

25/2015

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Calculate the velocity of nerve impulse in the Frog's nerve muscle preparation from the data given below:
  - (i) Latent period with stimulation of spinal end of the nerve = 0.01 sec.
  - (ii) Latent period with stimulation of muscle end of the nerve = 0.005 sec.
  - (iii) Length of the nerve between the two stimulated points = 7.5 cm.  
so the velocity of the nerve impulse is

(A) 1550 cm (B) 1576 cm  
(C) 1500 cm (D) 15000 cm
  
2. Calculate the respiratory quotient from the data are given :
  - (i) Volume of expired air in 6 minutes = 30 liters
  - (ii) Percentage of CO<sub>2</sub> in expired air = 4.2%
  - (iii) Oxygen consumption in 6 minutes = 1470 ml,  
the respiratory quotient (RQ) is

(A) 0.85 (B) 0.75  
(C) 0.65 (D) 0.81
  
3. Determine the oxygen carrying capacity and oxygen content of arterial and venous blood samples from the data are provided :
  - (i) Percentage saturation of arterial blood with oxygen = 97%
  - (ii) Percentage saturation of venous blood with oxygen = 75%
  - (iii) Hemoglobin concentration = 14.5 g/dl.  
Oxygen carrying capacity of blood and oxygen content of venous blood are respectively.

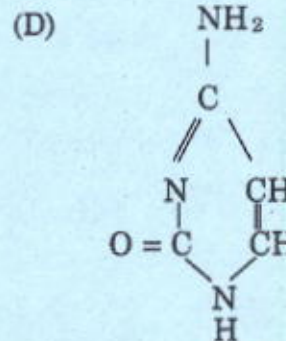
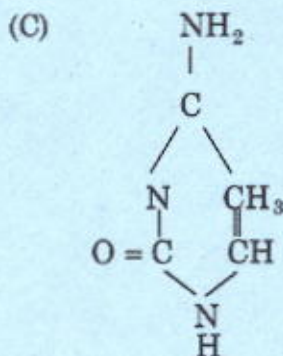
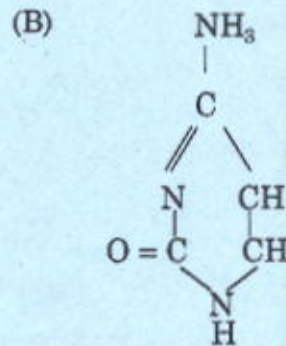
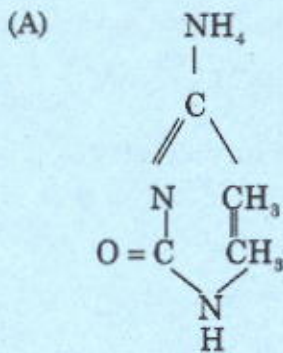
(A) 18.33 ml/dl, 14.37 ml/100 ml (B) 19.43 ml/dl, 14.57 ml/100 ml  
(C) 56.12 ml/dl, 23.37 ml/100 ml (D) 23.11 ml/dl, 42.23 ml/100 ml
  
4. Find out the breathing reserve and the dyspnea index from the data provided below :
  - (i) Respiratory rate = 12/min
  - (ii) Tidal volume = 500 ml
  - (iii) Maximum Voluntary Ventilation (MVV) = 130 liters  
So Dyspnea index (Breathing reserve percent) is

(A) 88 % (B) 95%  
(C) 80% (D) 100%
  
5. Calculate the heart rate from the ECG provided 1500 by the number of smallest squares between two R waves are assume 18, the heart rate will be:

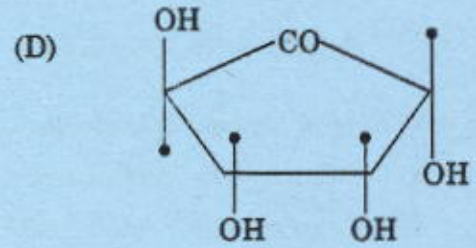
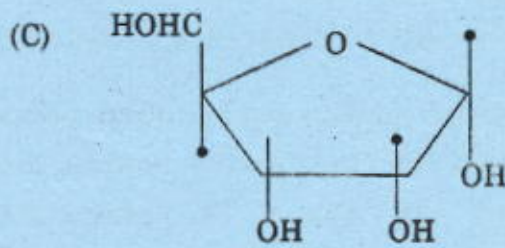
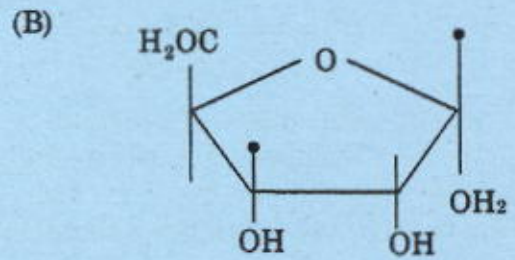
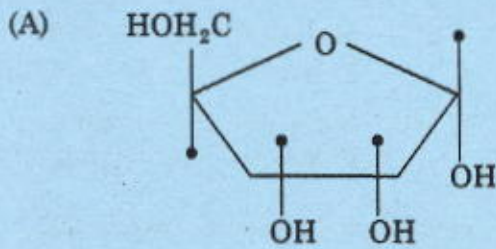
(A) 82 / min (B) 78 / min  
(C) 68 / min (D) 72 / min

6. Calculate the Renal Blood Flow (RBF) from the data given below. Data are :
- (i) Concentration of PAH in Urine ( $U_{PAH}$ ) = 14 mg/ml
  - (ii) Concentration of PAH in Plasma ( $P_{PAH}$ ) = 0.03 mg/ml
  - (iii) Rate of urine flow ( $V$ ) = 1.5 ml/min
  - (iv) Hematocrit (Hct) = 43%.
- The actual renal blood flow is
- (A) 1450 ml per minute
  - (B) 1445 ml per minute
  - (C) 1340 ml per minute
  - (D) 1350 ml per minute
7. Calculate the urea clearance from the given data :
- (i) Concentration of urea in Urine ( $U$ ) = 20 mg/ml
  - (ii) Concentration of urea in Blood ( $B$ ) = 38 mg/100 ml
  - (iii) Rate of Urine Flow ( $V$ ) = 1.5 ml/min.
- Urea clearance is
- (A) 60 ml/min
  - (B) 64 ml/min
  - (C) 720 ml/min
  - (D) 32 ml/min
8. The Red cell count of Males and Females are respectively :
- (A) Males 7.5 – 9.5 million /  $mm^3$   
Female 7.0 – 8.5 million /  $mm^3$
  - (B) Males 3.5 – 5.5 million /  $mm^3$   
Female 3.0 – 5.0 million /  $mm^3$
  - (C) Males 4.0 – 7.5 million /  $mm^3$   
Females 5.0 – 6.5 million /  $mm^3$
  - (D) Males 4.5 – 6.5 million /  $mm^3$   
Females 4.0 – 5.5 million /  $mm^3$
9. Hemoglobin of males and female are respectively :
- (A) Male 13.5 – 18 g/dl  
Females 11.5 – 16 g/dl
  - (B) Male 13.0 – 15 g/dl  
Females 10.5 – 15 g/dl
  - (C) Male 12.6 – 14 g/dl  
Females 10.6 – 12 g/dl
  - (D) Male 14.5 – 19 g/dl  
Females 12.5 – 17 g/dl
10. Blood – reference intervals of Arterial gases is :
- (A)  $PaCO_2$  : 38 – 48 mm Hg
  - (B)  $PaCO_2$  : 45 – 60 mm Hg
  - (C)  $PaCO_2$  : 60 – 70 mm Hg
  - (D)  $PaCO_2$  : 35 – 45 mm Hg
11. In respiratory system contain inspired air normally :
- (A)  $O_2$  : 30.96% ;  $CO_2$  : 0.09% ;  $N_2$  = 69.95%
  - (B)  $O_2$  : 40% ;  $CO_2$  : 1% ;  $N_2$  = 59%
  - (C)  $O_2$  : 20.96% ;  $CO_2$  : 0.04% ;  $N_2$  = 79%
  - (D)  $O_2$  : 15% ;  $CO_2$  : 1% ;  $N_2$  = 84%

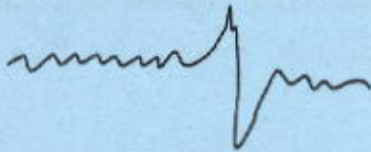
12. Kidneys of renal in maximum glucose reabsorptive capacity ( $Tm_c$ ) is normally :
- (A) Male 100 – 300 mg/min  
Females 200 – 250 mg/min
- (B) Male 100 – 300 mg/min  
Females 100 – 300 mg/min
- (C) Male 300 – 450 mg/min  
Females 200 – 300 mg/min
- (D) Male 300 – 450 mg/min  
Females 250 – 350 mg/min
13. The food item of dates, dried contains calories, proteins and fats are respectively.
- (A) Calories 317 Proteins 2.5 Fats 0.4 (B) Calories 217 Proteins 5.5 Fats 0.2
- (C) Calories 615 Proteins 4.7 Fats 0.1 (D) Calories 1012 Proteins 5.7 Fats 0.1
14. The food item of Mutton of boiled contains calories, proteins and fats are respectively.
- (A) Calories 300 Proteins 25.5 Fats 17.3 (B) Calories 194 Proteins 18.5 Fats 13.6
- (C) Calories 400 Proteins 35.7 Fats 4.7 (D) Calories 250 Proteins 17.5 Fats 10.9
15. In milk of cow's and curd contains calories, proteins and fats are respectively.
- (A) Calories 67 Proteins 3.2 Fats 4.1 (B) Calories 100 Proteins 10.7 Fats 1.2
- (C) Calories 102 Proteins 15.6 Fats 1.3 (D) Calories 50 Proteins 2.6 Fats 3.3
16. Molecular structure of cytosine bases of DNA is :



17. The classes of sugar of monosaccharide of example of Ribose is :



18. The following EEG diagram is represent :



(A) Biphasic spilce

(B) Biphasic sharp wave

(C) Monophasic sharp wave

(D) Slow wave sleep wave

19. EEG typically has frequency range of Beta ( $\beta$ ) is represented the following :

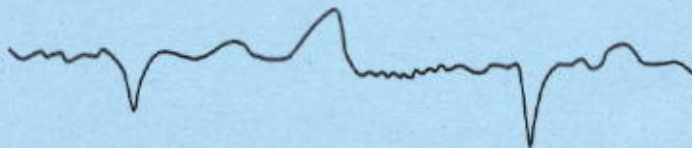
(A) Beta ( $\beta$ ) frequency range (above 17.5 Hz)

(B) Beta ( $\beta$ ) frequency range (2.5 – 3.5 Hz)

(C) Beta ( $\beta$ ) frequency range (7.5 – 12.5 Hz)

(D) Beta ( $\beta$ ) frequency range (above 12.5 Hz)

20. The following ECG diagram is represented :



(A) PVC

(B) Normal sinus rhythm

(C) Tachy cardia

(D) None of them

21. The cross correlation between the template sequence of the QRS complex and the incoming signal is computed using the following equation :

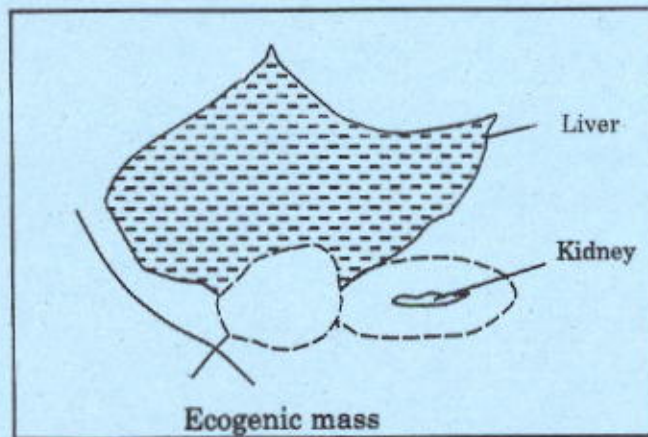
$$(A) \quad V_{xy}(m) = \begin{cases} \frac{1}{N} \sum_{n=0}^{N-m-1} x(n+m)y(n^2) & \text{for } 0 \leq m \leq N-1 \\ \frac{1}{N} \sum_{n=0}^{N-|m|-1} x(n) y(n+m) & \text{for } -(N-1) \leq m < 0 \end{cases}$$

$$(B) \quad V_{xy}(m) = \begin{cases} \frac{1}{N} \sum_{n=0}^{N-m-1} x(n+m)y(n) & \text{for } 0 \leq m \leq N-1 \\ \frac{1}{N} \sum_{n=0}^{N-|m|-1} x(n^2) y(n+m) & \text{for } -(N-1) \leq m < 0 \end{cases}$$

$$(C) \quad V_{xy}(m) = \begin{cases} \frac{1}{N} \sum_{n=0}^{N-m-1} x(n+m)y(n) & \text{for } 0 \leq m \leq N-1 \\ \frac{1}{N} \sum_{n=0}^{N-|m|-1} x(n) y(n+m) & \text{for } -(N-1) \leq m < 0 \end{cases}$$

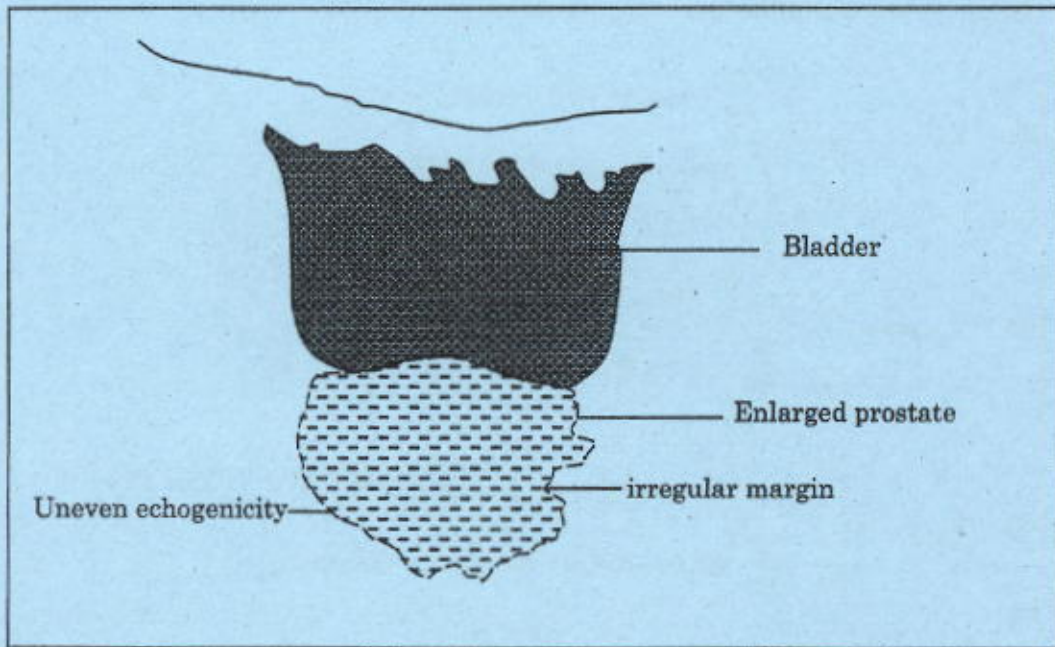
- (D) None of them

22. The following diagram of ultrasound appearances is represented :



- (A) Myelolipoma (LS)  
 (B) Neuroblastoma (LS)  
 (C) Pheochromocytoma (LS)  
 (D) Right adrenal mass (LS)

23. The following ultrasound of prostate of MALE PELVIS related image represented as :



- (A) Normal Prostate (LS)                      (B) Benign Prostatic Hypertrophy (LS)  
(C) Prostatitis (LS)                              (D) Prostatic Car Cinoma (TS)

24. Laws of Radiations is defined by:

- (A)  $\text{New dose} = \frac{\text{New dose} \times (\text{new distance})^2}{(\text{Old distance})^2}$   
(B)  $\text{New dose} = \frac{(\text{Old dose})^2 \times (\text{new distance})}{(\text{Old distance})^2}$   
(C)  $\text{New dose} = \frac{(\text{Old dose})^2 \times (\text{new distance})^2}{(\text{Old distance})}$   
(D)  $\text{New dose} = \frac{\text{Old dose} \times (\text{new distance})^2}{(\text{Old distance})^2}$

25. The following laws is states the rays must be absorbed to produce the effect will be produced at that which the rays are absorbed.

- (A) Law of Grothus - Drapper                      (B) Cosine Law  
(C) Law of Square                                      (D) Arndt - Schultz law

26. Which one electrodes used to method is used over larger area of the body. eg spine and is also called parallel method of placement?

- (A) Co-planar positioning of electrode (B) Contra-planar positioning of electrode  
(C) Mono – polar method (D) Cross – fire technique

27. Convert 120 ° F to ° C (conversion of Fahrenheit Scale to Centigrade Scale) is :

- (A) 48.8° C (B) 56.8°C  
(C) 30°C (D) 42°C

28. This type of microscope has a triple nosepiece with three objectives and two eye pieces.

- (A) Leitz Wetzler microscope (B) Bausch and Lomb microscope  
(C) Moreau microscope (D) Wilson's screw barrel type microscope

29. This type of objective lenses used in microscopes and corrected for Aplanatic, no spherical and chromatic aberration of red, blue, green. This type of lense is :

- (A) Aplanatic (B) Apochromatic  
(C) Achromatic (D) (A) and (C)

30. In rate of sedimentation defined as following :

- (A)  $\gamma = \frac{2}{9} \times \frac{\gamma_p^2 (\rho_p - \rho_m)}{\eta} \times g$  (B)  $\gamma = \frac{2}{9} \times \frac{\gamma_p (\rho_p - \rho_m)^2}{\eta^2} \times g$   
(C)  $\gamma = \frac{2}{18} \times \frac{\gamma_p^2 (\rho_p - \rho_m)^2}{\eta^2} \times g$  (D)  $\gamma = \frac{2}{18} \times \frac{\gamma_p^2 (\rho_p - \rho_m)}{\eta} \times g$

31. This type of Rotors used for low-speed centrifugation are made up of brass or steel and fixed zero angle rotor, the pellet is deposited along entire length of the outer wall.

- (A) Fixed angle rotors (B) Elutriator rotors  
(C) Vertical tube rotors (D) Zonal rotors

32. This type of electrode contains mercury chloride and saturated solution of Potassium Chloride for pH measurements.

- (A) Glass Electrode (B) Calomel Electrode  
(C) Compound Electrode (D) Armstrong Electrode