#### **1.** Mitochondrial electron transport chain:

- A. Generates an action potential
- B. Generates proton motive force
- C. Carries out oxidative phosphorylation
- D. Transports amino acids.
- E. Links electron transport to transport of pyruvate into mitochondria

#### 2. ATP synthesis by ATP synthase in the mitochondria

- A. Decreases the proton gradient
- B. Increases the proton gradient
- C. Requires glucose
- D. Requires fatty acids
- **3**. Synthesis/ oxidation of fatty acids occurs
  - A. In the mitochondria
  - B. In the rough endoplasmic reticulum
  - C. In the smooth endoplasmic reticulum
  - D. In the cytoplasm
- 4. The enzymes of the glycolysis are located:
  - A. In the mitochondria
  - B. In the rough endoplasmic reticulum

- C. In the smooth endoplasmic reticulum
- D. In the cytoplasm.
- 5. The major function of malate aspartate shuttle is to:
  - A. Transport reducing equivalent in cytosolic NADH into mitochondria
  - B. Transport reducing equivalent in mitochondrial NADH into cytosol
  - C. Transport reducing equivalent in cytosolic NADPH into mitochondria
  - D. Transport reducing equivalent in mitochondrial NADPH into cytosol.

**6.** Of the following nutrients, select the nutrient/s which cannot be converted to glucose:

- A. Lactic acid
- B. Alanine
- C. Palmitic acid
- D. Propionic acid
- E. Glutamine

7. The storage form of glucose in the liver and muscle is:

- A. Glycogen
- B. Cellulose
- C. Starch
- D. Glucuronic acid

**8.** The major determinant of biological value of dietary protein in monogastric animals is:

- A. Secretion of endogenous proteins
- B. Hind gut fermentation
- C. The amino acid composition of the digested and absorbed protein
- D. Digestibility
- 9. Complete oxidation of a mole of palmitic acid yields:
  - A. 129 moles of ATP
  - B. 12 moles of ATP
  - C. 2 moles of ATP
  - D. 38 moles of ATP

**10.** A codon for each amino acid is:

- A. Ambiguous and degenerate
- B. Ambiguous but not degenerate
- C. Degenerate but not ambiguous
- D. Degenerate but ambiguous

**11.** If k = 0.7 and ME intake = 10 MJ/d, then NE intake (MJ/d) =

- A. 0.7
- B. 0.07
- C. 7
- D. 14.29

**12.** Major organ responsible for production of endogenous arginine is:

- A. Stomach
- B. Heart
- C. Kidney
- D. Liver

**13.** Mammalian cells do not contain desaturases capable of introducing double bonds beyond carbon atom (from the carboxyl end):

A. 1 B. 3 C. 6 D. 9

**14.** Of the following amino acids, select the one which is non-essential:

- A. Lysine
- B. Leucine
- C. Valine
- D. Glutamine

**15.** Approximate net energy requirement for maintenance in cattle is:

- A. 77 MJ/d B. 25 MJ/d C. 10 MJ/d
- D. 0.7 MJ /d

**16.** Of the following nutrients, select the nutrient which can't be converted to glucose by hepatic gluconeogenesis

- A. Propionic acid
- B. Alanine
- C. Palmitic acid
- D. Acetic acid
- E. Butyric acid
- F. Lactic acid

#### **17.** Complete oxidation of a mole of glucose yields

- A. 129 moles of ATP
- B. 12 moles of ATP
- C. 2 moles of ATP
- D. 38 moles of ATP

**18.** Net energy requirement for maintenance of adult sheep is around

- A. 0.7 MJ /d
- B. 25 MJ /d
- C. 4 MJ / d
- D. 4 kJ /d

19. Major organ responsible for production of urea is

A. Stomach

- B. Heart
- C. Kidney
- D. Liver

20. Of the following are/one amino acids, select the one which is essential in the diet

- A. Alanine
- B. Citrulline
- C. Valine
- D. Glutamine

21. Of the following are/one amino acids, select the one which is essential in the diet

- A. Phenylalanine
- B. Asparagine
- C. Citrulline
- D. Alanine

**22.** Choose the likely MCP yield when a dairy cow eats 15 kg dry matter (M/D = 10) per day

- A. 150
- B. 1200
- C. 1.5
- D. 0.66

**23.** During ATP synthesis by substrate phosphorylation:

- A. A proton gradient is generated
- B. ATP is produced directly from ADP during a reaction
- C. ATP is synthesized directly from adenosine and inorganic phosphate
- D. All of the above

**24.** A shuttle involved in the transport of cytosolic NADH into mitochondria is:

- A. The phosphoenolpyruvate shuttle
- B. The malate-aspartate shuttle
- C. Citrate shuttle
- D. Oxaloacetate shuttle

**25.** How many moles of NADH are generated when 1 mole of Acetyl CoA is oxidized during one turn of TCA cycle?

- A. 1
- B. 3
- C. 12
- D. 122

**26.** During gluconeogenesis, propionic acid enters TCA cycle at the level of:

- A. Succinyl CoA
- B. Acetyl CoA
- C. Malate
- D. Oxaloacetate

**27.** Transfer of an amino group from one amino acid to a keto acid is called:

- A. Oxidative deamination
- B. Amino-keto transfer
- C. Ketoacidosis
- D. Transamination

**28.** Which of the following volatile fatty acids is the major source for synthesis of glucose?

- A. Acetic acid
- B. Butyric acid
- C. Propionic acid
- D. None of the above

**29.** Which of the following volatile fatty acids is the major source for synthesis of palmitic acid in ruminants?

- A. Acetic acid
- B. Butyric acid
- C. Propionic acid
- D. None of the above

**30.** Lactose synthetase is a complex of galactosyl transferase and:

- A. Casein
- B.  $\alpha$ -lacatlbumin
- C. Glucose

#### D. Lactose

**31.** Two major enzyme complexes involved in oxidative phosphorylation are:

- A. Fatty acid synthase complex and ATP synthase
- B. Electron transport chain and ATP synthase
- C. Electron transport chain and fatty acid synthase
- D. Oxidative deaminase and glycogen phosphorylase

**32.** Energy for the creation of a proton gradient across the inner membrane of mitochondria comes from a. b. c. d.

- A. NADPH
- B. NADH and FADH2
- C. Anaerobic glycolysis
- D. Gluconeogenesis

**33.** Which of the following is an essential amino acid?

- A. Serine
- B. Threonine
- C. Aspartic acid
- D. Glutamic acid

**34.** Net energy requirement for maintenance of adult cattle is around

A. 4 kJ /d

B. 4 MJ / d

C. 25 MJ /d

D. 0.7 MJ /d

**35.** The efficiency of utilization of ME for growth is around

A. 0.8

B. 0.7

C. 0.4

D. 0.2

**36.** Major end product of digestion protein in the small intestine of ruminants is

**37.** AcetateElongation of preformed fatty acid occurs in the \_\_\_\_\_\_ of the cell

**38.** The donor of two carbon units to extend the carbon chain for the synthesis of palmitate is \_\_\_\_\_

**39.** An example of a method of measuring protein digestibility that does not take into account contribution by endogenous proteins is \_\_\_\_\_\_

40. Many of the actions of somatotropin are mediated by \_\_\_\_\_

**41.** Transport of acetyl CoA from the mitochondrial matrix into the cytosol requires formation of

**42.** In the urea cycle, argininosuccinate is cleaved to form fumerate and

**43.** Major precursor of hepatic gluconeogenesis in the ruminants is \_\_\_\_\_\_

44. Synthesis of proteins occurs in the \_\_\_\_\_ of the cell

**45.** The major carbohydrate present in grasses is \_\_\_\_\_

**46.** An example of a method of measuring energy requirements for maintenance is

47. Synthesis of glucose from non-glucose precursors is called \_\_\_\_\_\_

**48.** Synthesis of lactose occurs in the \_\_\_\_\_ gland.

**49.** The major carbohydrate present in skeletal muscle is \_\_\_\_\_

**50.** Nucleic acids contribute \_\_% of nitrogen to microbial crude protein.

**51.** UDP content of 160 g CP of dg of 0.7 is \_\_\_\_

**52.** An important co-factor required in many biosynthetic reactions and produced by the pentose phosphate pathway is \_\_\_\_\_

53. Breakdown of fat by lipases results in the release of fatty acids and \_\_\_\_\_\_

54. The only amino acid that undergoes oxidative deamination in mammalian tissues is

55. RDP content of 160 g CP of dg of 0.7 is 48

56. Two tissues that are most active in the synthesis of fat are adipose tissue and the

**57.** In the first step of urea cycle, \_\_\_\_\_\_ is synthesized from ammonia, ATP and CO2

**58.** First limiting amino acid for protein synthesis in pigs fed a cereal based diet is likely to be \_\_\_\_\_\_

**59.** During gluconeogenesis oxalacetate is converted to phosphoenolpyruvate by the enzyme