

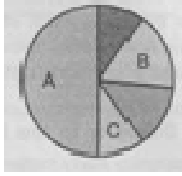
1. Gene which controls transcription of chain A and chain B required for humulin synthesis in *E. coli* is
 - (A) β -lactamase
 - (B) β -galactosidase
 - (C) Poly galacturonase
 - (D) Chitinase
2. Select an example of a tomato based GM crop that can tolerate abiotic stress.
 - (A) Flavr savr
 - (B) Bt-Brinjal
 - (C) Golden rice
 - (D) Pomato
3. Name the scientists associated with development of Golden Rice.
 - (A) Ingo Potrykus and Peter Beyer
 - (B) Milstein and Kohler
 - (C) Stanley Miller and Harold Urey
 - (D) Stanley Cohen and Herbert Boyer
4. A set of standards by which a community regulates its behaviour **and** activities in relation to the biological world is termed as
 - (A) Biopatent
 - (B) Biopiracy
 - (C) Patent
 - (D) Bioethics
5. What does 'Bt' in Bt toxin represent?
 - (A) Bioterrorism
 - (B) Bleeding toxin
 - (C) *Bacillus thuringiensis*
 - (D) Blue tooth toxin
6. Gene which controls transcription of chain A and chain B required for humulin synthesis in *E. coli* is
 - (A) β -lactamase
 - (B) β -galactosidase
 - (C) Poly galacturonase
 - (D) Chitinase
7. Which type of pH conditions are required for action by Bt toxin?
 - (A) 8.6
 - (B) 1
 - (C) 7.0
 - (D) 6.8
8. Mark the **correct** option regarding benefits of genetically modified (GM) plants.
 - (A) They are more susceptible to abiotic stress
 - (B) All of the GM plants are nutrient deficient
 - (C) Pest resistant plants have reduced reliance on chemical pesticides
 - (D) Their increased efficiency of mineral usage has led to depletion of nutrients in soil
9. Biopiracy is
 - (A) Distribution of bioresources fairly
 - (B) Patenting bioresources with authorisation
 - (C) Use of bioresources without authorisation
 - (D) Destroying bioresources
10. Presently how many recombinant therapeutics are being used worldwide?
 - (A) 12
 - (B) 18
 - (C) 30
 - (D) 47
11. An abnormal gene can be replaced by a normal gene by using
 - (A) Gene therapy
 - (B) Gene cloning
 - (C) Mutation
 - (D) Gene amplification
12. Presently how many recombinant therapeutics are being used worldwide?
 - (A) 12
 - (B) 18
 - (C) 30
 - (D) 47
13. Select the incorrect statement w.r.t. ELISA.
 - (A) K is based on the principle of antigen-antibody interactions
 - (B) Peroxidase is used in ELISA
 - (C) ELISA detects presence of antibodies synthesized against the pathogen
 - (D) It is used to detect mutations in genes of only suspected cancer patients
14. During conversion of proinsulin to insulin
 - (A) A and B chains are joined by disulphide linkages to form one single polypeptide
 - (B) C-peptide is removed
 - (C) C-peptide is added to chain B
 - (D) Rearrangement in position of A, B and C chains is observed.
15. The problem of vitamin-A deficiency in poor countries can be overcome by using
 - (A) Golden rice
 - (B) Transgenic maize
 - (C) Transgenic tomato
 - (D) Btbrinjal
16. Presently how many recombinant therapeutics are being used worldwide?
 - (A) 12
 - (B) 18
 - (C) 30
 - (D) 47
17. Which of the following is used in the production of insulin by genetic engineering?
 - (A) *Rhizobium*
 - (B) *Entamoeba ooli*
 - (C) *Saccharomyces*
 - (D) *Escherichia coli*
18. In India, the organisation responsible for assessing the safety of introducing genetically modified organisms for public use is
 - (A) NACO
 - (B) WHO
 - (C) RCGM
 - (D) GEAC
19. Presently how many recombinant therapeutics are being used worldwide?
 - (A) 12
 - (B) 18
 - (C) 30
 - (D) 47

20. 'Rosie' is a transgenic cow which produces milk rich in than normal cow. Select the option which fills the blank **correctly**
- (A) α_1 -antitrypsin
(B) Streptokinase
(C) Human α -lactalbumin
(D) Hirudin
21. Toxin present in Bt cotton in form of protoxin, gets converted into active toxin by
- (A) The action of saliva of insect
(B) Alkaline pH in gut of insect
(C) Acidic pH in gut of insect
(D) Action of microorganisms in gut of insect
22. Which of the following crop is more tolerant to abiotic stresses that has a much longer and more flavourful shelf life formed by using antisense RNA?
- (A) Flavr Savr tomato (B) Tobacco plant
(C) Both (A) & (B) (D) Bt cotton
23. The trigger for activation of toxin of *Bacillus thuringiensis* is
- (A) Acidic pH of stomach
(B) High temperature
(C) Alkaline pH of gut
(D) Mechanical action in the insect gut
24. Transgenic vitamin A. enriched basmati rice is
- (A) Golden rice (B) Hirudin
(C) Bt rice (D) Erythropoietin
25. Human insulin is being commercially produced from a transgeniG
- (A) *Mycobacterium* (B) *Escherichia*
(C) *Saccharomyces* (D) *Rhizobium*
26. How many amino acid are present in completely mature insulin?
- (A) 50 (B) 51
(C) 49 (D) 52
27. Which of the following vector has been used for introducing nematode-specific genes in infected tobacco plants?
- (A) *Meloidogyne incognita*
(B) *Bacillus thuringiensis*
(C) Ti plasmid of *Agrobacterium*
(D) Virus with RNA genome
28. α -1 antitrypsin is
- (A) An antacid
(B) An enzyme
(C) Used to treat arthritis
(D) Used to treat emphysema
29. Biopiracy means
- (A) Use of biopatents
(B) Thefts of plants and animals
(C) Stealing of bioresources
(D) Exploitation of bioresources without authentic permission
30. Which of the following companies started selling humulin in the year 1980s?
- (A) Eli Lilly
(B) GEAC
(C) Genetech
(D) Nexia biotechnologies

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| B | A | A | D | C | B | A | C | C | C | A | C | D | B | A |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| C | D | D | C | C | B | A | C | A | B | B | C | D | D | A |

- भूमण्डल पर कितने हॉट स्पॉट मौजूद हैं?
(A) 20 (B) 3
(C) 34 (D) 50
- उष्ण कटिबन्धीय क्षेत्रों में शीतोष्ण क्षेत्रों की अपेक्षा अधिक जैविक विविधता का कारण है
(A) अधिक मौसमी पर्यावरण की उपस्थिति
(B) विगत समय में हुआ निरन्तर हिमाच्छादान
(C) विगत समय में अत्यधिक परिवर्ती जलवायु तथा कम सौर ऊर्जा की प्राप्यता
(D) अधिक सौर ऊर्जा की प्राप्यता जो उच्च उत्पादकता में सहयोग देती है
- जन्तुओं तथा पादपों के विलोपन के लिए सबसे महत्वपूर्ण है
(A) अतिशोषण
(B) सहविलोपन
(C) विदेशज जातियों आक्रमण
(D) आवास ह्रास तथा विखण्डन
- भूमण्डलीय कशेरुकी विविधता के निम्न पाई चार्ट में A, B तथा C क्रमशः क्या प्रदर्शित करते हैं?



- (A) पक्षी, मछलियाँ, उभयचर
(B) स्तरधारी, सरीसृप, पक्षी
(C) मछलियाँ, पक्षी, उभयचर
(D) उभयचर, पक्षी, सरीसृप
- जैविविधता को संरक्षित रखने के लिए निम्न में से कौन मोटे तौर पर उपयोगी कारणों में सम्मिलित नहीं है?
(A) परागण
(B) सौन्दर्य सुख
(C) मृदा अपरदन का नियन्त्रण
(D) बाजार में बेचे जाने वाली 25% औषधियाँ पादपों
- निम्न में से कौन सा समीकरण जाति क्षेत्र सम्बन्ध को सही प्रदर्शित करता है?
(A) $\log C = \log S + Z \log A$
(B) $\log A = \log C + Z \log S$
(C) $\log A = \log S + Z \log C$
(D) $\log S = \log C + Z \log A$
- भूमण्डल पर कितने हॉट स्पॉट मौजूद हैं?
(A) 20 (B) 3
(C) 34 (D) 50
- एक स्थिर समुदाय द्वारा निम्न में से कौन सा/से लक्षण दर्शाया जाना/जाने चाहिए?
(A) विदेशज जातियों के आक्रमण के प्रति प्रतिरोधकता
(B) अवसरिक बाधाओं के प्रति प्रतिरोधकता
(C) वर्ष प्रतिवर्ष उत्पादकता में कम विभिन्नता
(D) इनमें से सभी
- अमेजन वर्षा वन पृथ्वी के वायुमण्डल में कुल ऑक्सीजन का _____ सहयोग देते हैं।
(A) 10% (B) 20%
(C) 15% (D) 25%

- जाति क्षेत्र संबंध किसने दिया था?
(A) राबर्ट मेय
(B) एडवर्ड विल्सन
(C) एलेकजेण्डर वॉन हम्बोल्ट
(D) पॉल इनलिक
- निम्न में से कौन सी प्रजातियाँ मानवों द्वारा किये गये अतिशोषण के कारण विलुप्त हुई हैं?
(A) नाइल पर्च (B) लेन्टाना
(C) अफ्रीकन केटफिश
(D) स्टीलर की समुद्री गाय
- कॉलमों का मिलान कीजिए तथा सही विकल्प का चयन कीजिए

| | Column A (Extinct species) | | Column B (Native area) |
|----|-------------------------------|-------|---------------------------|
| a. | डोडो | (i) | रूस |
| b. | क्वागा | (ii) | मॉरिशस |
| c. | थाइलेसाइन | (iii) | अफ्रीका |
| d. | स्टीलर की समुद्री काय | (iv) | ऑस्ट्रेलियन |

- | | a | b | c | d |
|-----|------|-------|-------|------|
| (A) | (ii) | (iv) | (iii) | (i) |
| (B) | (i) | (ii) | (iii) | (iv) |
| (C) | (ii) | (iii) | (iv) | (i) |
| (D) | (iv) | (iii) | (ii) | (i) |

- यदि हम संपूर्ण महाद्वीप में प्रजाति क्षेत्र संबंध का विश्लेषण करें तो हमें पता चलेगा कि समाश्रयण गुणांक (z) का मान निम्न परास में होता है
(A) 1.2 to 2.6 (B) 0.1 to 0.2
(C) 0.6 to 1.2 (D) 0.2 to 0.6
- निम्न में से कौन सा एक विदेशी प्रजाति का उदाहरण नहीं है?
(A) पूर्वी अफ्रीका के विक्टोरिया झील का सिचलिड मछली
(B) भारत का पार्थेनियम
(C) भारत की जलकुंभी
(D) पूर्वी अफ्रीका के विक्टोरिया झील की नाइल पर्च
- यदि हम संपूर्ण महाद्वीप में प्रजाति क्षेत्र संबंध का विश्लेषण करें तो हमें पता चलेगा कि समाश्रयण गुणांक (z) का मान निम्न परास में होता है
(A) 1.2 to 2.6 (B) 0.1 to 0.2
(C) 0.6 to 1.2 (D) 0.2 to 0.6
- कशेरुकियों के निम्नलिखित में से किस टैक्सा में अधिकतम संख्या में प्रजातियाँ पायी जाती हैं?
(A) मछली (B) पक्षी
(C) उभयचर (D) सरीसृप
- यदि हम संपूर्ण महाद्वीप में प्रजाति क्षेत्र संबंध का विश्लेषण करें तो हमें पता चलेगा कि समाश्रयण गुणांक (z) का मान निम्न परास में होता है
(A) 1.2 to 2.6 (B) 0.1 to 0.2
(C) 0.6 to 1.2 (D) 0.2 to 0.6
- दिया गया कौन सा एक झील विक्टोरिया का सबसे बड़ा परभक्ष मछली है जो स्थानिक जाति के विशिष्ट संयोजन के निष्कासन के लिए उत्तरदायी होता है?
(A) सिचलिड मछली (B) लैन्टाना
(C) आइकॉर्निया (D) नाइल पर्च

19. बहि-स्थाने संरक्षण नीतियों के संदर्भ में विषम पद का चयन कीजिए।
 (A) बीज बैंक
 (B) प्राणी उद्यान
 (C) राष्ट्रीय उद्यान
 (D) वन्यजीव सफारी उद्यान
20. निम्न में से कौनसा समूह विलोपन के अत्यधिक संकट का सामना कर रहा है?
 (A) पक्षी (B) स्तनी
 (C) अनावृतबीजा (D) उभयचरी
21. एक एकल जाति के द्वारा इसकी वितरण श्रेणी पर युग्मविकल्पी भिन्नताओं के कारण दर्शायी जाने वाली उच्च विविधता क्या कहलाती है
 (A) जातीय विविधता
 (B) पारिस्थितिकी विविधता
 (C) आनुवंशिक विविधता
 (D) पारितंत्र विविधता
22. सम्पूर्ण विश्व में कितनी प्रतिशत स्तनी जातियाँ विलोपन के खतरे का सामना कर रही है?
 (A) 12% (B) 23%
 (C) 32% (D) 31%
23. गलत मिलान वाले विकल्प का चयन कीजिए।
 (A) A.V. हम्बोल्ट : जाति क्षेत्र सम्बंध
 (B) डेविड टिलमैन : जैवविविधता पद दिया था
 (C) रॉबर्ट मेय : वैश्विक जातीय विविधता
 (D) पॉल इरलिक : रिबेट पोपर अवधारणा
24. हाल ही के वर्षों में कई जातियाँ विलुप्त हो चुकी हैं। इसके लिए निम्न में से कौन सा सबसे महत्वपूर्ण कारण है?
 (A) अति दोहन
 (B) सह विलोपन
 (C) आवास की हानि तथा खण्डन
 (D) विदेशी जातियों का हमला
25. निम्न में से कौन सा जैवविविधता के उत्स्थाने संरक्षण का एक तरीका है?
 (A) जैवमण्डल संरक्षण
 (B) वन्यजीव सफारी उद्यान
 (C) राष्ट्रीय उद्यान
 (D) वन्यजीव अभ्यारण्य
26. वर्तमान में प्रगति पर चल रहा "छटा विलोपन" पूर्व में होने वाले विलापनों से भिन्न है क्योंकि यह
 (A) मानवीय गतिविधियों के कारण नहीं हुआ
 (B) पूर्व विलापनों से अधिक धीमा है
 (C) कई नई जातियों का निर्माण कर रहा है
 (D) मुख्यतः मानवीय गतिविधियों के कारण हुई हैं

27. कॉलम I का कॉलम II से मिलान कीजिये तथा सही विकल्प का चयन कीजिए।

| | Column I | | Column II |
|----|------------------|-------|---------------------------|
| a. | पश्चिमी घाट | (i) | खासी व जैयन्तिया पहाडियाँ |
| b. | पवित्र घाट | (ii) | स्व स्थाने संरक्षण युक्ति |
| c. | वनस्पति उद्यान | (iii) | स्वस्थाने संरक्षण युक्ति |
| d. | राष्ट्रीय उद्यान | (iv) | हॉट स्पॉट |

- (A) a(iv), b(i), c(iii), d(ii)
 (B) a(iv), b(i), c(ii), d(iii)
 (C) a(iv), b(iii), c(ii), d(i)
 (D) a(iv), b(ii), c(iii), d(i)

28. जैवविविधता के हॉट स्पॉट के संदर्भ में विषम विकल्प का चयन कीजिए।

- (A) पश्चिमी घाट तथा श्रीलंका
 (B) इण्डो वर्मा
 (C) राजस्थान की अरावली पहाडियाँ
 (D) हिमालय

29. कॉलम I का कॉलम II से मिलान कीजिये तथा सही विकल्प का चयन कीजिए।

| | Column I | | Column II |
|----|------------------|-------|---------------------------|
| a. | पश्चिमी घाट | (i) | खासी व जैयन्तिया पहाडियाँ |
| b. | पवित्र घाट | (ii) | स्व स्थाने संरक्षण युक्ति |
| c. | वनस्पति उद्यान | (iii) | स्वस्थाने संरक्षण युक्ति |
| d. | राष्ट्रीय उद्यान | (iv) | हॉट स्पॉट |

- (A) a(iv), b(i), c(iii), d(ii)
 (B) a(iv), b(i), c(ii), d(iii)
 (C) a(iv), b(iii), c(ii), d(i)
 (D) a(iv), b(ii), c(iii), d(i)

30. कॉलम I का कॉलम II से मिलान कीजिये तथा सही विकल्प का चयन कीजिए।

| | Column I | | Column II |
|----|------------------|-------|---------------------------|
| a. | पश्चिमी घाट | (i) | खासी व जैयन्तिया पहाडियाँ |
| b. | पवित्र घाट | (ii) | स्व स्थाने संरक्षण युक्ति |
| c. | वनस्पति उद्यान | (iii) | स्वस्थाने संरक्षण युक्ति |
| d. | राष्ट्रीय उद्यान | (iv) | हॉट स्पॉट |

- (A) a(iv), b(i), c(iii), d(ii)
 (B) a(iv), b(i), c(ii), d(iii)
 (C) a(iv), b(iii), c(ii), d(i)
 (D) a(iv), b(ii), c(iii), d(i)

BIOLOGY

जैव विविधता एवं संरक्षण Biodiversity and conservation

DPP-1

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| C | D | D | C | D | D | C | D | B | C | D | C | C | A | C |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| A | C | D | C | D | C | B | B | C | B | D | B | C | B | B |

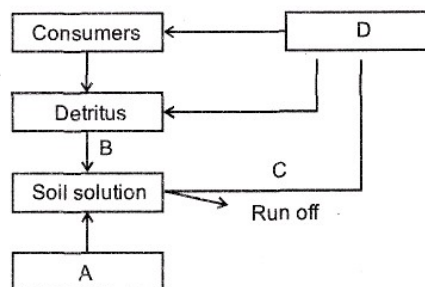
1. During the process of ecological succession
 - (A) Species diversity decreases
 - (B) Structural complexity decreases
 - (C) Niche become specialised
 - (D) Food chain relationship becomes simple
2. Which of the following statement about decomposition is incorrect?
 - (A) Decomposers break down complex organic matter into inorganic substances
 - (B) Water insoluble organic nutrients go down into the soil horizon during the process of leaching
 - (C) In fragmentation, detritivores break down detritus into smaller particles
 - (D) Saprophytic bacteria and fungi secrete digestive enzymes over the fragmented detritus
3. Phosphorus is major component of
 - (A) Biological membranes
 - (B) Nucleic acids
 - (C) Cellular energy transfer system
 - (D) All of these
4. For tree and grassland ecosystems, pyramid of biomass is
 - (A) Upright
 - (B) Inverted
 - (C) Spindle-shaped
 - (D) Urn-shaped
5. Which one is **not** a key functional aspect of an ecosystem?
 - (A) Decomposition
 - (B) Energy flow
 - (C) Species composition
 - (D) Nutrient cycle
6. In which of the following processes of decomposition, there is no direct involvement of living organisms?
 - (A) Fragmentation of detritus
 - (B) Leaching
 - (C) Humification
 - (D) Mineralisation
7. Identify true (T) or false (F) statements and select the **correct** option.
 - a. Tropical rainforest and sugarcane field are the most productive ecosystems.
 - b. Secondary productivity is the rate of formation of new organic matter by consumers.
 - c. Humus is colourless and partly decomposed organic matter.

| | a | b | c |
|-----|---|---|---|
| (A) | T | T | F |
| (B) | T | T | T |
| (C) | F | T | F |
| (D) | T | F | F |
8. Net primary productivity
 - (A) Does not depend on environmental factors
 - (B) Of ocean is higher than terrestrial ecosystems
 - (C) Is the available biomass for the consumption to heterotrophs
 - (D) Is the rate of formation of new organic matter by consumers
9. What is **incorrect** about primary succession?
 - (A) It starts at barren area
 - (B) Climax reaches very quickly
 - (C) Pioneer community does not get established easily
 - (D) Cooled volcanic lava, igneous rocks etc. are areas where it starts
10. Hydrarch succession proceeds from
 - (A) Hydric to xeric conditions
 - (B) Xeric to hydric conditions
 - (C) Mesic to hydric conditions
 - (D) Hydric to mesic conditions
11. Which one is **odd** w.r.t. gaseous cycle?
 - (A) Carbon cycle
 - (B) Hydrogen cycle
 - (C) Phosphorus cycle
 - (D) Nitrogen cycle
12. Each trophic level has certain mass of living material at a particular time called
 - (A) Standing crop
 - (B) Standing state
 - (C) GPP
 - (D) NPP
13. In aquatic ecosystem, major channel for energy flow is
 - (A) Grazing food chain
 - (B) Detritus food chain
 - (C) Auxiliary food chain
 - (D) Parasitic food chain
14. In most ecosystems, all the pyramids of number, energy and biomass are upright. It indicates that
 - (A) Producers are more in number and biomass than the herbivores.
 - (B) Herbivores are less in number and biomass than the carnivores.
 - (C) Energy at a lower trophic level is always more than at a higher level.

Choose the **correct** option.

 - (A) Only (A) is correct
 - (B) Only (B) is correct
 - (C) Both (A) and (C) are correct
 - (D) Both (B) and (C) are correct
15. During primary succession on rocks, pioneer species are
 - (A) Annual grasses
 - (B) Perennial grasses
 - (C) Xerophytic shrubs
 - (D) Lichens
16. What is the percentage of PAR(Photosynthetically active radiation) in incident solar radiation?
 - (A) 50%
 - (B) > 50%
 - (C) 0%
 - (D) < 50%
17. Find the odd statement w.r.t. phosphorus cycle
 - (A) Natural reservoir of phosphorus is rocks.
 - (B) Herbivores and other animals obtain phosphorus from soil.
 - (C) There is no respiratory release of phosphorus into atmosphere.
 - (D) Inputs of phosphorus through rainfall is much smaller.

18. In hydrarch succession
 (A) Lichens are the pioneer community
 (B) Germination and establishment of propagules does not occur
 (C) The succession occurs xeric to mesic conditions
 (D) Total biomass and humus content of soil increases
19. The rate of formation of new organic material by consumers is called
 (A) Gross primary productivity
 (B) Secondary productivity
 (C) Net primary productivity
 (D) Photosynthetic efficiency
20. Select the correct statement w.r.t energy flow in an ecosystem
 (A) Plants capture 2-10% of incident solar radiation for photosynthesis
 (B) Energy flow in an ecosystem is always multidirectional
 (C) Energy remains trapped in any organism permanently
 (D) Energy flow follows laws of thermodynamics
21. Which of the following places are suitable sites for secondary succession?
 (a) Cooled volcanic lava
 (b) Sand dunes
 (c) Abandoned farm lands
 (d) Igneous rocks
 (e) Burned or cut forests
 (f) Flooded lands
 (A) Only (a) and (c)
 (B) Only (c), (e) and (f)
 (C) Only (a), (b) and (d)
 (D) All except (d)
22. The pyramid of number is upright in
 (A) Tree and pond ecosystems
 (B) Grassland and pond ecosystems
 (C) Tree and grassland ecosystems
 (D) Aquatic ecosystems only
23. Reed swamp stage of succession in a pond is characterised by
 (A) Rooted emergent plants
 (B) Submerged floating plants
 (C) Plants in shallow water but non-emergent
 (D) Free floating plants
24. Choose the **incorrect** statement w.r.t. phosphorus cycle.
 (A) Has no respiratory release
 (B) Much smaller amount of phosphorus is added through rainfall
 (C) Small amount of phosphate is added through weathering of rocks
 (D) Comparatively faster replenishment than carbon cycle
25. Choose the correct option w.r.t. given below flow chart of phosphorus cycle.



- a. $B = C$
 b. A is reservoir pool
 c. D are producers
 d. Is a gaseous cycle
 (A) a & c (B) b & d
 (C) c & d (D) b & c
26. The biogenetic nutrients in a ecosystem
 (A) Exist in ionic or active form in cycling pool
 (B) As a whole remain in circulation all the time
 (C) Are recycled by physical processes like oxidation and reduction by consumers
 (D) Are not replenished by gaseous cycle
27. NPP, mathematically can be expressed as
 (A) $NPP = R$ (B) $R = GPP$
 (C) $GPP = R$ (D) $GPP + R$
28. Ecological pyramids of an ecosystem do not accommodate
 (A) Saprotrophs
 (B) Decomposers and food web
 (C) Consumers occupying different trophic levels
 (D) More than one option is correct
29. Which of the following trophic level is occupied by the man feeding on curd?
 (A) T_2 (B) T_3
 (C) T_4 (D) T_1
30. Food web usually exists in ecosystem which
 (A) Is based on order of preference
 (B) Consists of several interconnected food chains
 (C) May include organisms occupying different trophic levels
 (D) More than one option is correct

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C | B | D | A | C | B | A | C | B | D | C | A | A | C | D |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| D | B | D | B | D | B | B | A | D | D | A | C | D | B | D |

1. Which of the following is considered as a pollution indicator in light of industrial melanism?
 - (A) Frequency of melanic moth
 - (B) Lichen
 - (C) Predator birds
 - (D) Frequency of light coloured moth
2. Weismann's theory of germplasm rejected
 - (A) Mutation theory
 - (B) Darwin's theory of natural selection
 - (C) Darwin's theory of Pangenesis
 - (D) Neo-Darwinism
3. Dinosaurs were dominant in the world in which of the following Era?
 - (A) Cenozoic
 - (B) Jurassic
 - (C) Mesozoic
 - (D) Devonian
4. Key concepts on which Darwinian theory of evolution is based are
 - (A) Branching descent and natural selection
 - (B) Saltation and mutations
 - (C) Genetic drift and variations
 - (D) Population statistics and physical fitness of organism
5. Big-Bang theory attempts to explain the
 - (A) Origin of life
 - (B) Origin of species
 - (C) Origin of Earth
 - (D) Origin of Universe
6. Study of history of life forms on earth is known as
 - (A) Evolutionary biology
 - (B) Morphology
 - (C) Physiology
 - (D) Biogenesis
7. Which of the following animals is connecting link between annelida and arthropoda?
 - (A) *Peripatus*
 - (B) *Neopilina*
 - (C) *Protopterus*
 - (D) *Platypus*
8. S. Miller created electric discharge in a closed flask containing CH_4 , H_2 , NH_3 and water vapours at 800°C and initially observed formation of
 - (A) Fats
 - (B) Amino acids
 - (C) Nucleic acids
 - (D) Polysaccharides
9. Which of following examples does not show analogy?
 - (A) Mouth parts of mosquito and cockroach
 - (B) Eyes of Octopus and mammals
 - (C) Fins of shark and Flippers of dolphin
 - (D) Sting of honeybee and scorpion
10. Tendrils of *Cucurbita* and thorn of *Bougainvillea* are
 - (A) Homologous organs that have evolved due to convergent evolution
 - (B) Homologous organs that have evolved due to divergent evolution
 - (C) Analogous organs that have evolved due to convergent evolution
 - (D) Analogous organs that have evolved due to divergent evolution
11. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask
 - (A) CH_3 , H_2 , NH_4 and water vapor at 800°C
 - (B) CH_4 , H_2 , NH_3 and water vapor at 600°C
 - (C) CH_3 , H_2 , NH_3 and water vapor at 600°C
 - (D) CH_4 , H_2 , NH_3 and water vapor at 800°C
12. The chronological order of human evolution from early to the recent is
 - (A) *Australopithecus* → *Ramapithecus* → *Homo habilis* → *Homo erectus*
 - (B) *Ramapithecus* → *Australopithecus* → *Homo habilis* → *Homo erectus*
 - (C) *Ramapithecus* → *Homo habilis* → *Australopithecus* → *Homo erectus*
 - (D) *Australopithecus* → *Homo habilis* → *Ramapithecus* → *Homo erectus*
13. Embryological support for evolution was disapproved by
 - (A) Alfred Wallace
 - (B) Charles Darwin
 - (C) Oparin
 - (D) Karl Ernst von Baer
14. After about how many years of formation of earth, life appeared, on this planet?
 - (A) 50 billion years
 - (B) 500 billion years
 - (C) 50 million years
 - (D) 500 million years
15. The similarity of bone structure in the forelimbs of many vertebrates is an example of
 - (A) Homology
 - (B) Analogy
 - (C) Adaptive radiation
 - (D) Convergent evolution
16. A Hominid fossil discovered in Java in 1891, now extinct, having cranial capacity of about 900 cc was
 - (A) *Australopithecus*
 - (B) *Homo erectus*
 - (C) Neanderthal' man
 - (D) *Homo sapiens*
17. Flippers of Penguins and Dolphins are examples of
 - (A) Convergent evolution
 - (B) Industrial melanism
 - (C) Natural selection
 - (D) Adaptive radiation

18. Match the hominids with their correct brain size :
- | | |
|----------------------------------|------------------|
| (a) <i>Homo habilis</i> | (i) 900 cc |
| (b) <i>Homo neanderthalensis</i> | (ii) 1350 cc |
| (c) <i>Homo erectus</i> | (iii) 650-800 cc |
| (d) <i>Homo sapiens</i> | (iv) 1400 cc |
- Select the correct option.
- | | | | | |
|-----|-------|-------|------|------|
| | (a) | (b) | (c) | (d) |
| (A) | (iii) | (i) | (iv) | (ii) |
| (B) | (iii) | (ii) | (i) | (iv) |
| (C) | (iii) | (iv) | (i) | (ii) |
| (D) | (iv) | (iii) | (i) | (ii) |
19. Which of the following statements is correct about the origin and evolution of men?
- (A) Neanderthal men lived in Asia between 1,00,000 and 40,000 years back.
- (B) Agriculture came around 50,000 years back.
- (C) The *Dryopithecus* and *Ramapithecus* primates existing 15 million years ago, walked like men.
- (D) *Homo habilis* probably ate meat.
20. Embryological support for evolution was proposed by
- (A) Alfred Wallace (B) Ernst Heckel
(C) Karl Ernst von Baer (D) Charles Darwin
21. Miller's experiment provided evidence for the theory of
- (A) Special creation
(B) Biogenesis followed by abiogenesis
(C) Biogenesis
(D) Chemical evolution
22. Which of the following is a direct ancestor of *Homo sapiens*?
- (A) *Homo erectus*
(B) *Homo sapiens neanderthalensis*
(C) *Ramapithecus*
(D) *Australopithecus*
23. Who said that "Life arises from pre-existing life"?
- (A) Aristotle (B) Louis Pasteur
(C) Oparin (D) Darwin
24. What are the anatomical structures called that share a common ancestry?
- (A) Analogous structures
(B) Homologous structures
(C) Evolutionary structures
(D) Vestigial structures
25. Pattern of bones in forelimbs of humans and wings of bat are an example of
- (A) Parallel evolution
(B) Vestigial organs
(C) Analogous organs
(D) Homologous organs
26. Who were the first to use hides to protect their body and buried their dead?
- (A) Neanderthal man (B) *Homo erectus*
(C) Cromagnon man (D) *Homo habilis*
27. The most significant change in human evolution is regarded as
- (A) Evolution of language
(B) Erect posture
(C) Increase in cranial capacity
(D) Bipedal gait and binocular vision
28. Mule is a product of
- (A) Mutation (B) Inbreeding
(C) Cross-breeding (D) Interspecific hybridization
29. Which of the following is **not** a connecting link?
- (A) *Neopilina* (B) *Peripatus*
(C) *Latimeria* (D) *Limulus*
30. Fitness, according to Darwin refers ultimately and only to
- (A) Dominance over others
(B) Ability to defend
(C) Strategy for obtaining food
(D) Number of offsprings

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| D | C | C | A | D | A | A | B | A | B | D | B | D | D | A |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| B | A | C | D | B | D | A | B | B | D | A | C | D | D | D |

1. If the DNA codons are ATG ATG ATG and a cytosine base is inserted at the beginning, then which of the following will result?
 - (A) CATGATGATG
 - (B) A non-sense mutation
 - (C) CATGATGATG
 - (D) CATGATGATG
2. If the sequence of bases in DNA is ATTCGATG, then the sequence of bases in its transcript will be
 - (A) GUAGCUUA
 - (B) AUUCGAUG
 - (C) CAUCGAAU
 - (D) UAAGCUAC
3. Which of the following serves as an stop codon?
 - (A) UAG
 - (B) AGA
 - (C) AUG
 - (D) GCG
4. The codons causing chain termination are.
 - (A) AGT, TAG, UGA
 - (B) UAG, UGA, UAA
 - (C) TAG, TAA, TGA
 - (D) GAT, AAT, AGT
5. In a DNA, percentage of thymine is 20% then what will be percentage of guanine?
 - (A) 20%
 - (B) 40%
 - (C) 30%
 - (D) 60%
6. The lac operon is an example of
 - (A) Repressible operon
 - (B) Overlapping genes
 - (C) Arabinose operon
 - (D) Inducible operon
7. Which enzyme/s will be produced in a cell in which there is a nonsense mutation in the lac y gene?
 - (A) Lactose permease
 - (B) Transacetylase
 - (C) Lactose permease and transacetylase
 - (D) β -galactosidase
8. Which one of the following triplet codon, is correctly matched with its specificity for an amino acid in protein synthesis or as 'start' or 'stop' codon?
 - (A) UCG-start
 - (B) UUU - stop
 - (C) UGU-leucine
 - (D) UAC - tyrosine
9. m-RNA is synthesised on DNA template in which -direction?
 - (A) 5' \rightarrow 3'
 - (B) 3' \rightarrow 5'
 - (C) Both (A) & (B)
 - (D) Any of these
10. Removal of RNA polymerase III from nucleoplasm will affect the synthesis of
 - (A) mRNA
 - (B) rRNA
 - (C) tRNA
 - (D) hnRNA
11. There are special proteins that help to open up DNA double helix in front of the replication fork. These proteins are
 - (A) DNA Ligase
 - (B) DNA topoisomerase I
 - (C) DNA gyrase
 - (D) DNA polymerase I
12. What does "lac" refer to in what we call the lac operon?
 - (A) Lactose
 - (B) Lactase
 - (C) Lac insect
 - (D) The number 1,00,000
13. Removal of introns and joining of exons in a defined order during transcription is called
 - (A) Slicing
 - (B) Splicing
 - (C) Looping
 - (D) Inducing
14. Which one of the following is not a part of a transcription unit in DNA?
 - (A) A promoter
 - (B) The structural gene
 - (C) The inducer
 - (D) A terminator
15. If one strand of DNA has the nitrogenous base sequence as ATCTG, what would be the complementary RNA strand sequence?
 - (A) AACTG
 - (B) ATCGU
 - (C) TTAGU
 - (D) UAGAC
16. Which one of the following *does* not follow the central dogma of molecular biology?
 - (A) HIV
 - (B) Pea
 - (C) *Mucor*
 - (D) *Chlamydomonas*
17. The 3' — 5' phosphodiester linkages inside a polynucleotide chain serve to join
 - (A) One DNA strand with the other DNA strand
 - (B) One nucleoside with another nucleoside
 - (C) One nucleotide with another nucleotide
 - (D) One nitrogenous base with pentose sugar
18. 'Lac operon' in *E. coli*, is induced by
 - (A) "i" gene
 - (B) Promoter gene
 - (C) β -galactosidase
 - (D) Lactose

19. Semiconservative replication of DNA was first demonstrated in
 (A) *Escherichia coli*
 (B) *Streptococcus pneumoniae*
 (C) *Salmonella typhimurium*
 (D) *Drosophila melanogaster*
20. Jacob and Monod studied lactose metabolism in *E. coli* and proposed operon concept. Operon concept is applicable for
 (A) All prokaryotes
 (B) All prokaryotes and some eukaryotes
 (C) All prokaryotes and all eukaryotes
 (D) All prokaryotes and some protozoans
21. Whose experiments cracked the DNA and discovered unequivocally that a genetic code is a "triplet"?
 (A) Hershey and Chase
 (B) Morgan and Sturtevant
 (C) Beadle and Tatum
 (D) Nirenberg and Mathaei
22. The Okazaki fragments in DNA chain growth:
 (A) Polymerize in the 5'-to-3' direction and explain 3'- to -5' DNA replication
 (B) Result in transcription
 (C) Polymerize in the 3'- to -5' direction and forms replication fork
 (D) Prove semi-conservative nature of DNA replication
23. In the genetic code dictionary, how many codons are used to code for all the 20 essential amino acids?
 (A) 20 (B) 64
 (C) 61 (D) 60
24. One turn of the helix in a B-form DNA is approximately:
 (A) 20 nm (B) 0.34 nm
 (C) 3.4 nm (D) 2 nm
25. Out of 64 codons, 61 codons code for 20 types of amino acid. It is called
 (A) Degeneracy of genetic code
 (B) Overlapping of genes
 (C) Wobbling of codons
 (D) Universality of codons
26. One gene - one enzyme hypothesis was postulated by
 (A) R. Franklin
 (B) Hershey and Chase
 (C) A. Garrod
 (D) Beadle and Tatum
27. Uridine, present only in RNA is a
 (A) Pyrimidine (B) Nucleoside
 (C) Nucleotide (D) Purine
28. Initiation codon in eukaryotes is
 (A) GAU (B) AGU
 (C) AUG (D) UAG
29. Which of the following is **not** a property of the genetic code?
 (A) Universal (B) Non-overlapping
 (C) Ambiguous (D) Degeneracy
30. Which of the following nucleotide sequences contain 4 pyrimidine bases?
 (A) GATCAATGC (B) GCUAGACAA
 (C) UAGCGGUAA (D) Both (B) & (C)

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| A | D | A | B | C | D | D | D | A | C | C | A | B | C | D |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| A | C | D | A | A | D | A | C | C | A | D | B | C | C | A |

1. In entomophily, flowers are
 - (A) Dull coloured
 - (B) Nectarless
 - (C) With sticky pollen grains
 - (D) Small sized solitary
2. In flowering plants, the generative cell of pollen grain divides mitotically to give rise to the
 - (A) 2 male gametes
 - (B) 3 male gametes
 - (C) 1 male gamete
 - (D) 4 male gametes
3. Select the **correct** match w.r.t. vegetative propagules in angiosperms.

| | |
|---------------|----------------------|
| (A) Rhizome | : Water hyacinth |
| (B) Offset | : <i>Bryophyllum</i> |
| (C) Bulbil | : <i>Oxalis</i> |
| (D) Leaf buds | : Ginger |
4. Which of the following weed has become a major cause of pollen allergy in India?
 - (A) *Pistia*
 - (B) *Myosotis*
 - (C) *Parthenium*
 - (D) *Mirabilis*
5. Scutellum is
 - (A) Single cotyledon in monocots
 - (B) Radical sheath in monocots
 - (C) Plumule covering in monocots
 - (D) Cotyledons in dicots
6. Select the plant species which flower only once in their life time, generally after 50-100 years, produce large number of fruits and die....._
 - (A) *Strobilanthus*
 - (B) Bamboo
 - (C) Rice
 - (D) Teak
7. The precautionary measures in artificial hybridisation is/are
 - (A) Emasculation only
 - (B) Bagging only
 - (C) Both emasculation and bagging
 - (D) Tagging
8. Mature male gametophyte is
 - (A) One-celled
 - (B) Two celled
 - (C) One-celled and two-nucleate
 - (D) Three-celled
9. Select the odd one out w.r.t. wall layers of microsporangium in flowering plants
 - (A) Endothecium
 - (B) Middle layers
 - (C) Tapetum
 - (D) Integument
10. Which of the following pollination is common amongst abiotic agents?
 - (A) Hydrophily
 - (B) Entomophily
 - (C) Ornithophily
 - (D) Anemophily
11. Which of the following option about tapetum is correct?
 - (A) Nutritive tissue
 - (B) Sporogenous tissue
 - (C) Protective and haploid tissue
 - (D) External layer of microsporangium wall
12. The vital link that ensures continuity of species between organisms of one generation and the next is
 - (A) Zygote
 - (B) Sperm
 - (C) Pollen grain
 - (D) Egg
13. A typical angiospermic anther is bilobed and tetragonal consisting of
 - (A) Two microsporangia
 - (B) Three microsporangia
 - (C) Four microsporangia
 - (D) Only one microsporangium
14. In most of the flowering plants, pollination takes place at _____celled stage.
 - (A) 2
 - (B) 3
 - (C) 4
 - (D) 5
15. Porogamy is entry of pollen tube into ovule through the
 - (A) Integument
 - (B) Chalaza
 - (C) Micropyle
 - (D) Funicle
16. Majority of insect pollinated flowers are
 - (A) Small, colorless, fragrant and producing dry pollens
 - (B) Large, colorful, fragrant and rich in nectar
 - (C) Small and producing large number of dry pollens
 - (D) Large, colorful, without nectar and producing dry pollens
17. The **correct** sequence of events of sexual reproduction is
 - (A) Gametogenesis, embryogenesis and fertilization events
 - (B) Pre-fertilization, fertilization and gametogenesis events
 - (C) Pre-fertilization, fertilization and post fertilization events
 - (D) Pre-fertilization, parthenogenesis and embryogenesis
18. Choose the odd statement for pollen grains
 - (A) Pollen grains of some species cause severe allergies
 - (B) Can be used as food supplement
 - (C) Can be stored at -196°C in liquid N_2
 - (D) Have fascinating array of patterns and designs of pectocellulose on outer wall.

19. The term _____ is used to describe morphologically and genetically similar individuals
 (A) Clone (B) Hybrid
 (C) Offspring (D) Monoecious
20. An aquatic plant which is pollinated by water is
 (A) Water hyacinth (B) Water lily
 (C) *Zostera* (D) *Salvia*
21. Endospermic dicotyledonous seeds are present in
 (A) Pea (B) Castor
 (C) Beans (D) Groundnut
22. In flowering plants, which of the following structures is present before fertilisation?
 (A) Seed (B) Pericarp
 (C) Ovule (D) Endosperm
23. The layer in pollen grain which has germ pores is
 (A) Epidermis (B) Epicarp
 (C) Exine (D) Outer integument
24. The event which is unique to angiosperms is
 (A) Fusion of male and female gametes
 (B) Fusion of male gamete with secondary nucleus
 (C) Formation of zygote
 (D) Presence of female gametophyte
25. Pollen grains are the carrier of male gametes in
 (A) Algae (B) Bryophytes
 (C) Angiosperms (D) Pteridophytes
26. Which of the following structure guides the entry of pollen tube into the embryo sac?
 (A) Nucellus
 (B) Antipodal cells
 (C) Filiform apparatus of synergid cells
 (D) Egg cell
27. Parthenocarpic fruits
 (A) Develop from fertilised ovary
 (B) Are seedless
 (C) Are apple and cashew nut
 (D) Develop from other parts of fertilised ovary except its wall
28. If the chromosome number in a meiotically produced gamete of a plant is 10, then the ploidy level of that plant is
 (A) (n) (B) (2n)
 (C) (3n) (D) (n + n)
29. Persistent nucellus present in some seeds is called
 (A) Perisperm (B) Pericarp
 (C) Periderm (D) Phelloderm
30. The innermost layer of anther wall is
 (A) Endothecium and it provides nutrition to pollens
 (B) Tapetum and it nourishes the developing pollen grains
 (C) Nucellus and it forms microspores
 (D) Endothecium and it helps in dehiscence of anther

NUKSING CAREER POINT

BIOLOGY

पुश्पीय i kni ks e i y f x d tuu
Sexual reproduction in plant

DPP-1

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| C | A | C | C | A | B | C | D | D | D | A | A | C | A | C |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| B | C | D | A | C | B | C | C | B | C | C | B | B | A | B |

- Select the organism which is the source of heat-stable PCR enzyme
 - Thermophilus aquaticus*
 - Haemophilus influenzae*
 - Thermo proteus*
 - Bacillus thuringiensis*
- Plasmids are extra-chromosomal genetic material found in
 - Algae
 - Mammalian cell
 - Bacteria
 - Viruses
- Method in which recombinant DNA is directly injected into the nucleus of animal cell by using microneedles is called
 - Gene Gun method
 - Biolistic method
 - Microinjection method
 - Direct DNA injection method
- Which of the following bonds are formed by action of DNA ligase?
 - Sugar-phosphate bond
 - Phosphodiester bond
 - Phosphate-phosphate bond
 - Both (A) & (B)
- Select the organism which is the source of heat-stable PCR enzyme
 - Thermophilus aquaticus*
 - Haemophilus influenzae*
 - Thermo proteus*
 - Bacillus thuringiensis*
- The specific DNA sequence where *EcoRI* cuts is
 - GATTCG
 - GAATTC
 - GTTCAA
 - TTCCAA
- The tumor inducing capacity of _____ is located in large extra-chromosomal plasmid called Ti plasmid.
Choose the option which correctly fills the blank.
 - Thermus aquaticus*
 - Salmonella typhimurium*
 - E. coli*
 - Agrobacterium tumefaciens*
- Genetic material of Retroviruses is
 - DNA
 - RNA
 - Protein
 - ssDNA
- Isolation of genetic material from fungal cells involves primarily the use of
 - Lysozyme
 - Cellulase
 - Chitinase
 - Polymerase
- Which of the following would be used to link antibiotic resistance gene with plasmid vector ?
 - DNase
 - DNA polymerase
 - DNA ligase
 - Endonuclease
- Which of the following organisms is the source of thermostable PCR enzyme
 - Thermophilus aquaticus*
 - Haemophilus influenzae*
 - Thermo protease*
 - Bacillus thuringiensis*
- Match column I and column II and choose the correct option.

| Column I | Column II |
|----------------------|----------------------------------|
| a. Selectable marker | (i) DNA precipitation |
| b. Blunt ends | (ii) <i>Sma</i> I |
| c. Chilled ethanol | (iii) Identify transformed cells |
| d. Plasmids | (iv) Autonomous replication |

 - a(ii), b(iii), c(i), d(iv)
 - a(iii), b(ii), c(iv), d(i)
 - a(ii), b(ii), c(i), d(iv)
 - a(iii), b(i), c(ii), d(iv)
- Which of the following organisms is the source of thermostable PCR enzyme
 - Thermophilus aquaticus*
 - Haemophilus influenzae*
 - Thermo protease*
 - Bacillus thuringiensis*
- Tumor inducing plasmid delivers a piece of DNA known as T-DNA to transform
 - Agrobacterium*
 - Fungi
 - Dicot plants
 - Mycobacterium*
- While constructing the first recombinant DNA molecule, Stanley Cohen and Herbert Boyer isolated plasmid from a while b acted as host for the recombinant plasmid.
Select the option which gives **correct** answer for blanks in above statements.

| | a | b |
|-----|----------------------------------|----------------------------------|
| (A) | <i>Escherichia coli</i> | <i>Salmonella typhimurium</i> |
| (B) | <i>Salmonella typhimurium</i> | <i>Escherichia coli</i> |
| (C) | <i>Haemophilus influenzae</i> | <i>Agrobacterium tumefaciens</i> |
| (D) | <i>Agrobacterium tumefaciens</i> | <i>Haemophilus influenzae</i> |
- The intercalating agent that stacks between base pairs of DNA and helps in visualizing them under UV light is
 - Methylene blue
 - Bromophenol blue
 - Ethidium bromide
 - Aniline blue

17. Fragments of DNA formed after treatment with endonucleases like Bam HI are separated by technique called
 (A) Gene gun (B) Gel electrophoresis (C) Gene subtraction (D) Restriction mapping
18. The correct order of steps in Polymerase Chain Reaction (PCR) is
 (A) Extension, Denaturation, Annealing (B) Annealing, Extension, Denaturation (C) Denaturation, Extension, Annealing (D) Denaturation, Annealing, Extension
19. Amplification of gene of interest by using PCR for 30 cycles may go upto
 (A) 0.1 million times (B) 1.0 million times (C) 1.0 billion times (D) 1.0 trillion times
20. Process **not** involved in downstream processing is
 (A) Screening (B) Separation (C) Purification (D) Formulation
21. Bacteria protect themselves from viruses by fragmenting viral DNA upon its entry with
 (A) Methylase (B) Endonucleases (C) Ligases (D) Transcriptase
22. In gel electrophoresis, macromolecules are separated from each other on the basis of their
 (A) Charge only (B) Size only (C) Charge to size ratio (D) All of these
23. Which of the following is not a vectorless method of gene transfer?
 (A) Chemical mediated method of gene transfer (B) Biolistics (C) Microinjection (D) Disarmed pathogen
24. 5'GAATTC', is the recognition sequence and cleavage site for which of the following enzymes
 (A) *Alu I* (B) *Eco RI* (C) *Bam HI* (D) *Hind III*
25. The specific DNA sequence where the enzyme EcoRI cuts is
 (A) 5'- GGATCC-3' / 3'- CCTAGG-5' (B) 5'- GAATTC-3' / 3'- CTTAAG-5' (C) 5'- AAGCTT-3' / 3'- TTCGAA-5' (D) 5'- CCCGGG-3' / 3'- GGGCCC-5'
26. A plant genetic engineer wishes to transfer and express a gene from sunflower into beans. Which of the following would be the vector of choice?
 (A) Retrovirus (B) Papilloma virus (C) Ti-plasmid (D) Adenovirus
27. Which of the following has been **incorrectly** matched?
 (A) Ligase - Molecular glue (B) p-galactosidase - Encoded by lac Y gene (C) Restriction - Molecular knives endonuclease (D) Cellulase - Plant cell wall
28. The PCR is used to
 (A) Amplify gene of interest (B) Cleave bacteria plasmids (C) Seal sticky ends (D) Identify target plasmids
29. Source of energy for polymerisation in a PCR is
 (A) ATP (B) dNTP (C) Mg²⁺ (D) Primers
30. PCR amplification cycle involves
 (a) Template denaturation (b) Primer annealing (c) DNA polymerization (d) Reaction mixture containing target DNA, primer, thermostable DNA polymerase and dNTPs.
 (A) (a), (c) & (d) only (B) (a), (b) & (c) only (C) (b), (c) & (d) only (D) (a), (b), (c) & (d)

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| A | C | C | D | A | B | D | B | C | C | A | C | A | C | B |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| C | B | D | C | A | B | D | D | B | B | C | B | A | B | D |

- Motile zygote of *Plasmodium* occurs in
 - Human liver
 - Gut of female *Anopheles*
 - Salivary glands of *Anopheles*
 - Human RBCs
- Which one of the following acts as a physiological barrier to the entry of microorganisms in human body?
 - Skin
 - Epithelium of urogenital tract
 - Tears
 - Monocytes
- A certain patient is suspected to be suffering from Acquired Immuno Deficiency Syndrome. Which diagnostic technique will you recommend for its detection?
 - WIDAL
 - ELISA
 - MRI
 - Ultrasound
- Which one of the following statements is **correct** with respect to immunity?
 - Rejection of a kidney graft is the function of B lymphocytes
 - Preformed antibodies need to be injected to treat the bite by a viper snake
 - The antibodies against small pox pathogen are produced by T lymphocytes
 - Antibodies are protein molecules, each of which has four light chains
- Which one of the following options gives the **correct** matching of a disease with its causative organism and mode of infection

| | Disease | Causative Organisms | Mode of Infection |
|-----|---------------|---------------------------------|--|
| (A) | Elephantiasis | <i>Wuchereria bancrofti</i> | With infected water and food |
| (B) | Malaria | <i>Plasmodium vivax</i> | Bite of male <i>Anopheles mosquito</i> |
| (C) | Typhoid | <i>Salmonella typhi</i> | With inspired air |
| (D) | Pneumonia | <i>Streptococcus pneumoniae</i> | Droplet infection |
- Ringworm in humans is caused by
 - Viruses
 - Bacteria
 - Fungi
 - Nematodes
- Which one of the following techniques is safest for the detection of cancers?
 - Magnetic resonance imaging (MRI)
 - Radiography (X-ray)
 - Computed tomography (CT)
 - Histopathological studies
- A person suffering from a disease caused by *Plasmodium*, experiences recurring chill and fever at the time when?
 - The sporozoites released from RBCs are being rapidly killed and broken down inside spleen
 - The trophozoites reach maximum growth and give out certain toxins
 - The parasite after its rapid multiplication inside RBCs ruptures them, releasing the stage to enter fresh RBCs
 - The microgametocytes and megagametocytes are being destroyed by the WBCs
- Which one of the following statements is **correct** with respect to AIDS?
 - The causative HIV retrovirus enters helper T lymphocytes thus reducing their numbers
 - The HIV can be transmitted through eating food together with an infected person
 - Drug addicts are least susceptible to HIV infection
 - AIDS patients are being fully cured cent per cent with proper care and nutrition
- Match the disease in Column I with the appropriate items (pathogen/prevention/treatment) in Column II

| | Column I | | Column II |
|----|------------|-------|------------------------------------|
| a. | Amoebiasis | (i) | <i>Treponema palladium</i> |
| b. | Diphtheria | (ii) | Use only sterilized food and water |
| c. | Cholera | (iii) | DPT Vaccine |
| d. | Syphilis | (iv) | Use oral rehydration therapy |

 - a(ii), b(iii), c(iv), d(i)
 - a(i), b(ii), c(iii), d(iv)
 - a(ii), b(iv), c(i), d(iii)
 - a(ii), b(i), c(iii), d(iv)
- AIDS is caused by HIV that principally infects
 - All lymphocytes
 - Activator B cells
 - T₄ lymphocytes
 - Cytotoxic T cells
- The main reason why antibiotics could not solve all the problems of bacteria mediated disease is
 - Decreased efficiency of the immune system
 - Insensitivity of the individual following prolonged exposure to antibiotics
 - Development of mutant strains resistant to antibiotics
 - Activation of antibiotics by bacterial enzymes
- Which of the following pair of diseases is caused by virus?
 - Rabies, mumps
 - Cholera, tuberculosis
 - Typhoid, tetanus
 - AIDS, syphilis

14. Carcinoma refers to
 (A) Malignant tumours of the connective tissue
 (B) Malignant tumours of the skin or mucous membrane
 (C) Malignant tumours of the bone
 (D) Benign tumours of the connective tissue
15. Which of the following is a viral glycoprotein that plays a role in the infection of human cells by HIV?
 (A) gp 120 (B) CD₄
 (C) CCR₅ (D) Both (A) & (C)
16. Identify the incorrectly matched pair
 (A) Plague - Viral diseases
 (B) Malignant malaria - *Plasmodium falciparum*
 (C) Common cold - Rhino virus
 (D) *Trichophyton* - Ring worm
17. Human immuno deficiency virus (HIV) has a protein coat and a genetic material which is
 (A) Double stranded RNA
 (B) Double stranded DNA
 (C) Single stranded DNA
 (D) Single stranded RNA
18. Which of the following is a component of physiological barrier of innate immunity?
 (A) Skin and mucous membrane
 (B) Histamine and serotonin
 (C) Sebum and bile
 (D) Performs and pyrogens
19. The second most abundant antibody in human body is
 (A) IgA (B) IgG
 (C) IgM (D) IgE
20. Select the correct set of viral diseases in humans.
 (A) Rabies, Common cold, Tetanus
 (B) Plague, Dengue, Chicken pox
 (C) Small pox, Measles, Diphtheria
 (D) Mumps, Polio, Chikungunya
21. Which of the following antibody is present in mother's milk and provides natural passive immunity to new born?
 (A) IgD (B) IgM
 (C) IgE (D) IgA
22. Choose the **Incorrect** statement w.r.t. common cold
 (A) Rhinovirus causes common cold
 (B) Rhinovirus infects the nose, respiratory passage and lungs
 (C) Common cold is characterised by nasal congestion and discharge, sore throat, hoarseness, cough, headache, tiredness etc.
 (D) Droplets resulting from cough or sneezes of an infected person are inhaled directly or transmitted through contaminated objects and can cause infection in a healthy person
23. Intestinal perforation is the characteristic symptom of
 (A) Pneumonia (B) Plague
 (C) Typhoid (D) Pertussis
24. Cirrhosis of liver is caused by chronic intake of
 (A) LSD (B) Tobacco
 (C) Cocaine (D) Alcohol
25. *Wuchereria bancrofti*, the filarial worm that causes elephantiasis belongs to phylum
 (A) Platyhelminthes (B) Aschelminthes
 (C) Coelenterate (D) Arthropoda
26. Recently chikungunya and dengue cases were reported from various parts of the country. Choose the correct vector responsible for these diseases
 (A) *Anopheles* mosquito
 (B) *Xenopsylla* (Rat flea)
 (C) *Culex* mosquito
 (D) *Aedes* mosquito
27. Antigen binding site in an antibody is formed by
 (A) Two light chains
 (B) Two heavy chains
 (C) One heavy and one light chain
 (D) Either between two light chains or between one heavy and one light chain depending upon the nature of antigen
28. Which of the following causes plague?
 (A) *Trichinella spiralis*
 (B) *Salmonella typhimurium*
 (C) *Yersinia pestis*
 (D) *Xenopsylla*
29. The causative organism of AIDS spreads by
 (A) Sharing infected needles and syringes
 (B) Transfusion of infected blood
 (C) Unsafe sexual relationships
 (D) All of these
30. Cancer refers to
 (A) Rupturing of cells
 (B) Uncontrolled meiosis
 (C) Uncontrolled mitosis
 (D) Loss of immunity of the cells

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| B | C | B | B | A | C | A | C | A | A | C | C | A | B | A |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| A | D | C | A | D | D | B | C | D | B | D | C | C | D | C |

1. In all the methods of asexual reproduction
 - (A) Offsprings produced are genetically identical to the parents
 - (B) Offsprings produced are genetically different from the parents
 - (C) Offsprings produced may or may not be identical to the parents
 - (D) None of these
2. There are some special types of cells found in the seminiferous tubules known as sertoli cells. These are
 - (A) Germinal cells
 - (B) Reproductive cells
 - (C) Somatic cells
 - (D) Protective cells
3. The sperms become motile in human being in
 - (A) Seminiferous tubules
 - (B) Vas deferens
 - (C) Epididymis
 - (D) Only in seminal vesicle
4. Differentiation in morphology of the two sexes of the same species is called
 - (A) Hermaphrodite
 - (B) Heteromorphosis
 - (C) Sexual dimorphism
 - (D) Unisexual
5. Which is secreted by a acrosome
 - (A) Hyaluronic acid
 - (B) Hyaluronidase
 - (C) TSH
 - (D) Fertilizin
6. A phenomenon is termed parthenogenesis when
 - (A) Artificial fertilization occurs
 - (B) Egg is fertilized by a sperm
 - (C) Egg undergoes cleavage without fertilization
 - (D) Sperm dies before fertilization
7. The asexual process replaced by the sexual method is known as
 - (A) Semigamy
 - (B) Amphimixis
 - (C) Apospory
 - (D) Apomixis
8. In man the epididymis from anterior to the posterior is divided into
 - (A) Caput, corpus and cauda
 - (B) Corpus, vas deferens and caput
 - (C) Corpus, cauda and caudal region
 - (D) Caput, cauda and vas deferens
9. The disadvantage of parthenogenesis is
 - (A) Establishment of polyploid generation
 - (B) Elimination of variety in population
 - (C) Means of reproduction
 - (D) Does not encourage the appearance of new and advantageous combinations of genes
10. The capsule enclosing testis of mammal is called as
 - (A) Tunica albuginea
 - (B) Tunica membrana
 - (C) Tunica vaginalis
 - (D) Tunica vesiculosa
11. Fusion of two dissimilar gametes is known as
 - (A) Allogamy
 - (B) Anisogamy
 - (C) Autogamy
 - (D) Dichogamy
12. Cell division in sexual reproduction is
 - (A) Amitotic
 - (B) Mitotic
 - (C) Meiotic
 - (D) Both meiotic and mitotic
13. Majority of mammalian spermatozoa acquire capacitation in
 - (A) Female reproductive tract
 - (B) Female reproductive tract/Epididymis
 - (C) Epididymis
 - (D) Seminal vesicle
14. Survival time of sperms introduced into the vagina may be
 - (A) 1 – 2 days
 - (B) 3 – 4 days
 - (C) 5 – 10 days
 - (D) 1 week
15. Which of the following is the endocrine tissue of testes
 - (A) Epidermis
 - (B) Inguinal canal
 - (C) Leydig cells
 - (D) Spermatic cord
16. Cowper's glands secrete a substance to
 - (A) Neutralize acidity of urethra
 - (B) Nourish sperms
 - (C) Kill pathogens
 - (D) All the above

17. Composition of semen is
 (A) Secretion of the testes and epididymis
 (B) Secretions of the seminal vesicles
 (C) Secretions of prostate gland and bulbourethral glands
 (D) All the above
18. The seminiferous tubules of the testis are lined by the germinal epithelium consisting of
 (A) Cells of sertoli (B) Spermatoocytes
 (C) Spermatogonium (D) Spermatids
19. In man the two vasa deferentia open into
 (A) Urinary bladder (B) Rectum
 (C) Urethra (D) Penis
20. The fold of skin covering the penis is called
 (A) Corpora cavernosa
 (B) Corpus spongiosum
 (C) Prepuce
 (D) None of these
21. The acrosome plays important role in
 (A) Motility of sperm
 (B) Penetration of ovum by sperm
 (C) The fusion of pronuclei of the gametes
 (D) None of these
22. Temperature in scrotum necessary for sperm formation should be
 (A) 2°C above body temperature
 (B) 2°C below body temperature
 (C) 4°C above body temperature
 (D) 4°C below body temperature
23. "Sertoli cells" in human testis are found in
 (A) Seminiferous tubules
 (B) Leydig cells
 (C) Outside the seminiferous tubules
 (D) None of these
24. Secondary sex organ is
 (A) Testis (B) Breast
 (C) Beard (D) Vas deferens
25. The correct order of the reproductive tract of a male human being is
 (A) Rete testis, epididymis, vasa efferentia, urethra
 (B) Rete testis, vasa efferentia, epididymis, urethra
 (C) Vasa efferentia, epididymis, urethra, rete testis
 (D) Urethra, rete testis, epididymis, vasa efferentia
26. Which one is primary sex organ
 (A) Scrotum (B) Penis
 (C) Testis (D) Prostate
27. Inguinal canal is the connection between the scrotal sac and the
 (A) Tunica vaginalis
 (B) Urethral lumen
 (C) Abdominal cavity
 (D) Urethra masculinus
28. Release of spermatozoa from urethra by male animals is called
 (A) Spermatogenesis (B) Spermiogenesis
 (C) Ejaculation (D) Insemination
29. Cowper's glands are present in
 (A) Female mammals (B) Male mammals
 (C) Both (A) and (B) (D) None of these
30. The acrosome of the sperm is derived from
 (A) Mitochondria (B) Nucleus
 (C) Golgi bodies (D) Centrosome

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| A | D | C | C | B | C | B | A | D | A | B | D | A | A | C |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| A | D | C | C | C | B | B | A | D | B | C | C | C | B | C |

1. In which of the following step large and small particles are removed from sewage through sequential filtration and sedimentation?
 (A) Primary treatment
 (B) Secondary treatment
 (C) Biological treatment
 (D) Tertiary treatment
2. Mark the incorrect option (w.r.t. distilled alcoholic beverages)
 (A) Wine (B) Brandy
 (C) Rum (D) whisky
3. Mark the correct option (w.r.t. composition of biogas)
 (A) 50 - 70% H₂ (B) 30 - 40% CO₂
 (C) 95% CH₄ (D) 10% CO
4. Statins are competitive inhibitor of
 (A) Streptokinase
 (B) HMG COA reductase
 (C) Pectinase
 (D) Cellulase
5. For commercial production of ethanol, _____ is used.
 (A) *Saccharomyces cerevisiae*
 (B) *Candida lipolytica*
 (C) *Streptococcus*
 (D) *Aspergillus niger*
6. Which of the following pairs is **wrongly** matched?
 (A) Activated sludge : Secondary treatment
 (B) Gobargas : CH₄ + CO₂
 (C) Biopesticide : *Xanthomonas campestris*
 (D) Detergent : Lipases formulations
7. The greater BOD (Biochemical Oxygen Demand) of waste water indicates
 (A) Its less pollution level
 (B) Its more pollution level
 (C) Less amount of organic matter present in it
 (D) High level of dissolved oxygen in it
8. The turbidity of bottled fruit juices is cleared with _____ the help of enzyme
 (A) Pectinases (B) Lipases
 (C) Amylases (D) Streptokinase
9. An autotrophic microbe which can fix nitrogen is
 (A) *Oscillatoria* (B) *Rhizobium*
 (C) *Frankia* (D) *Clostridium*
10. Toddy is made by fermenting sap from
 (A) Wheat (B) Rice
 (C) Palm (D) Soyabean
11. The Ministry of Environment and Forests has initiated Ganga and Yamuna Action Plan to
 (A) Prevent water-borne diseases
 (B) Prevent microbial treatment of sewage
 (C) Prevent the discharge of untreated sewage into these rivers
 (D) Treat waste water biologically only
12. Fill in the given blanks by choosing **correct** option for A and B.
- | Type of microbes | Name | Commercial product |
|------------------|---------------------------|--------------------|
| A | <i>Monascus purpureus</i> | Statins |
| Bacterium | B | Clot buster enzyme |
- A**
B
- (A) Bacterium *Streptococcus*
 (B) Bacterium *Acetobacter*
 (C) Yeast *Clostridium*
 (D) Yeast *Streptococcus*
13. Primary treatment of waste water is mainly a ----- treatment.
 (A) Chemical (B) Physical
 (C) Biological (D) Physico-chemical
14. Which of the following plant is genetically engineered to develop resistance against pest?
 (A) Transgenic cotton
 (B) Transgenic rice
 (C) Transgenic tobacco
 (D) Pomato
15. Large holes in "Swiss cheese" are due to high fermentation activity of
 (A) Eukaryotic mycelial organism
 (B) Baker's yeast
 (C) Prokaryotic organism
 (D) Unicellular fungi
16. _____ act as blood cholesterol lowering agents that are obtained from a _____.
 (A) Statins, Yeast
 (B) Streptokinase, Bacterium
 (C) Cyclosporin A, Fungus
 (D) Statins, Prion
17. Treatment of waste water in STP is done by all, except
 (A) Aerobic microbes
 (B) Photosynthetic microbes
 (C) Microbes naturally present in sewage
 (D) Heterotrophic bacteria and fungi
18. Growing of microbes in very large vessels called A is practically used in making B.
 (A) A- Fermenters B - Industrial products
 (B) A - Biogas plant B - Activated sludge
 (C) A - Fermenter B - Toddy
 (D) A - Biogas plant B - Biogas
19. Products of which of the following is modified by genetic engineering and is used as a "clot buster"?
 (A) *Trichoderma* (B) *Monascus*
 (C) *Streptococcus* (D) *Aspergillus*
20. The nutritional quality of curd is increased due to the presence of
 (A) Vit. B₁₂
 (B) Vit C
 (C) Cyanocobalamine
 (D) Milk protein

21. Complete the following analogy
Aspergillus : Citric acid : : _____ : Butyric acid
 Choose the option which correctly fills up the given blanks.

- (A) *Acetobacter* (B) *Lactobacillus*
 (C) *Clostridium* (D) *Saccharomyces*

22. The first antibiotics discovered by Alexander Fleming was

- (A) Penicillin (B) Erythromycin
 (C) Neomycin (D) Fumagillin

23. The enzymes helps in clarifying fruit juices are

- (A) Lipase and catalase
 (B) Pectinase and proteases
 (C) Amylase and lipase
 (D) Catalase and amylase

24. Which of the following can be used as a biocontrol agent in the treatment of plant disease?

- (A) *Trichoderma* (B) *Chlorella*
 (C) *Anabaena* (D) *Lactobacillus*

25. Cyclosporin A, used as immunosuppression agent, is produced from

- (A) *Trichoderma polysporum*
 (B) *Monascus purpureus*
 (C) *Saccharomyces cerevisiae*
 (D) *Penicillium notatum*

26. Match Column-I with Column-II and select the correct option using the codes given below :

Column-I

Column-II

- a. Citric acid (i) *Trichoderma*
 b. Cyclosporin A (ii) *Clostridium*
 c. Statins (iii) *Aspergillus*
 d. Butyric acid (iv) *Monascus*

Codes :

- a b c d**
 (A) (iii) (i) (ii) (iv)
 (B) (iii) (i) (iv) (ii)
 (C) (i) (iv) (ii) (iii)
 (D) (iii) (iv) (i) (ii)

27. For the commercial and industrial production of Citric Acid, which of the following microbes is used?

- (A) *Clostridium butylicum*

- (B) *Aspergillus niger*
 (C) *Lactobacillus sp*
 (D) *Saccharomyces cerevisiae*

28. Select the mismatch

- (A) *Frankia - Alnus*
 (B) *Rhodospirillum - Mycorrhiza*
 (C) *Anabaena - Nitrogen fixer*
 (D) *Rhizobium - Alfalfa*

29. Match the following columns and select the correct option :

| | Column - I | Column - II |
|-----|-------------------------------|--|
| (a) | Dragonflies | (i) Biocontrol agents of several plant pathogens |
| (b) | <i>Bacillus thuringiensis</i> | (ii) Get rid of Aphids and mosquitoes |
| (c) | Glomus | (iii) Narrow spectrum insecticidal applications |
| (d) | Baculoviruses | (iv) Biocontrol agents of lepidopteran plant pests |
| | | (v) Absorb phosphorus from soil |

- (A) (a)-(ii), (b)-(iv), c-(v), (d)-(iii)
 (B) (a)-(iii), (b)-(v), c-(iv), (d)-(i)
 (C) (a)-(ii), (b)-(i), c-(iii), (d)-(iv)
 (D) (a)-(ii), (b)-(iii), c-(iv), (d)-(v)

30. Match the following organisms with the products they produce

- (a) *Lactobacillus* (i) Cheese
 (b) *Saccharomyces* (ii) Curd *cerevisiae*
 (c) *Aspergillus niger* (iii) Citric Acid
 (d) *Acetobacter aceti* (iv) Bread
 (v) Acetic Acid

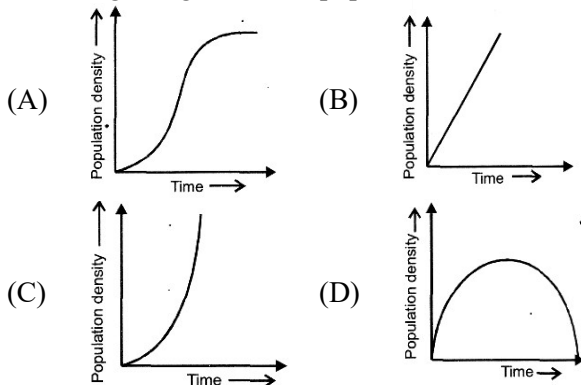
Select the **correct** option.

- (a) (b) (c) (d)**
 (A) (ii) (iv) (v) (iii)
 (B) (ii) (iv) (iii) (v)
 (C) (iii) (iv) (v) (i)
 (D) (ii) (i) (iii) (v)

ANSWER KEY

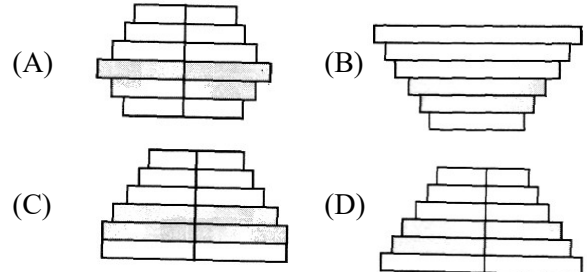
| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| A | A | B | B | A | C | B | A | A | C | C | D | B | A | C |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| A | B | A | C | A | C | A | B | A | A | B | B | B | A | B |

- Find the odd one w.r.t. parasitism
(A) *Cuscuta* (B) Liver fluke
(C) Female mosquito (D) *Plasmodium*
- Mark the **incorrect** match (w.r.t. population interactions)
(A) Amensalism : -, 0
(B) Predation : +, -
(C) Commensalism : +, +
(D) Parasitism +, -
- The growth curve of bacterial population in lab is plotted against time. What will be the shape of graph?
(A) Sigmoid
(B) Hyperbolic
(C) Ascending straight line
(D) J-shaped
- Organisms restricted to a narrow range of temperature, are called as
(A) Euryhaline (B) Stenothermal
(C) Eurythermal (D) Stenohaline
- The maximum number of individuals of a population which can be supported with optimum resources for their survival is called
(A) Biotic potential
(B) Carrying capacity
(C) Environmental resistance
(D) Potential natality
- Which of the following curve represents Verhulst Pearl Logistic growth in a population?



- Find the **correct** option (w.r.t. predation)
(A) VAM (B) Lichen
(C) *Yucca-Pronuba*
(D) *Opuntia* and Cochineal insect
- Cuckoo and crow are examples of
(A) Competition (B) Ectoparasites
(C) Brood parasitism (D) Predation
- 'Sexual deceit' is employed by
(A) Figs (B) Orchid
(C) *Yucca* (D) *Pinus*
- Which of the following organism is capable of meeting its water requirement through internal oxidation of fats?
(A) Desert lizard (B) Antarctic
(C) Kangaroo rat (D) Sea

- Predation performs all, **except**
(A) Transfer of energy
(B) Keeps prey population under control
(C) Loss of sense organs
(D) Maintains species diversity
- Which of the given age pyramid reflects a stable human population?



- The study of the relationships of living organisms with the abiotic and biotic components of their environment is called
(A) Morphology (B) Ecosystem
(C) Ecology (D) Biotechnology
- To overcome the altitude sickness which of the following adaptations are shown by humans?
Nausea, Increasing RBC production, Increasing breathing rate, Decreasing binding capacity of haemoglobin, Heart palpitations
(A) Six (B) Four
(C) Three (D) Five
- All birds and mammals are able to
(A) Keep their body temperature constant
(B) Decrease their body temperature when the surrounding temperature becomes low
(C) Increase their body temperature when the surrounding temperature becomes high
(D) Increase their body temperature when the surrounding temperature becomes low
- Taking species A as '+' sign, match the different interactions with species B where '+', '-' and '0' signs assigning beneficial, detrimental and neutral interactions, respectively.

| Species B | Interaction |
|-----------|------------------|
| (A) + | (i) Commensalism |
| (B) - | (ii) Mutualism |
| (C) 0 | (iii) Parasitism |
| | (iv) Amensalism |

Select the **correct** option.

- a(iv), b(i, iii), c(ii) (B) a(ii), b(iii), c(i)
(C) a(ii), b(i, iv), c(iii) (D) a(i, iv), b(ii), c(iii)
- Predators help in maintaining species diversity in a community by
(A) Reducing the intensity of competition among competing prey species
(B) Increasing the intensity of competition among competing prey species
(C) Removing the non-competing prey species in the prey populations
(D) Introducing the exotic prey species in the prey populations

18. All are the anatomical adaptations of hydrophytes, except
- Presence of aerenchyma in roots
 - Sunken stomata on leaf epidermis
 - Epistomatic floating leaves.
 - Well developed dead mechanical tissue
- (A) a only (B) b and c
(C) b and d (D) a and c
19. When we go at higher altitudes, the binding affinity of haemoglobin
- Remains unaffected
 - Increases for O₂
 - Increases for N₂ gas
 - Decreases for O₂
20. Altitude sickness can be acclimatized gradually by
- Decreasing RBC production
 - Decreasing breathing rate
 - Physiological adaptation
 - Increasing binding affinity of haemoglobin
21. The logistic growth model is considered a more realistic one because
- Resources for growth for most animal populations are finite
 - Resource for growth become limiting sooner or later
 - Resources in a habitat are unlimited
 - More than one option is correct
22. Thick layer of fat (blubber) below skin acts as insulator and reduces loss of body heat, is characteristic feature of
- Kangaroo rat (B) Desert lizard
 - Seals (D) Fishes
23. Organisms that can regulate themselves only over a limited range of environmental gradients and beyond this range become conformers are called
- Homeotherms
 - Regulators
 - Partial regulators
 - Both conformers and regulators
24. Plants which produce characteristic pneumatophores belong to
- Mesophytes (B) Halophytes
 - Psammophytes (D) Hydrophytes
25. In the interaction between A and B species one species is benefited and other is suffered in
- Parasitism and amensalism
 - Commensalism and predation
 - Predation and parasitism
 - Mutualism and competition
26. Select the **incorrect** match w.r.t interspecific interaction.
- | | Species A | Species B | Interaction |
|-----|-----------|-----------|------------------|
| (A) | - | - | Competition |
| (B) | - | 0 | Amensalism |
| (C) | + | 0 | Predation |
| (D) | + | + | Protocooperation |
27. Which one of the following plants shows a very close relationship with a species of moth, where none of the two can complete its life cycle without the other?
- Hydrilla* (B) *Yucca*
 - Viola* (D) Banana
28. The impact of immigration on population density is
- Positive
 - Negative
 - Both positive and negative
 - Neutralized by natality
29. *Cuscuta* is an example of
- Ectoparasitism
 - Brood parasitism
 - Predation
 - Endoparasitism
30. Decline in the population of Indian native fishes due to introduction of *Clarias gariepinus* in river Yamuna can be categorised as
- Alien species invasion
 - Co-extinction
 - Habitat fragmentation
 - Over exploitation

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| C | A | D | B | B | C | D | C | B | D | C | C | C | C | A |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| B | A | C | D | C | D | C | C | B | C | C | B | A | A | A |

1. A genome is the
 - (A) Diploid set of chromosomes
 - (B) Haploid set of chromosomes
 - (C) Triploid set of chromosomes
 - (D) All the above
2. Holandric genes are
 - (A) Carried by 'X' chromosomes
 - (B) Carried by different parts of 'Y' chromosomes
 - (C) Carried by 'X' and 'Y' chromosomes
 - (D) Carried by autosomes
3. Chromosome set in zygote is
 - (A) $2n$
 - (B) $1n$
 - (C) $3n$
 - (D) $4n$
4. A gene is said to be dominant, if
 - (A) It is never expressed in any condition
 - (B) It is expressed only in heterozygous condition
 - (C) It expresses its effect only in homozygous stage
 - (D) It is expressed both in homozygous and heterozygous conditions
5. An unfertilized human egg contains
 - (A) Two X chromosomes
 - (B) One X and Y chromosome
 - (C) One Y chromosome only
 - (D) One X chromosome only
6. Who used the word "*chromosome*"
 - (A) Huxley
 - (B) Flemming 1888
 - (C) Kollikar 1888
 - (D) Waldeyer 1888
7. The total number of nitrogenous bases in human genome is estimated to be about
 - (A) 3.5 million
 - (B) 35 thousand
 - (C) 35 million
 - (D) 3.1 billion
8. Homologous chromosomes which are present in male and female both are known as
 - (A) Heterosomes
 - (B) Replosomes
 - (C) Androsomes
 - (D) Autosomes
9. How many chromosomes are present in an unfertilized egg
 - (A) 22 autosomes and one sex chromosome
 - (B) 22 pairs of autosomes and one sex chromosome
 - (C) 44 autosomes and one pair of sex chromosome
 - (D) Total 22 chromosomes
10. Gene can be defined as
 - (A) Unit of segregation
 - (B) Unit of physiological activity
 - (C) Unit of recombination
 - (D) Unit of function
11. A male human is heterozygous for autosomal genes *A* and *B* and is also hemizygous for hemophilic gene *h*. What proportion of his sperms will be *abh*
 - (A) $\frac{1}{16}$
 - (B) $\frac{1}{4}$
 - (C) $\frac{1}{8}$
 - (D) $\frac{1}{32}$
12. When two genes are situated very close to each other in a chromosome
 - (A) The percentage of crossing over between them is very high
 - (B) Hardly any crossing over is detected
 - (C) No crossing over can take place between them
 - (D) Only double cross overs can take place between them
13. In an organism that has 44 chromosomes i.e. 22 homologous pairs; at the end of first meiotic division the daughter cell will have
 - (A) 44 chromosomes
 - (B) 11 chromosomes
 - (C) 22 chromosomes
 - (D) Any number between 44 and 22
14. Jumping genes are now known as
 - (A) Transposons
 - (B) Transversion
 - (C) Transduction
 - (D) Transformation
15. A child receives
 - (A) 25% genes from his father
 - (B) 50% genes from his father
 - (C) 75% genes from his father
 - (D) 100% genes from his father
16. The males of grasshoppers and moths possess two sets of autosomes and
 - (A) X and Y chromosomes
 - (B) Only X chromosome
 - (C) Only Y chromosome
 - (D) Neither X nor Y chromosome
17. Blood group 'O' has
 - (A) No antibodies
 - (B) No antigens
 - (C) 'A' or 'B' antibodies
 - (D) 'A' or 'B' antigens

18. If a certain patient with blood group B requires immediate blood transfusion, the following type can be given to him
 (A) O and B (B) O and AB
 (C) A and AB (D) B and AB
19. In erythroblastosis foetalis, which factors of the mother pass through placenta into the foetus
 (A) Rh antigens (B) Rh antibodies
 (C) ABO antibodies (D) Agglutinins
20. Inheritance of ABO blood group system is an example of
 (A) Multiple allelism
 (B) Partial dominance
 (C) Epistasis
 (D) Dominance
21. The problem due to Rh⁻ factor arises when the blood two (Rh⁺ and Rh⁻) mix up
 (A) In a test tube
 (B) Through transfusion
 (C) During pregnancy
 (D) (A) and (C) both
22. Genotype of blood group 'A' will be
 (A) I^AI^A (B) I^BI^B
 (C) I^AI^A or I^AI^O (D) I^AI^O
23. If one parent belongs to 'A' blood group and the other to 'O' blood group, their children possibly represent
 (A) A and B groups only
 (B) AB only
 (C) A and O groups only
 (D) All four groups
24. Blood group 'B' will have alleles
 (A) ii (B) I^AI^A
 (C) I^BI^B (D) I^BI^B or Ii
25. Persons of blood group A contain
 (A) Antigen A and antibodies b
 (B) Antigen A and antibodies a
 (C) Antigen A and B and no antibodies
 (D) No antigens and both a and b antibodies
26. A person with blood group 'A' can be given blood of which group
 (A) A and B (B) B and O
 (C) A and O (D) A, B, AB and O
27. If a child has O type of blood group and the father B type, the genotype of the father will be
 (A) I^OI^O (B) I^AI^B
 (C) I^OI^B (D) I^BI^B
28. Which pair of chromosomes is concerned with Down's syndrome
 (A) 7th (B) 18th
 (C) 21st (D) 23rd
29. Alkaptonuria is caused due to
 (A) Dominant autosomal gene
 (B) Recessive autosomal gene
 (C) X linked recessive gene
 (D) X linked dominant gene
30. The number of chromosomes in Klinefelter's syndrome is
 (A) 47 (44 + XXY)
 (B) 47 (44 + XXX)
 (C) 47 (46 + 1 chromosome 21)
 (D) None of these

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| B | B | A | D | D | D | C | D | A | C | C | B | C | A | B |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| B | B | A | B | A | D | C | C | C | A | C | C | C | B | A |

1. Population growth rate depends upon
(A) Birth rate (B) Death rate
(C) Age-sex ratio (D) All of these
2. The average number of children that would be borne by a female during her lifetime is called
(A) Natality
(B) Birth rate
(C) Population growth rate
(D) Total fertility rate
3. Which of the following can be included under natural methods of birth control?
(A) Rhythm method
(B) Coitus interruptus
(C) Lactational amenorrhoea
(D) All of these
4. Which of the following is/are hormone releasing IUDs?
(A) Progestasert (B) Levonorgestrel
(C) Both (A) &(B) (D) Lippe'sloop
5. Which of the following ART involves direct injection of sperm into the ovum?
(A) IUI (B) GIFT
(C) AI (D) ICSI
6. Hormone releasing IUD is
(A) CuT (B) Lippes loop
(C) LNG-20 (D) Cu7
7. Select the **correct** option w.r.t. the full form of GIFT.
(A) Germ cell intra fallopian transfer
(B) Gamete inter fallopian transfer
(C) Gamete intra fallopian transfer
(D) Gamete inter fertilization transfer
8. If we consider GIFT and ZIFT, fertilization in former and latter occur
(A) *in vitro*; *in vivo* (B) *in vivo*; *in vitro*
(C) *in vivo*; *in vivo* (D) *in vitro*; *in vitro*
9. The legal marriageable age of women in India has been raised to
(A) 16 years (B) 18 years
(C) 20 years (D) 17 years
10. When did the Medical Termination of Pregnancy Act in India come into existence?
(A) 1984 (B) 2002
(C) 1951 (D) 1971
11. Read the statements given below and choose the **correct** option.
(A) Permissible use of the technique amniocentesis in India is for detecting sex of the unborn foetus
(B) Artificial insemination implies transfer of sperms of a healthy donor to a test tube containing many ova_
- (C) Use of 'Nirodh' prevents sperms from reaching cervix
(D) Generally chances of conception are nil as long as mother feeds breast milk to the young one
12. Which one of the following is the most widely accepted method of contraception in India at present?
(A) Tubectomy (B) Diaphragms
(C) Cervical caps (D) IUDs
13. Out of the following statements regarding MTPs, choose the correct options given below:
(i) MTPs are generally advised during first trimester
(ii) MTPs are used as a contraceptive method.
(iii) MTPs can always be performed by taking a single dose of mifepristone
(iv) MTPs require the assistance of qualified medical personnel.
(A) (ii) & (iii) (B) (ii) & (iv)
(C) (i) & (iv) (D) (i) & (ii)
14. 'Saheli', a weekly oral contraceptive can be best described as
(A) Progesterone - antagonist .
(B) Non-steroidal preparation
(C) Ovulation inhibitor
(D) Affecting the nature of cervical mucus
15. Surgical procedure used as contraceptive method is
(A) Ovariectomy (B) Hysterectomy
(C) Vasectomy (D) Castration
16. Which of the following is/are hormone releasing IUDs?
(A) Progestasert (B) Levonorgestrel
(C) Both (A) &(B) (D) Lippe'sloop
17. Population growth rate depends upon
(A) Birth rate (B) Death rate
(C) Age-sex ratio (D) All of these
18. Which of the following STD is caused by a protozoan?
(A) Trichomoniasis (B) Chlamydiasis
(C) Gonorrhoea (D) Syphilis
19. The average number of children that would be borne by a female during her lifetime is called
(A) Natality
(B) Birth rate
(C) Population growth rate
(D) Total fertility rate

20. Which of the following is a venereal disease, caused by a virus and can get transmitted by blood contact also?
 (A) Gonorrhoea (B) Syphilis
 (C) Trichomoniasis (D) Hepatitis-B
21. Which of the following can be included under emergency contraception?
 (A) An antiprogesterone pill
 (B) Insertion of IUD within 72 hours of unprotected sexual contact
 (C) Both (A) & (B)
 (D) Vasectomy
22. Which of the following can be included under natural methods of birth control?
 (A) Rhythm method
 (B) Coitus interruptus
 (C) Lactational amenorrhoea
 (D) All of these
23. Which of the following contraceptive devices also protects against sexually transmitted diseases?
 (A) Fern shield (B) Sponge
 (C) IUDs (D) LNG-20
24. All of the following can be considered as complications of sexually transmitted diseases except
 (A) Pelvic inflammatory disease
 (B) Still birth
 (C) Down's syndrome
 (D) Infertility
25. When did the Medical Termination of Pregnancy Act in India come into existence?
 (A) 1984 (B) 2002
 (C) 1951 (D) 1971
26. Match column I with column II and select the correct option.
- | | Column I | | Column II |
|----|-----------|-------|--|
| a. | Saheli | (i) | Suppresses sperm motility and fertilising capacity of sperms |
| b. | Condoms | (ii) | Non-steroidal oral contraceptive |
| c. | Cu7 | (iii) | Terminal method of family planning |
| d. | Vasectomy | (iv) | Prevent the entry of semen into female reproductive tract |
- (A) a(iv), b(ii), c(iii), d(i)
 (B) a(ii), b(iv), c(i), d(iii)
 (C) a(ii), b(iv), c(iii), d(i)
 (D) a(iv), b(iii), c(i), d(ii)
27. Which of the following STI is completely curable if detected early and treated properly?
 (A) Genital herpes (B) Syphilis
 (C) Hepatitis B (D) HIV infection
28. Select the correct option.
 (A) Amniocentesis is used to test for Down's syndrome, haemophilia and sickle cell anemia
 (B) A rapid increase in maternal mortality rate (MMR) and infant mortality rate (IMR) are the reasons for population explosion
 (C) "Saheli" was discovered at NDRI, Lucknow
 (D) The "family planning" programmes were initiated in India in 1971
29. Which of the following ART involves direct injection of sperm into the ovum?
 (A) IUI (B) GIFT
 (C) AI (D) ICSI
30. The legal marriageable age of women in India has been raised to
 (A) 16 years (B) 18 years
 (C) 20 years (D) 17 years

ANSWER KEY

| | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| D | D | D | C | D | C | C | B | B | D | C | D | C | B | C |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| C | D | A | D | D | C | D | A | C | D | B | B | A | D | B |