, y)}{g_{max}(x, y) - g_{min}(x, y)}$

133. Calculate the voltage across AB in the network shown below and indicate the polarity of the voltage.



(A) $+2$ Volts
(B) -2 Volts
(C) -4 Volts
(D) $+4$ Volts

134. The diffusion coefficients of Cu in Al at 500 and 600°C are 4.8×10^{-14} and 5.3×10^{-13} m^2/s, respectively. Determine the appropriate time at 500°C that will produce the same diffusion result as a10-h heat treatment at 600°C.

(A) *100.1* h
(B) *110.1* h
(C) *110.4* h
(D) *100.4* h

135. Estimate the number of atoms per cubic centimeter of pure silicon

(A) 1.12×10^{23} atom/cm^3
(B) 1.12×10^{24} atom/cm^3
(C) 1.12×10^{22} atom/cm^3
(D) 1.12×10^{21} atom/cm^3

136. A CVD process involves a reactant being diluted to 2% in the carrier oxygen gas at 490°C. Find the number of molecules in a cubic meter volume of the carrier gas. Pressure variation in the process is negligible.

(A) 103.24×10^{24} molecules/m^3 (B) 103.24×10^{23} molecules/m^3

(C) 103.24×10^{22} molecules/m^3 (D) 103.24×10^{20} molecules/m^3

137. Diffusive transport of membrane based blood perfusion is given by which of the following equation?

(A) $J = D * A * \Delta C / \Delta x$ (B) $J = - D * A * \Delta x / \Delta C$

(C) $J = - D * A * \Delta C / \Delta x$ (D) $J = D * A * \Delta x / \Delta C$

138. Following equation describe the transport phenomena in left atria:

(A) $P_{LA}(t) = \alpha_{LA}(t)(V - V_v)_{LA}$ (B) $P_{LA}(t) = \alpha_{LA}(t)(V_v - V)_{LA}$

(C) $P_{LA}(t) = \alpha_{RA}(t)(V - V_v)_{RA}$ (D) $P_{LA}(t) = \alpha_{RA}(t)(V_v - V)_{RA}$

139. The voltage output from a thermopile can be obtained by the following expression:

(A) $\Delta V = N\beta / \Delta T$ (B) $\Delta V = N\beta\Delta T$

(C) $\Delta V = N\Delta T / \beta$ (D) $\Delta V = \Delta T\beta / N$

140. Which of the following component of inner ear decompose the received sound based on its wavelength before sending it to auditory nerve fibres?

(A) Arch of Corti (B) Organ of Corti

(C) Scala vestibuli (D) Reissner's membrane

141. The clearance between head and cup surfaces of healthy knee joint of an adult individual is : -

(A) $10 \leq h \leq 20\mu m$ (B) $5 \leq h \leq 20\mu m$

(C) $5 \leq h \leq 10\mu m$ (D) $1 \leq h \leq 10\mu m$

142. The designing parameters for pulse forming network of a Laser source holds the voltage bank expression as

(A) $V \geq 2R_L I_P$ (B) $V \leq R_L I_P / 2$

(C) $V \leq 2R_L I_P$ (D) $V \geq R_L I_P / 2$

143. Orientation of pulse-height-analyzer unit in gamma camera system is

(A) Z – Direction (B) X – Direction

(C) Y – Direction (D) θ – Radian

144. Fleisch Pneumotachometer is used for .....

(A) Breathing study (B) Respiratory study

(C) Circulatory study (D) Endocrine study

145. If the arterial movement with the opening and closing of the artery is 5×10^{-3}m, and snapping occurs in 0.1s, what is the arterial wall velocity?

(A) 50×10^{-4}m/s (B) 50×10^{-3}m/s

(C) 25×10^{-3}m/s (D) 25×10^{-4}m/s

146. RMS current of the output of a surgical diathermy instrument can be evaluated using analyzer with one of the following relationship:

(A) $I = \left[\frac{1}{T}\int_0^{T/2}[i(t)]^2 dt\right]^{1/2}$ (B) $I = I_0\left[\int_0^{T}[i(t)]^2 dt\right]^{1/2}$

(C) $I = \left[\frac{1}{T}\int_0^{T}[i(t)]^2 dt\right]^{1/2}$ (D) $I = I_0\left[\int_0^{T/2}[i(t)]^2 dt\right]^{1/2}$

147. Voltage expression of the exposure timing system of a x-ray machine is given by : -

(A) $V_t(t) = V_s(1 - e^{RC/t})$ (B) $V_t(t) = V_s(1 - e^{-RC/t})$

(C) $V_t(t) = V_s(1 - e^{t/RC})$ (D) $V_t(t) = V_s(1 - e^{-t/RC})$

148. In case of an ultrasonic spirometer, flow velocity of respirated/breath air is evaluated by the following relationship:

(A) $V = \frac{D}{2\cos\theta}[f_2 - f_1]$ (B) $V = \frac{2D}{\cos\theta}[f_2 - f_1]$

(C) $V = \frac{D}{2\cos\theta}[f_1 - f_2]$ (D) $V = \frac{D}{2\sin\theta}[f_1 - f_2]$

149. Gauge factor of a Strain Gauge Pressure Transducer changes by what factor if incremental change in length is 20% and incremental change in resistance is 0.5%?

(A) *0.25%* (B) *2.5%*

(C) *25%* (D) *0.025%*

150. In case of intravascular oximeter, SO_2 can be measured using reflectance at two wavelengths by following relationship :

(A) $SO_2 = A(R\lambda_1/R\lambda_2) + B$ (B) $SO_2 = A + B(R\lambda_1/R\lambda_2)$

(C) $SO_2 = A + B/(R\lambda_1/R\lambda_2)$ (D) $SO_2 = A/(R\lambda_1/R\lambda_2)^{+B}$

151. Nernst equation to represent potential of the glass electrode for measurement of blood pH is given by equation : -

(A) $E = E_0 + \frac{2.3036F}{RT} \cdot \Delta pH$ (B) $E = E_0 - \frac{2.3036F}{RT} \cdot \Delta pH$

(C) $E = E_0 + \frac{2.3036RT}{F} \cdot \Delta pH$ (D) $E = E_0 - \frac{2.3036RT}{F} \cdot \Delta pH$

152. Consider a bar (A=10^3 mm^2) subjected to tensile load of 100 KN. Determine the stress symmetry and the existence of the principal plane.

(A) –47MPa and 67.11MPa (B) 67.11MPa and –47MPa

(C) 76.11MPa and –74MPa (D) –74MPa and 76.11MPa

153. Unit distance code is another name of:

(A) Sequential code (B) Self complementing code

(C) Cyclic code (D) XS-3 code

154. In a subject, the following pathological data are obtained:
O_2 consumed by lungs: 250 ml/min
O_2 content in arterial blood: 20ml/100ml of blood
O_2 content in venous blood: 15ml/100ml of blood
What will be the cardiac output?

(A) 5000 ml/min (B) 5000 ml/sec

(C) 500 ml/min (D) 500 ml/sec

155. Determine the color index of blood for a blood sample of male subject with following details:
RBC count: 4 millions/ mm^3
Hemoglobin content:8g/dL
PCV=30%

(A) 0.76 (B) 0.67

(C) 0.54 (D) 0.45

156. Which of the following statements is true for needle electrodes used for EMG

(A) The material of the needle electrode is stainless steel.

(B) The electrodes should be thoroughly sterilized before use.

(C) Needle electrodes made up of stainless steel are noisy thus making it unfavourable electrode material.

(D) All of the above.

157. The devices which measure the instantaneous rate of volume flow of the respired gases are called:
(A) Pneumotachometers. (B) Spirometers.
(C) Spectrophotometers. (D) None of the above.

158. Which of the following pins of 8085 microprocessor will get highest priority when activated at the same time?
(A) TRAP (B) RST 7.5
(C) RST6.5 (D) HOLD

159. With reference to 8085 microprocessor, which of the following statements is false about 'INR M' instruction?
(A) It is a 1 byte instruction.
(B) It has three machine cycles.
(C) Carry flag is affected after execution of this instruction.
(D) The addressing mode is register indirect.

160. Which of the following statements is false with reference to the high frequency model of the transistor?
(A) The transconductance is independent of the variations in collector to emitter voltage.
(B) The emitter capacitance decreases with increase in collector to emitter voltage.
(C) The base spreading resistance decreases with increase in temperature.
(D) The collector capacitance is independent of variations in temperature.

161. Current amplifier is characterized by-
(A) Low input impedance and high output impedance.
(B) Low input impedance and low output impedance.
(C) High input impedance and high output impedance.
(D) High input impedance and low output impedance.

162. Muscle force is generated in-
(A) Nerves. (B) Sacromere.
(C) Ligaments. (D) Tendons.

163. Which of the following is false about Foam-
(A) It is a polymer material.
(B) It is a homogeneous material.
(C) It has one of its phases as empty phase.
(D) It has high ratio of surface area to volume.

164. The propagation of excitation is delayed at AV node so that ..... can be filled up with the blood from the .....
(A) Atria, vena cava (B) Ventricles, atria
(C) Ventricles, vena cava (D) Atria, Ventricles

165. Normal recording of ERG usually consists of-
(A) Initial positive wave from photoreceptors.
(B) Large cornea positive wave generated by Miller cells.
(C) A positive wave representing metabolic activity of pigment epithelium.
(D) Both (B) & (C)

166. The optimal Weiner filter can be designed if -
(A) The signal is statistically stationary.
(B) The signal is non-stationary.
(C) The noise is a non-stationary random process.
(D) Both (B) & (C) are correct.

167. Ensemble averaging of signal to remove noise is possible when the signal is-
(A) Statistically stationary.
(B) Quasi periodic.
(C) Cyclo-stationary.
(D) All of the above.

168. The perfectly polarizable electrodes are those in which-
(A) There is no actual charge crosses the electrode-electrolyte interface when current is applied.
(B) The current passes freely across the electrode-electrolyte interface.
(C) There are no overpotentials.
(D) Can be fabricated.

169. Which of the following is false about chemical biosensors?
(A) They can be made in small size.
(B) There are no electric hazards to the patient.
(C) Reference electrode is necessary.
(D) Multiple sensors can be introduced together for intravascular measurements.

170. Which portion of the brain is center for emotions in the brain?
(A) Thalamus.
(B) Hypothalamus.
(C) Cerebellum.
(D) Pons.

171. The area under probability density function of random variable X is-
(A) >1
(B) <1
(C) =1
(D) 0

172. With reference to an amplitude modulated signal, which of the following statements is false-
(A) Both lower and upper sideband carries same information.
(B) The bandwidth is twice the message bandwidth.
(C) The carrier signal carries information related to message.
(D) The modulation index should be greater than or equal to 1.

173. The quantization error arising in quantization process-
(A) Increases with increase in step size.
(B) Decreases with increase in step size.
(C) Independent of step size.
(D) Cannot be viewed as noise.

174. The transfer function of a linear system is-
(A) Ratio of output and input.
(B) Ratio of derivatives of output and input.
(C) Ratio of Laplace transforms of output and input with zero initial conditions.
(D) None of these.

175. The convolution in time domain is equal to-
(A) Convolution in frequency domain.
(B) Multiplication in frequency domain.
(C) Autocorrelation in time domain.
(D) Correlation in time domain.

176. Thermal runaway is not possible in FET because as temperature of FET increases-
(A) Mobility decreases.
(B) Transconductance increases.
(C) Drain current increases.
(D) None of these.

177. The signal x(t) = t . u(t) is a–
(A) Energy signal.
(B) Power signal.
(C) Neither energy nor power signal.
(D) None of the above.

178. Which of the following modalities does not use a form of ionizing radiation:
(A) Radiography.
(B) Computed tomography.
(C) Sonography.
(D) Positron emission tomography.

179. In the radiology literature the relationship between the sensitivity and specificity of a diagnostic procedure is generally shown using a:
(A) MTF curve.
(B) ROC curve.
(C) True-positive/false-positive ratio.
(D) True-negative/false-negative ratio.

180. Match the cell structure components given in Group I with appropriate functions from Group II.

Group I	Group II
(P) Cell membrane	(I) Nutrient transport
(Q) Purple membrane	(II) Photosynthesis
(R) Cisternae	(III) Active transport
(S) Outer membrane	(IV) Protein glycosylation
	(V) Light-driven proton transport

Options:
(A) P-I, Q-V, R-II, S-III
(B) P-I, Q-II, R-IV, S-III
(C) P-III, Q-II, R-V, S-I
(D) P-III, Q-V, R-IV, S-I

181. Which digestive tract hormone inhibits gastric gland secretion and gastric motility?

(A) Gastrin
(B) Secretin
(C) Cholecystokinin
(D) Anti-diuretic Hormone

182. Lowering mechanical stress to the crestal bone-implant interface can best be accomplished by the use of .....

(A) Wide diameter implants (> 4.7 mm).
(B) Long implants (> 12 mm).
(C) A cantilever prosthesis.
(D) Smooth cylinder implants.

183. What is the typical value of refractive index for an ethyl alcohol?

(A) 1
(B) 1.36
(C) 2.6
(D) 3.4

184. Which among the following compression techniques is/are intended for still images?

(A) JPEG
(B) H.263
(C) MPEG
(D) All of the above

185. What does the symbol '#' represent in the instruction MOV A, #55H?

(A) Direct datatype
(B) Indirect datatype
(C) Immediate datatype
(D) Indexed datatype

186. Attenuation coefficient of bone is 600 m^{-1} for x-rays of energy 20 keV and intensity of beam of x-rays is 20 Wm^{-2}, then intensity of beam after passing through a bone of 4mm is

(A) 3 Wm^{-2}
(B) 2.5 Wm^{-2}
(C) 2.0 Wm^{-2}
(D) 1.8 Wm^{-2}

187. After having completed a study that involved the collection of tissue from the subjects, an investigator wishes to perform additional analysis of the archived tissue samples. This nature of this analysis was not explicitly stated in the original consent form. Should the investigator be required to obtain explicit consent for the new research?

(A) The investigator is required to obtain explicit consent for the new research from the IRB.
(B) The investigator is NOT required to obtain explicit consent for the new research.
(C) The investigator is required to obtain a general consent.
(D) The investigator is required to obtain explicit consent for the new research from the patient.

188. In FT-NMR, how are nuclei excited?

(A) By radio-frequency radiation whose frequency is swept across a predetermined range

(B) By an intense pulse of radiation which contains a wide range of frequencies

(C) By an intense pressure

(D) None of the above

189. What is the maximum strength of magnet approved for medical imaging of patient?

(A) 7.0 T (B) 1.5 T

(C) 5.0 T (D) 3.0 T

190. Skin is _____ material.

(A) Pseudo elastic (B) Pseudo plastic

(C) Viscoelastic (D) Elastic

191. A normal subject raises the right upper extremity from a position of 60 degrees of shoulder flexion to 120 degrees of shoulder flexion. What type of muscular contraction is occurring in anterior deltoid during this activity?

(A) concentric (B) isotonic

(C) isometric (D) a & c

192. In anatomical position, where is the center of gravity located relative to the spine?

(A) posterior (B) anterior

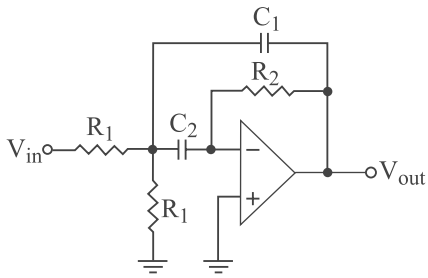
(C) lateral (D) inferior

193. All the following of protein sequence databases except-

(A) PIR (B) PSD

(C) SWISS PROT (D) EMBL

194. The gain of the multiple-feedback band-pass filter above is equal to which of the following? Assume $C = C_1 = C_2$.



(A) $A_0 = R_2 / R_1$ (B) $A_0 = R_1 / R_2$

(C) $A_0 = R_2 / 2\,R_1$ (D) $A_0 = R_1 / 2\,R_2$

195. Anatomical waste consists of human and animal tissue, organs, and body parts. Which containers should this waste be disposed into?
(A) Red containers.
(B) Sharps containers.
(C) Containers lined with yellow bags.
(D) Containers lined with black bags.

196. How does it become possible to reduce the interference level generated corresponding to the stray magnetic fields in LVDT?
(A) By Shielding
(B) By Grounding
(C) Both a & b
(D) None of the above

197. Which of the following is not a characteristic property of ceramic material?
(A) high temperature stability
(B) high mechanical strength
(C) low elongation
(D) low hardness

198. An imaging system has a numerical Aperture (NA) 0.2 at object side. If the system magnification M=-4, What is its NA at the image side?
(A) 0.8
(B) 0.05
(C) 0.4
(D) –0.05

199. When using Doppler ultrasound to determine blood flow velocity it is necessary for the equipment operator to make a specific adjustment unique to the Doppler function for:
(A) Transducer frequency.
(B) Depth of vessel.
(C) Direction of vessel.
(D) Size of vessel.

200. What are the advantages of neural networks over conventional computers?
(i) They have the ability to learn by example.
(ii) They are more fault tolerant.
(iii) They are more suited for real time operation due to their high 'computational' rates.
(A) (i) and (ii) are true
(B) (i) and (iii) are true
(C) Only (i)
(D) All of the mentioned