

Tags #Fishery Edu-Test

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# QUESTION BANK



Fisheries Science

**F**ishery industry involves catching, processing, marketing and conservation of fish. One can learn about managing and understanding fisheries by pursuing academic career in *Fisheries Science* – like:

Bachelor of Fisheries Science (B.F.Sc), B.Sc. (Industrial Fish and Fisheries), B.Sc. (Fisheries), B.Sc. (Aquaculture), Master's of fisheries science (M.F.Sc), Master's of Science (M.Sc. Zoology: Fish and Fisheries) etc.

Besides, one can also pursue M.Sc. in the specialized disciplines – like - Aquatic Biology & Fisheries, Coastal Aquaculture and Marine Biology, Fishery Science and Aquaculture, Industrial Fisheries, Limnology and Fisheries, Marine Biology and Fisheries.

There are a number of Colleges and Universities in India which provide education in fisheries:

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The selection of eligible students into the various courses in Fishery Science is done through **ENTRANCE EXAMS**.

Besides, Indian Council of Agricultural Research (ICAR) organizes, All India Competitive Examinations for Junior Research Fellowship, Senior Research Fellowship (Doctor of Philosophy) [ICAR AICE-JRF/SRF (Ph.D)], under the aegis of National Testing Agency (NTA); for different disciplines of Agriculture, Horticulture, Forestry, Veterinary, Animal Sciences, Agricultural Engineering, Community Science (erstwhile Home Science), **FISHERIES**, Dairy Science and other allied sciences in Agricultural Universities of India. **ENTRANCE EXAMS** are also organized for various 'JOB' opportunities in government and the private sector. After possessing an undergraduate degree (B.Sc./B.F.Sc), one may apply for the post Instructor, Research Assistant, Biochemist, Biologist, Technicians, etc. Also, one can apply in the Fisheries Department of State Government for the post of Fishery technician, Inspector Fisheries, Sub-Inspector Fisheries, Assistant Directors, Assistant Fisheries Development Officer (AFDO), Fisheries Extension Officer (FEO) and Fisheries Development Officer (FDO) etc.

The exams conducted for various Indian administrative services like IAS/IFS/PCS etc also include questions on Zoology/Fisheries.

To build a firm footing in FISHERY SECTOR  
&  
for fulfilling the desired 'aspirations'  
let us venture into Fishery QUESTION BANK arena.



### MULTIPLE-CHOICE QUESTIONS

1. How many wetlands in India are identified under Ramsar Convention (as of Jan. 2024)?  
(a) 80 (b) 62 (c) 39 (d) 26
2. In India, the Ramsar Convention came into force *w.e.f.*:  
(a) 01.02.1982 (b) 02.02.1971 (c) 19.08.2002 (d) 08.11.2005
3. On which day the World Wetland Day is celebrated all over the world every year?  
(a) 5th June (b) 22 April (c) 2nd February (d) 4th October
4. Which year Ramsar Convention on protection of wetlands was adopted?  
(a) 1971 (b) 1972 (c) 1982 (d) 1987
5. Which year Forest (Conservation) Act (INDIA), was enacted?  
(a) 1972 (b) 1980 (c) 1986 (d) 1971
6. Where was the only International treaty devoted to protect the wetlands, the Ramsar Convention, adopted?  
(a) Ramsar, India (b) Ramsar, Iran  
(c) Ramsar, Iraq (d) Ramsar, Malaysia
7. India joined CITES in:  
(a) 1976 (b) 1967 (c) 1867 (d) 1997
8. Which of the following is a multilateral treaty to protect endangered plants and animals?  
(a) UNCLOS (b) IUCN (c) CITES (d) CAWT
9. The Bay of Bengal Programme (BOBP) is sponsored by which of the following Governments?  
(a) Japan (b) US and Japan  
(c) Korea and Japan (d) Japan and Denmark
10. Where was the International Conference on Responsible Fishing held?  
(a) Mexico (1992) (b) *Rio de Janeiro* (1992)  
(c) US (1992) (d) Rome (1992)
11. Where is Marine Products Export Development Authority (MPEDA) stationed?  
(a) Kerala (b) Hyderabad (c) Kochi (d) Chennai
12. Where and when was the Coastal Aquaculture Authority (CAA) Act (India) enacted?  
(a) 2004, Odisha (b) 2005, Chennai (c) 2005, Kerala (d) 2009, Kolkata
13. Where was the Convention on Biological Diversity signed by the Govt. of India?  
(a) Japan (b) Brazil (c) China (d) Netherlands
14. Indian Coastal Regulation Zone (CRZ) notification was issued in which year?  
(a) 1991 (b) 1919 (c) 1891 (d) 1819
15. The Indian Fisheries Act was enacted in which year?  
(a) 1989 (b) 1897 (c) 1889 (d) 1797
16. Where is Central Institute of Freshwater Aquaculture (CIFA) is headquartered?  
(a) Bhubaneswar (b) Bhimtal (c) Lucknow (d) Barrackpore
17. Where is Central Institute of Fisheries Education (CIFE) situated in India?  
(a) Kolkata (b) Chennai (c) Kochi (d) Mumbai
18. Who of the following has played a significant role in developing *FishBase*?  
(a) Walter Fisher (b) Daniel Pauly (c) Evelyn Pruitt (d) Rainer Froese
19. The GPS NAVIC system of India consists of a constellation of how many satellites?  
(a) 4 satellites (b) 33 satellites (c) 7 satellites (d) 24 satellites

20. Space Vehicle Numbers (SVNs) are the serial numbers assigned to which of the following?  
 (a) GPS Satellites (b) GIS Satellites  
 (c) RS Satellites (d) NAVIC Satellites
21. What is the minimum number of satellites for a full GPS constellation?  
 (a) 72 (b) 27 (c) 24 (d) 42
22. 'Navstar' is the term related with which of the following?  
 (a) RS (b) GIS (c) GPS (d) ICT
23. Global Navigation Satellite System (GNSS) is associated with which of the following technologies?  
 (a) GPS (b) RS (c) GIS (d) ICT
24. Who of the following is aptly called as the father of GIS?  
 (a) Roger Tomlinson (b) Howard T. Fisher  
 (c) Evelyn Pruitt (d) Vikram Sarabhai
25. Photozincography is the term associated with the historical aspects of which of the following?  
 (a) RS (b) GIS (c) GPS (d) CGIS
26. In Remote Sensing system, which of the following has been flown on board satellites to continuously and repetitively records temperature of land and ocean surfaces?  
 (a) Advanced Very High Resolution Radiometer (AVHRR)  
 (b) Synthetic Aperture Radar (SAR)  
 (c) The Multispectral Scanner System (MSS)  
 (d) Thematic Mapper (TM)
27. In Remote Sensing system, which of the following is commonly used to image water colour ?  
 (a) Multispectral Scanner System (MSS) (b) Synthetic Aperture Radar (SAR)  
 (c) Seafaring Satellite (SEASAT) (d) Scanning Multifrequency Microwave Radiometer (SMMR)
28. Which of the following is the basic prerequisite for the entire process of remote sensing?  
 (a) EMR (b) Sensor (c) Spatial resolution (d) Spectral signature
29. Different objects return different amount of energy in different bands of which of the following?  
 (a) UV Rays (b)  $\gamma$  - Rays (c) EMR (d) Infrared Rays
30. Who coined the term Remote Sensing?  
 (a) Roger Tomlinson (b) Howard T. Fisher  
 (c) Evelyn Pruitt (d) John Snow
31. Which of the following marked the beginning of the 'space age'?  
 (a) LANDSAT -1 (b) SEASAT- 1(c) NIMBUS- 1 (d) SPUTNIK-1
32. Heterogeneous floating mass of vegetation, soil and organic matter at various stages of decomposition, called '*phumdis*' is unique to which of the following wetlands of India?  
 (a) Vembanad- Kol Wetland (b) Loktak Lake  
 (c) Wular Lake (d) Kolleru Lake
33. 'Kolleru Bird Sanctuary' is situated in which State?  
 (a) Kerala (b) Karnataka (c) Tamil Nadu (d) Andhra Pradesh
34. Endangered Indian Wild Ass (*Equus hemionus khur*) is found in which of the following wetlands?  
 (a) Deepor Beel (b) Nalsarovar Bird Sanctuary  
 (c) Hokera Wetland (d) Tso Moriri
35. Which of the following is the high altitude (at about 4500 m) 'brackish water' wetland?  
 (a) Renuka Lake (b) Wular Lake (c) Sambhar Lake (d) Tso Moriri

36. World's highest bird migration (more than 7,000m) in the Himalayan region is exhibited by which of the following?  
(a) Bar-headed goose (b) Black-necked crane  
(c) Grey Leg Goose (d) Ruddy Shelduck
37. Which of the following is the 'longest lake' of India?  
(a) Sasthamkotta Lake (b) Wular Lake  
(c) Loktak Lake (d) Vembanad Lake
38. Saltwater crocodiles (*Crocodylus porosus*) and Olive Ridley sea Turtles (*Lepidochelys olivacea*) are the prominent wildlife in which of the following wetlands?  
(a) Chilika Lake (b) Bhitarkanika Mangroves  
(c) Upper Ganges Wetland (d) Harike Wetland
39. Which of the following is the largest brackish water coastal lagoon in India and the second largest lagoon in the world ?  
(a) Chilika Lake (b) Sasthamkotta Lake  
(c) Vembanad - Kol Wetland (d) Point Calimere
40. Where is the flagship species, Irrawaddy dolphin (*Orcaella brevirostris*) found?  
(a) Upper Ganga River (b) Chilika Lake  
(c) Rudrasagar Lake (d) Kanjli Wetland
41. Which of the following is the wetland located in Punjab ?  
(a) Keoladeo National Park (b) Harike Wetland  
(c) Bhoj Wetland (d) Ashtamudi Wetland
42. Which of the following is synonymous with Bharatpur Bird Sanctuary?  
(a) Sambhar Lake (b) Bhoj Wetland  
(c) Keoladeo National Park (d) Bhitarkanika Mangroves
43. Which of the following Wetlands is the home for the endangered/flagship species/endemic Indian blackbuck (*Antelope cervicapra*)?  
(a) Point Calimere Bird Sanctuary (b) Keoladeo Ghana National Park  
(c) Wular Lake (d) Nalsarovar Bird Sanctuary
44. Which lake is known for the famous 'Neermahal' lake palace, built in the centre of the lake ?  
(a) Rudrasagar Lake (b) Rana Pratap Sagar  
(c) Ropar Lake (d) Loktak Lake
45. Upper Ganga River Wetland of Uttar Pradesh (India) falls under which of the following districts?  
(a) Allahabad (b) Kanpur (c) Bulandshahr (d) Bijnor
46. 'Fiat panis' - 'let there be bread' is the working 'motto' of which of the following?  
(a) FCR (b) FFDA (c) FAO (d) CCRF
47. Who of the following is aptly known as 'father of DNA bar-coding' ?  
(a) Rainer Froese (b) Daniel Pauly (c) Walter Fisher (d) Paul Hebert
48. National Institute of Oceanography, Goa, India, operates under which of the following agencies of Govt. of India?  
(a) CSIR (b) ICAR (c) IMO (d) MPA
49. On which of the following dates, the Pradhan Mantri Matsya Sampada Yojana (PMMSY) draft was brought to public domain in India?  
(a) 31st March, 2016 (b) 20th May 2020  
(c) 20th February, 2020 (d) 2nd May, 2019
50. Which financial year had been considered as the terminal year of Indian XII<sup>th</sup> Five-Year Plan ?  
(a) 2016-2017 (b) 2018-2019 (c) 2015-2016 (d) 2017-2018

51. Which of the following wetlands of India has been designated as 'community reserve'?

- (a) Harike Wetland (b) Beas Conservation Reserve  
(c) Nangal Wildlife Sanctuary (d) Keshopur-Miani

52. Which of the following wetlands has been designated as Ramsar Site in Uttarakhand (India)?

- (a) Parvati Arga Bird Sanctuary (b) Saman Bird Sanctuary  
(c) Asan Wetland (d) Samaspur Bird Sanctuary

53. Match the following:

- |                            |                   |
|----------------------------|-------------------|
| (i) Kanwar lake            | 1. Assam          |
| (ii) Bhoj Wetland          | 2. Maharashtra    |
| (iii) Deepor Beel          | 3. Madhya Pradesh |
| (iv) Nandur Madhamaheshwar | 4. Bihar          |

Choose the correct option:

- (a) (i) – 4, (ii)-3, (iii)-1, (iv)-2 (b) (i) – 3, (ii)- 4, (iii)-2, (iv)-1  
(c) (i) – 2, (ii)- 3, (iii)- 4, (iv)-1 (d) (i) – 4, (ii)- 3, (iii)-2, (iv)-1

### FIND OUT THE FULL FORM OF THE FOLLOWING ABBREVIATIONS

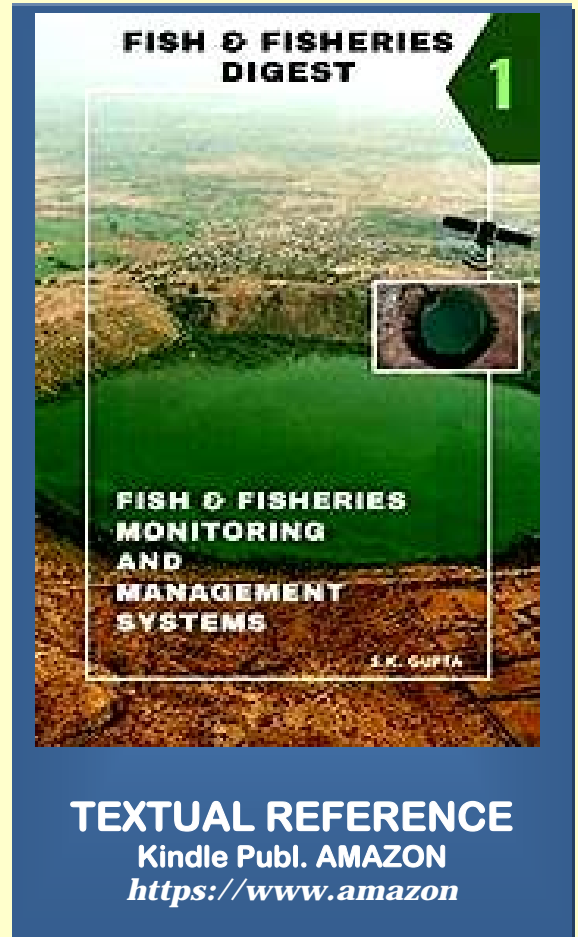
[Textual reference: APPENDIX-I:

#### **FISH & FISHERIES DIGEST – PART – 1]**

ISPRS, CZCS, AVHRR, NOAA, MSMR, SST, SAFARI, ISRO, GSAT, GAGAN, IRNSS, IIRS, NNRMS, PFZ, LIDAR, SEASAT, SMMR, SARSAT, MOSS, GRASS, CAD, ERDAS, NAVSAT, NAVIC, DST, PSAT, NASSCOM, F-MIS, IFFCO, OAS, STREAM, ICLARM, CD-ROM, FTDC, CIBA, NFDB, NRCCWF, NBFGR, CIFE, BFDA, CRZ, NBA, NPMF, CAA, MPEDA, CCRF, UNCLOS, IUCN, GATT, CITES, WCCB, TRAFFIC, ASEAN-WEN, UNODC, MARPOL, IMO, IMCO, WWF, SANDRAP, GOES, FSI, HUFA, IATTC, ICCAT, IMO, INCOIS, IUU, LANDSAT, *Matsyafed*, MCPA, CCAMLR, NMLRDC, NRSA, OSPESCA, SEAFDEC, SIOFA, TRIFED, UNDP, FBIS, FISH-BOL, BOLD, NCBI, INSDC, NIO, FSI, CSIR, CIFNET, CICEF, PMMSY.

#### **ANSWERS**

- 1.(a), 2. (a), 3. (c), 4. (a), 5. (b), 6. (b), 7. (a), 8. (c), 9. (d), 10. (a), 11. (c), 12. (b), 13. (b), 14. (a), 15. (b), 16. (a), 17. (d), 18. (b), 19. (c), 20. (a), 21. (c), 22. (c), 23. (a), 24. (a), 25. (b), 26. (a), 27. (a), 28. (a), 29. (c), 30. (c), 31. (d), 32. (b), 33. (d), 34. (b), 35. (d), 36. (a), 37. (d), 38. (b), 39. (a), 40. (a), 41. (b), 42. (c), 43. (a), 44. (a), 45. (c), 46. (c), 47. (d), 48. (a), 49 (b), 50 (a), 51 (d), 52 (c), 53 (a)

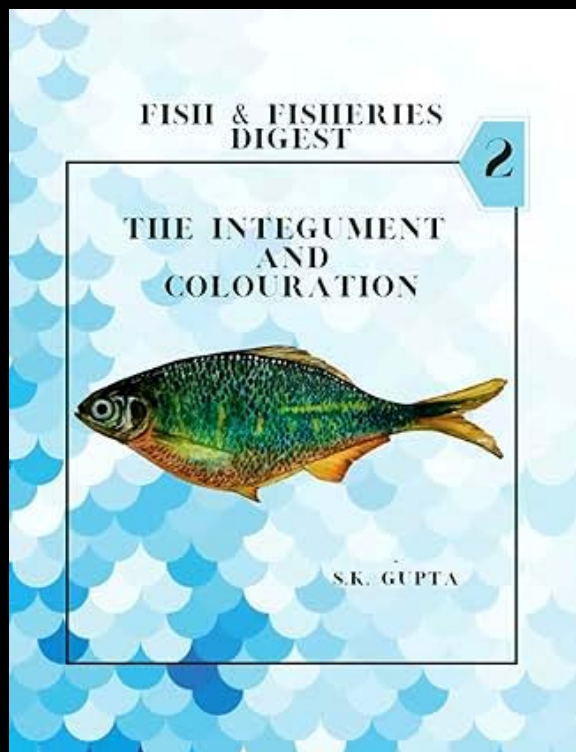


1. 'Jack of all trades' is the phrase often used for which of the following?  
(a) Sharks (b) Skin (c) Scales (d) Bony Plates
2. Dermis of the skin originates from which of the following?  
(a) Endoderm (b) Ectoderm (c) Epidermis (d) Mesoderm
3. 'Thread Cells' of the skin are the characteristic to which of the following?  
(a) Rays (b) *Chimaera* (c) *Myxine* (d) *Anguilla*
4. 'Large epidermal tooth' is found on the roof of buccal cavity in which of the following?  
(a) Lung Fishes (b) *Myxines* (c) *Petromyzon* (d) Catfishes
5. 'Ostracoderms' belong to which of the following?  
(a) Extinct Agnathans (b) Extinct Holocephali  
(c) Extinct Acanthodii (d) Extinct Gnathostomes
6. *Cephalaspis*, *Birkenia* and *Pteraspis* are the examples of:  
(a) Agnatha (b) Acanthodii (c) Actinopterygii (d) Dipnoi
7. Placoderms belong to which of the following?  
(a) Fossil Agnatha (b) Fossil Gnathostomata  
(c) Fossil Acanthodii (d) Fossil Dipnoi
8. Pterygopodial Glands are found in which of the following?  
(a) Cartilaginous fishes (b) Bony fishes  
(c) Holocephali (d) Cyclostomata
9. 'Ceratotrichia' are epidermal fin rays, characteristic to which of the following?  
(a) Cartilaginous fishes (b) Bony fishes  
(c) Lung fishes (d) Catfishes
10. What is the name of the 'folded dentine' developed around a pulp cavity with outstanding ridges?  
(a) Plicidentine (b) Vasodentine (c) Osteodentine (d) Vitrodentine
11. The greatly enlarged denticles, known as 'bucklers' are found in which of the following?  
(a) Skates (b) Rays (c) Saw Fish (d) *Acipenser*
12. The dermal fin rays, called 'Camptotrichia', are found in which of the following?  
(a) Elasmobranchs (b) Dipnoi (c) Holocephali (d) Agnatha
13. The hypermineralized (capping) tissue, called limiting layer is the part of which of the following?  
(a) Cosmoid scales (b) Placoid scales  
(c) Ganoid scales (d) Elasmoid scales
14. Which of the following is considered as the crown Gnathostome?  
(a) *Dunkleosteus* (b) *Entelognathous* (c) *Pteraspis* (d) *Coccosteus*
15. Microridges or micropapillae, forming fingerprint-like patterns, are characteristic to which of the following?  
(a) Superficial epithelial cells of Teleosts  
(b) Superficial epithelial cells of Sharks  
(c) Superficial surface of Cosmoid scales  
(d) Superficial surface of Ganoid scales.
16. 'Alarm substance cells' (= *Schreckstoff* cells) is the name used for which of the following?  
(a) Granular gland cells (b) Club cells  
(c) Sacciform cells (d) Goblet cells
17. A complex of 'pore-canal network', developed between and around the dentinal odontodes is the characteristic of which of the following?  
(a) Cosmine (b) Ganoine (c) Elasmidine (d) Vitrodentine

18. Distinctive denticular (teeth-like) structures called 'Lepidonts', are the characteristic to which of the following?  
 (a) Ganoid scales (b) Polypterid scales  
 (c) Lepisosteid scales (d) Elasmoid scales
19. The scales above the lateral line are mostly ctenoid and those below it are cycloid, is diagnostic to which of the following families?  
 (a) Sciaenidae (b) Gobiidae (c) Serranidae (d) Mugilidae
20. Which of the following is a paedomorphic scaleless fish?  
 (a) *Schindleria brevipinguis* (b) *Draconestes narinus*  
 (c) *Synchiropus splendidus* (d) *Silurus glanis*
21. The world's deep sea dwelling scaleless fish is Hadal Snailfish (*Pseudoliparis swirei*) from Mariana Trench. It has been recorded at about which depth of the sea?  
 (a) up to about 4,500 m (b) up to about 5,000 m  
 (c) up to about 3,000 m (d) up to about 8,200 m
22. South American freshwater 'Thorny Catfishes' belong to which of the following families?  
 (a) Callichthyidae (b) Doradidae (c) Loricaridae (d) Amblycipitidae.
23. Some coldwater marine fishes called Poachers are quite distinctive as compared to other families of the Order Scorpaeniformes; characterized by a body covering of scales modified into bony plate armour of 6 – 8 longitudinal rows. Poachers belong to which of the following families?  
 (a) Agonidae (b) Liparidae (c) Cottidae (d) Cyclopteridae
24. The body is either uniformly covered with small to moderate scales or a corselet (large thick scales) is present behind head and around pectoral fins. This character relates to which of the following?  
 (a) Mackerels (b) Tunas (c) Jacks and Pompanos (d) Both (a) & (b).
25. A fish has two chin (hyoid) barbels, which are mechanically separate components *i.e.*, moving independently, lowering and raising by hyoid bars and each having its own musculature. This is characteristic to which of the following?  
 (a) Black dragonfishes (b) Sturgeons (c) Cods (d) Goatfishes
26. Which of the following is an important example of 'external skin-brooding fishes'?  
 (a) Banjo catfishes (b) Anglerfish (c) Bagariid catfish (d) Loaches
27. Which of the following exhibits unusual behaviour of parental care in that both parents provide offsprings with mucus secretions as a nutritive and defensive feed ?  
 (a) Tiger Perches (b) Pencil Catfishes (c) Pupfishes (d) Discus Fish
28. 'Kairomones' are a kind of semiochemicals released by an organism. They mediate which of the following interactions?  
 (a) Interspecific interactions (b) Intraspecific interactions  
 (c) Mutualistic interactions (d) Host-parasite interactions
29. Who of the following authored the book entitled, 'Animal Colouration'?  
 (a) Isaac Newton (b) Robert Hooke  
 (c) Frank Evers Beddard (d) Thomas Young
30. Which of the following is the most prevalent carotenoid, common in red-coloured fishes ?  
 (a) Tunaxanthin (b) Astaxanthin (c) Zeaxanthin (d) Canthaxanthin
31. Which of the following is the precursor amino acid of melanin?  
 (a) Valine (b) Tryptophan (c) Phenylalanine (d) Tyrosine
32. Denticritic, blue-coloured cyanophores have recently been discovered in the dermis of which of the following fishes?  
 (a) *Fundulus* sp. (b) *Synchiropus* sp.  
 (c) *Pseudochromis* sp. (d) *Oryzias* sp.
33. Which of the following is a melanocortin?  
 (a) MSH (b) MCH (c) Dopamine (d) Melatonin.

34. Based on innervations of chromatophores most Teleosts have which type of chromatophores?  
 (a) Aneuronic (b) Mononeuronic (c) Dineuronic (d) Neuronic
35. The postganglionic fibres are known to facilitate aggregation or dispersion of pigment granules in chromatophores *via* which of the following receptors?  
 (a) Adrenoreceptors (b) Melanin-concentrating receptors  
 (c) Melatonin receptors (d) Melanocortin receptors
36. 'Agouti-signaling proteins' (ASP) are associated with which of the following ?  
 (a) Dark colours and more melanosomes (b) Lighter colours and fewer melanosomes (c) Dark colours and fewer melanosomes  
 (d) Lighter colours and more melanosomes
37. Refractosomes are characteristic to which of the following?  
 (a) Melanophores (b) Leucophores (c) Erythrophores (d) Iridophores
38. 'Erythro-iridophores', which have the capability of both reflecting and absorbing light to impart reddish-violet hues, have been found in which of the following fishes?  
 (a) Butterfly fishes (b) Fang-tooth blennies  
 (c) Topminnows (d) Purple stripe dottyback
39. Which of the following factors is involved in the control of 'circadian pigment rhythms' in teleosts?  
 (a) Melanocortin (b) Melatonin (c) Melanin (d) MSH
40. In fishes, the lighter colour along the belly is achieved through inhibition of melanoblast differentiation and iridophore proliferation by which of the following ?  
 (a) cAMP (b) Melanocortin  
 (c) Agouti-signaling protein (d) Epinephrine
41. An example of pigmentation and depigmentation is furnished by cave Tetras of Mexico. They belong to which of the following families?  
 (a) Centarchidae (b) Cyprinodontidae (c) Cichlidae (d) Characidae
42. Apatitic Colours refer to which of the following?  
 (a) Attractive (b) Aggressive (c) Deceitful (d) Bright
43. With reference to colouration mechanisms, Thayer's Law is applicable to which of the following ?  
 (a) Countershading (b) Disruptive Colouration  
 (c) Directive marks (d) Deflective marks
44. Barber fishes or Cleaner fishes, which often display brilliant blue stripe along the flanks, are the best examples to illustrate the 'advertisement strategy through colouration'. Which of the following Genera relates to a cleaner fish ?  
 (a) *Labroides* sp. (b) *Luxilus* sp. (c) *Fundulus* sp (d) *Etheostoma* sp.
45. Which of the following is the Amazon Leaf Fish?:  
 (a) *Monocirrhus* (b) *Monopterus* (c) *Nandus* (d) *Platichthys*
46. Remarkable resemblance to the fronds of an eel-grass is shown by which of the following?  
 (a) *Aluterus* sp.(b) *Anabas* sp. (c) *Anguilla* sp. (d) Elvers
47. The resemblance of a harmless and dark ringed snake eel to a venomous seasnake is one of the early examples Batesian mimicry. Select out the name of Genus of the snake eel:  
 (a) *Meiacanthus* (b) *Myrichthys* (c) *Canthigaster* (d) *Plagiotremus*
48. Which of the following fishes is famous for mimicking unpalatable marine flatworms belonging to *Pseudoceros* sp.?  
 (a) Gaum scorpion fish (b) Black saddled filefish  
 (c) Fang blenny (d) Shaded batfish
49. The best known and one of the first discoveries of aggressive mimicry comes from which of the following families?  
 (a) Nemipteridae (b) Blenniidae (c) Serranidae (d) Belontiidae
50. The fishes called 'anthias' are famous for living in huge aggregations of several thousand individuals. The Carberryi Anthias (*Nemanthias carberryi*) is a very striking fish from the coral reef regions of Maldives (Western Indian Ocean), exhibiting 'school-oriented mimicry'. It belongs to which of the following families?  
 (a) Serranidae (b) Scaridae (c) Scorpaenidae (d) Sciaenidae





## **ANSWERS**

1. (b), 2. (d), 3. (c), 4. (b), 5. (a), 6. (a), 7. (b), 8. (a), 9. (a), 10. (a), 11. (a), 12. (b), 13. (d), 14. (b), 15. (a), 16. (b), 17. (a), 18. (d), 19. (c), 20. (a), 21. (d), 22. (b), 23. (a), 24. (d), 25. (d), 26. (a), 27. (d), 28. (a), 29. (c), 30. (b), 31. (d), 32. (b), 33. (a), 34. (c), 35. (a), 36. (b), 37. (b), 38. (d), 39. (b), 40. (c), 41. (d), 42. (c), 43. (a), 44. (a), 45. (a), 46. (a), 47. (b), 48. (d), 49. (b), 50. (a).

## **TEXTUAL REFERENCE**

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**F**ishery industry involves catching, processing, marketing and conservation of fish. One can learn about managing and understanding fisheries by pursuing academic career in *Fisheries Science* – like:

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The selection of eligible students into the various courses in Fishery Science is done through **ENTRANCE EXAMS**.

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The exams conducted for various Indian administrative services like IAS/IFS/PCS etc also include questions on Zoology/Fisheries.

**To build a firm footing in FISHERY SECTOR  
&  
for fulfilling the desired 'aspirations'  
let us venture into Fishery QUESTION BANK arena.**

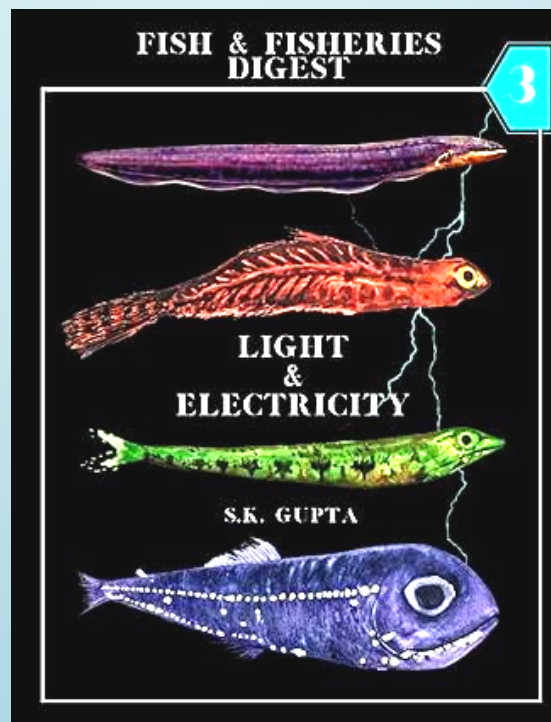
1. With reference of an electric fish, whose Arabic name is translated as 'father of thunder'?  
(a) *Uranoscopus* (b) *Mormyrus* (c) *Electrophorus* (d) *Malapterurus*
2. 1 pair, kidney-shaped Electric organ, derived from branchial muscles, is found in which of the following?  
(a) *Raja* (b) *Gymnarchus* (c) *Torpedo* (d) *Gymnotus*
3. The electric organ, a modified tail musculature, consists of 4 tube like columns of electrocytes in which of the following?  
(a) *Torpedo* (b) *Mormyrus* (c) *Gnathonemus* (d) *Malapterurus*
4. As a part of electric organs Sach's organ and Hunter's organ is found in which of the following ?  
(a) *Uranoscopus* (b) *Gymnotus*  
(c) *Electrophorus electricus* (d) *Malapterurus electricus*
5. 'Neurogenic electric organ' is found in which of the following families?  
(a) Sternopygidae (b) Rhamphichthyidae  
(c) Gymnotidae (d) Apterotonidae
6. Which of the following has an electric organ of modified eye muscles?  
(a) *Apterotonus* (b) *Uranoscopus* (c) *Mormyrus* (d) *Astroscopus*
7. Who coined the term luminescence?  
(a) Aristotle (b) Wiedemann (c) Florian Heller (d) J. Baker
8. That the production of living light required two separate water-soluble components, the *luciferin* and *luciferase*, was confirmed by whose work?  
(a) Newton Harvey (b) Charles Darwin  
(c) Raphael Dubois (d) Rodrihgs Raphael
9. 'Far-red' suborbital photophore is found in which of the following?  
(a) *Opisthoproctus* (b) *Chlorophthalmus*  
(c) *Melanostomias* (d) *Malacosteus*
10. Which zone of the ocean is often referred as the oceanic 'bioluminescent hotspot'?  
(a) Epipelagic (b) Mesopelagic (c) Benthopelagic (d) Abyssopelagic
11. In terms of numbers, which of the following represent the most abundant fauna on the planet?  
(a) Gonostomatids (b) Stomiids  
(c) Squaliform sharks (d) Anglerfishes
12. Bioluminescent Lantern Sharks belong to which of the following families?  
(a) Somniosidae (b) Oxynotidae (c) Dalatiidae (d) Etmopteridae
13. Which of the following is the Genus of Cookiecutter Sharks?  
(a) *Isistius* (b) *Etmopterus* (c) *Zameus* (d) *Oxynotus*
14. Which of the following is the only example of bioluminescent species belonging to Order Clupeiformes?  
(a) *Winteria* (b) *Engraulius* (c) *Coilia* (d) *Sardinella*
15. All species of a Family have a black shoulder sac apparatus, producing blue green luminous fluid, with a tubular opening outside. Choose the correct option:  
(a) Platyroctidae (b) Alepocephalidae  
(c) Gonostomatidae (d) Sternoptychidae
16. In addition to the regular ventral and lateral photophores, bioluminescent barbels are also found among the members of which Family?  
(a) Paralepididae (b) Stomiidae  
(c) Phosichthyidae (d) Evermannllidae

17. 'Females' are provided with an *illicium*, the *esca* of which is luminescent due to being filled up with luminous bacteria in which of the following?  
 (a) Ceratoid anglerfishes (b) Midshipmen  
 (c) Flashlight fishes (d) Flabby whalefishes
18. The luminous gland is a whitish-yellow U-shaped filiform body, embedded in the muscles of the pectoral and ventral regions. It is characteristic to which of the following?  
 (a) *Leiognathus* (b) *Acropoma* (c) *Siphamia* (d) *Gazza*
19. Which of the following is now regarded as the smallest deep sea shark having light producing photophores along the belly?  
 (a) *Etmopterus perryi* (b) *Squaliolus aliae*  
 (c) *Isistius brasiliensis* (d) *Oxynotus centrina*
20. The first calcium-activated photoprotein, called 'aequorin' was extracted and purified from which of the following?  
 (a) A jellyfish (b) An Ostracod (c) An Annelid (d) A Gymnotid
21. Which of the following is responsible for intrinsic bioluminescence in fishes?  
 (a) *Siphamia* (b) *Photobacterium kishitanii*  
 (c) Ostracod Crustacean (d) *Aliivibrio fischeri*
22. Which of the following anglerfishes has an intrinsic and bacterial, dual source of light production on the same animal?  
 (a) *Monocentris* sp. (b) *Saccopharynx* sp.  
 (c) *Linophryne* sp. (d) *Ceratias* sp.
23. Besides having light organs along the belly, which of the following also has nasal light organs (both in front and below the eyes), acting like a 'headlights'?  
 (a) *Photoblepharon* sp. (b) *Diaphus* sp.  
 (c) *Kryptophanaron* sp. (d) *Taaningichthys* sp.
24. Which of the following exhibits the presence of numerous photophores (up to 850) arranged along 4 lateral lines and based on the location, the photophores are identified as of cephalic and trunk series?  
 (a) *Coelorinchus* sp. (b) *Antimora* sp.  
 (c) *Malacocephalus* sp. (d) *Porichthys* sp.
25. An epidermal tissue, secreting a mucous layer which covers most of the head and body with red luminescence, is characteristic to which of the following?  
 (a) *Dibranchus* sp. (b) *Cetomimus* sp. (c) *Anomalops* sp. (d) *Cleidopus* sp.
26. The light organ is rotated downward so that only the heavily pigmented posterior part of the organ is exposed. Which of the following exhibits this characteristic?  
 (a) *Photoblepheron* sp. (b) *Anomalops* sp. (c) *Diaphus* sp. (d) *Cyclothone* sp.
27. Biofluorescence has been reported for the first time in two juvenile specimens of Arctic variegated snailfishes, belonging to which of the following genera?  
 (a) *Eviota* sp. (b) *Sander* sp. (c) *Enneapterygius* sp. (d) *Liparis* sp.
28. Bright green fluorescence has been found in Chain Catsharks (Scyliorhinidae) due to the presence of 'fluophores' containing which of the following unique compounds?  
 (a) Brominated tryptophan-kynurenine (b) GFP proteins  
 (c) Fatty-acid-binding protein (d) Guanine crystals
29. A basic green fluorescent protein named *UnaG* was derived from the muscles of which of the following fishes?  
 (a) *Anguilla japonica* (b) *Kaupichthys* sp.  
 (c) *Sander vitreus* (d) *Pseudocheilinus* sp.
30. Historically, researches done on electric fish proved fundamentally important for demonstrating that electricity might be involved in animal physiology. Who of the following was inspired by the works done on the 'torporifick eels' (*i.e.*, electric eels) of Guiana?  
 (a) Michel Adanson (b) Benjamin Franklin  
 (c) Edward Bancroft (d) John Walsh

31. Who is supposed to be using the most aspired word '*animal electricity*'?  
 (a) Alexander von Humboldt (b) Alessandro Volta  
 (c) Luigi Galvani (d) John Walsh
32. With reference to electric organs who of the following used the phrase '*organe electrique artificiel*'?  
 (a) Luigi Galvani (b) John Walsh  
 (c) Michel Adanson (d) Alessandro Volta
33. Histologically, the electrocyte is itself a spinal electromotor neuron, having long axons. It is diagnostic to which of the following?  
 (a) Apterontidae (b) Gobiidae  
 (c) Stomiidae (d) Mormyridae
34. Presence of which of the following is characteristic to all layers of Electrosensory Lateral line Lobe (ELL)?  
 (a) Glutamatergic interneurons (b) *GABAergic* interneurons  
 (c) Cholinergic interneurons (d) Adrenergic interneurons
35. Which of the following acts as a signaling molecule or 'neuromodulator' of neurally induced luminescence in many marine organisms?  
 (a) Nitric Acid (b) Nitrous oxide (c) Inorganic Nitrate (d) Nitric Oxide

#### ANSWERS

1(d), 2 (c), 3 (b), 4 (c), 5 (d), 6 (d), 7(b), 8 (c), 9 (d), 10 (b), 11 (a), 12 (d), 13 (a), 14 (c), 15 (a), 16 (b), 17 (a), 18 (b), 19 (b), 20 (a) 21 (c), 22 (c), 23 (b), 24 (d), 25 (b), 26 (b), 27 (d), 28 (a), 29 (a), 30 (d), 31 (c), 32 (d), 33 (a), 34 (b), 35 (d).



#### TEXTUAL REFERENCE

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1. Who authored the publication entitled 'Poisonous and Venomous Marine Animals of the World'?  
(a) J.S. Nelson (b) Perriere and Perriere  
(c) J.R. Norman (d) Bruce Walter Halstead
2. Which of the following are mainly Ichthyohepatotoxic?:  
(a) Cyprinids (b) Catfishes (c) Sharks (d) Cyclostomes
3. Which of the following are mainly Ichthyocrinotoxic?:  
(a) Hagfishes (b) Rays (c) Ratfishes (d) Dogfishes
4. Pahutoxin has been identified in which of the following?  
(a) *Ostracion* (b) *Diodon* (c) *Tetraodon* (d) *Carcharodon*
5. Which of the following toxins was first isolated from the sea bass or soapfish (*Pogonoperca punctata*)?  
(a) Grammistins (b) Saponins (c) Ciguatoxins (d) Pahutoxins
6. What type of toxicity has been identified in *Schizothorax* sp.?  
(a) Hepatotoxicity (b) Crinotoxicity (c) Oototoxicity (d) Hemotoxicity
7. In the roe of which species Dinogunellin has been identified as a lysophospholipid toxin?  
(a) Japanese prickleback (b) Shark  
(c) Japanese sandfish (d) Japanese Mackerel
8. Which of the following families is supposed to be hemotoxic?  
(a) Cyprinidae (b) Anguillidae (c) Tetraodontidae (d) Siluridae
9. Who coined the term anaphylaxis?  
(a) Charles Chilton (b) Charles Robert Richet  
(c) Halstead (d) Robert Rover
10. Histamine poisoning is caused by which of the following?  
(a) Scombridae (b) Anguillidae (c) Muraenidae (d) Acipenseridae
11. Balloonfish, blowfish, bubblefish, globefish, swellfish, toadfish, toadies, honey toads and sea squab are the common names for the fishes belonging to which Family?  
(a) Coryphaenidae (b) Xiphiidae (c) Diodontidae (d) Tetraodontidae
12. The skin and certain internal organs of many fishes belonging to Tetraodontidae are highly toxic but nevertheless the meat of some species is considered a delicacy in both Japan (as *fugu*) and Korea (as *bok*). These fishes belong to which Genus?  
(a) *Tetraodon* (b) *Diodon* (c) *Stichaeus* (d) *Scorpaenichthys*
13. Which of the following is the main cause of clupeotoxism?  
(a) Palytoxin (b) Ciguatoxins (c) Maitotoxins (d) Grammistins
14. Gempylid Diarrhea or Escolar diarrhea is caused by :  
(a) *Rita* sp. (b) *Ruvettus* sp. (c) *Rutilus* sp. (d) *Rohtee* sp.
15. What is the older name of Tokyo (Japan)?  
(a) Edo (b) Shimonoseki (c) Tokugawa (d) Kansai
16. Which of the following places is most famous for consumption of '*fugu*' in Japan?  
(a) Tokugawa (b) Kansai (c) Shimonoseki (d) Tokyo
17. Which is the most poisonous/dangerous part of 'Puffer'?  
(a) Liver (b) Ovary (c) Pancreas (d) Muscles
18. What is the full form of CFP?  
(a) Clupeoid fish poisoning (b) Ciguatera fish poisoning  
(c) Crayfish poisoning (d) Congereel fish poisoning
19. *Fugu*, that has its poisonous parts removed, is marketed with which name?  
(a) Sashimi (b) Higanfugu (c) Migaki fugu (d) Takefuku
20. What is the name of *fugu*, cooked in a broth made from the poisonous livers and intestines?  
(a) Fugu Kara-age (b) Hire-zake (c) Chiri (d) Yubiki

21. 'Dream fish' or 'nightmare fish' are concerned with which toxicity?  
 (a) Ichthyootoxism (b) Ichthyohepatotoxism  
 (c) Ichthyocrinotoxims (d) Ichthyoallyeinotoxism
22. After ingestion, which of the following cause 'psychoactive' effects?  
 (a) *Kyphosus* sp. (b) *Erilepis* sp. (c) *Stromuteus* sp. (d) *Ruvettus* sp.
23. Dimethyltryptamine (DMT), found in some fish, is what kind of a toxin?  
 (a) Ciguatoxin (b) Tetraodotoxin (c) Scaritoxin (d) Hallucinogen
24. Who gave the name ciguatera?  
 (a) Don Antonio Parra of Japan (b) Don Parra Antonio of the Carribean (c) Antonio Don Parra of Germany (d) Don Antonio Parra of Cuba
25. The '*cigua*', is the Spanish trivial name of which of the following?  
 (a) A Shrimp (b) A Crab (c) Scorpionfish (d) A Mollusk
26. Which of the following families are considered key vectors in the transfer of ciguatoxins to carnivorous fish?  
 (a) Acanthuridae and Scaridae (b) Carangidae and Labridae  
 (c) Lutjanidae and Scombridae (d) Serranidae and Sphyraenidae
27. The dinoflagellate, known as *Gambierdiscus toxicus*, is potentially involved with which toxicity?  
 (a) Ichthyoallyeinotoxism (b) Puffer fish poisoning  
 (c) Ciguatera (d) Moray eel poisoning
28. Which of the following is a more oxidized form of Gambiertoxin?  
 (a) Tetraodotoxin (b) Ciguatoxins (c) Scaritoxin (d) Palytoxin
29. The main ciguatoxins identified from the Pacific are P-CTX-1, P-CTX-2 and P-CTX-3, but which is/are the major toxin(s) found in carnivorous fish?  
 (a) CTX-1 (b) P-CTX-2 (c) P-CTX-3 (d) CTX-1 and P-CTX-2
30. Which of the following is solely affected by Ciguatoxins ?  
 (a) Blood (b) Muscles  
 (c) Peripheral nervous system (d) Respiratory system
31. Select out the fish, called '*maito*' in Tahiti language, after which ciguatera-causing maitotoxins (MTXs) have been named?  
 (a) *Ctenochaetus striatus* (b) *Calamus calamus*  
 (c) *Caranx latus* (d) *Cheilinus undulatus*
32. Ciguatera-causing palytoxin was first isolated from which of the following?  
 (a) Diatoms (b) Dinoflagellates (c) Soft coral (d) Mollusks
33. Haff disease or Rhabdomyolysis is caused by the poisoning of which of the following?  
 (a) *Tetraodon* (b) *Ictalurus* (c) *Ictiobus* (d) *Anguilla*
33. The major symptoms of Rhabdomyolysis are associated with which of the following?  
 (a) Heart (b) Skeletal muscles (c) Gastrointestinal tract (d) Liver
35. Phycotoxins are toxic compounds that enter into the food chain as components of which of the following?  
 (a) Crustaceans (b) Soft corals (c) Mollusks (d) Phytoplankton
36. Saxitoxin (STX) is a neurotoxin. The term STX originates from which of the following species of bivalve mollusks?  
 (a) Alaska butter clam (b) Blue mussels  
 (c) Soft-shell clams (d) Razor clams
37. More than 100 years ago, where was Paralytic Shellfish Poisoning (PSP) reported for the first time?  
 (a) China (b) Africa (c) South America (d) Canada
38. Which of the following are recognized as closely related 3,4,6-trialkyltetrahydropurine compounds?  
 (a) DSP toxins (b) PSP toxins (c) ASP toxins (d) NSP toxins
39. Which one of the following is listed as a grade one chemical weapon under the UN Chemical Weapons Convention and used in CIA suicide pills?  
 (a) Saxitoxin (b) Tetrodotoxin (c) Okadaic acid (d) Pectenotoxin
40. Which are the most affected parts/systems by Saxitoxins (STXs)?  
 (a) Smooth muscles (b) Skeletal Muscles  
 (c) Gastrointestinal tract (d) Peripheral nerves

41. Although Diarrhetic Shellfish Poisoning (DSP) is reported worldwide, which of the following appear to be the highly affected areas?  
 (a) Japan and China (b) America and Africa  
 (c) Asia and South America (d) Europe and Japan
42. DSP toxins are produced by which of the following dinoflagellates?  
 (a) *Pyrodinium* spp. (b) *Dinophysis* spp.  
 (c) *Gymnodinium* spp. (d) *Alexandrium* spp.
43. Depending on chemical structure, DSP toxins are often divided into three groups. Which of the following is the 'first group'?  
 (a) Polyether-lactones (b) Okadaic acid  
 (c) Yessotoxins (d) Saxitoxins
44. Which is the another name for Amnesic Shellfish Poisoning (ASP)?  
 (a) Okadaic acid poisoning (OAP) (b) Azaspiracid poisoning (AZP)  
 (c) Domoic Acid Poisoning (DAP) (d) Dynophysistoxin poisoning (DTXP)
45. Where was Amnesic Shellfish Poisoning (ASP) first recognised in 1987?  
 (a) Prince Edward Island, Canada (b) Bay of Fundy  
 (c) Canada Oregon and Washington States (d) Japan
46. What is the chemical nature of Domoic Acid (DA), the chief naturally occurring toxin responsible for Amnesic Shellfish Poisoning (ASP)?  
 (a) A crystalline water-soluble alkaline amino acid (b) A crystalline fat-soluble acidic amino acid (c) A crystalline water-soluble aromatic amino acid (d) A crystalline water-soluble acidic amino acid
47. The shellfish poisoning toxin, Domoic Acid (DA), was originally isolated from:  
 (a) Green macroalga (*Alsidium corallinum*) (b) Red macroalga (*Chondria armata*) (c) Diatom (*Amphora coffaeiformis*)  
 (d) Dinoflagellate (*Dinophysis*)
48. Domoic Acid (DA) intoxication has been aptly called as Amnesic Shellfish Poisoning (ASP), because of its impact on:  
 (a) Muscles (b) Memory (c) Blood (d) Liver
49. Neurologic Shellfish Poisoning (NSP) is also known as:  
 (a) Domoic Acid Poisoning (DAP) (b) Diarrhoeic Shellfish Poisoning (DSP) (c) Brevetoxin (BTX) poisoning (d) Paralytic Shellfish Poisoning (PSP)
50. The body of which of the following is relatively fragile and is readily broken down due to wave action along beaches, thus releasing the toxins?  
 (a) *Karenia brevis* (b) *Gambierdiscus toxicus*  
 (c) *Alexandrium* spp. (d) *Dinophysis* spp.
51. Azaspiracid poisoning (AZP) toxins are found to have been produced by which of the following ?  
 (a) *Alsidium* sp. (b) *Dinophysis* sp.  
 (c) *Protoceratum* sp. (d) *Gambierdiscus* sp.
52. Which of the following Horse-shoe crabs, causing shellfish-poisoning, is found along the Eastern coast of India?  
 (a) *Carcinoscorpius rotundicauda* (b) *Tachypleus tridentatus*  
 (c) *Limulus polyphemus* (d) *Xiphosura polyphemus*
53. Which of the following is the species of northern hemisphere Genus of 'lobsters'?  
 (a) *Homarus* (b) *Penaeus* (c) *Limulus* (d) *Nephrops*
54. 'Tomalley' of the 'lobsters' and 'crabs' refers to which of the following?  
 (a) Testes (b) Hepatopancreas (c) Tail muscles (d) Ovaries
55. Bitter Crab Disease (BCD) is with which of the following?  
 (a) Xanthid crabs (b) Blue Crabs  
 (c) Dungeness crabs (d) Coconut Crabs
56. Alpha-crustacyanin is a pigment characteristic to the shell of a kind of crabs. Which colour it is responsible for?  
 (a) Orangish hue (b) Greenish hue  
 (c) Spotted black-brownish hue (d) Bluish hue



57. *Metacarcinus magister* is the scientific name of which of the following?  
 (a) Blue crab (b) Xanthid crab  
 (c) Horse-shoe crab (d) Dungeness crab
58. Which of the following is the largest edible marine species of crabs?  
 (a) *Callinectes sapidus* (b) *Demania toxica*  
 (c) *Metacarcinus magister* (d) *Lophozozymus pictor*
59. Which of the following is famous as a 'Market Crab'?  
 (a) Dungeness crab (b) Coconut Crab (c) Blue Crab (d) Robber crab
60. ASP and PSP are the chief poisonings caused by ingesting which of the following crustaceans?  
 (a) Lobsters (b) Dungeness crab (c) Prawns (d) Shrimps
61. Which of the following is the largest land living arthropod?  
 (a) Horse-shoe crab (b) Dungeness crab  
 (c) Coconut crab (d) Xanthid crab
62. *Birgus latro* is the scientific name of which of the following?  
 (a) Coconut crab (b) Dungeness crab (c) Blue crab (d) King crab
63. Cardiac-arresting cardenolides or cardenolide glycosides are the chief toxins found in the flesh of which of the following?  
 (a) Xanthid crabs (b) Blue Mussels (c) Oysters (d) Coconut crabs
64. Which of the following is basically a shellfish allergy-causing protein?  
 (a) Myosin (b) Tropomyosin (c) Troponin (d) Actin
65. Most venomous fishes are:  
 (a) Marine, bottom-dwellers (b) Marine, coast-dwellers  
 (c) Estuarine (d) Coral reef dwellers
66. The Dogfish Sharks with venomous dorsal fin spines belong to which of the following Genera?  
 (a) *Scoliodon* (b) *Sphyrna* (c) *Squalus* (d) *Somniosus*
67. River stingrays belong to which of the following families?  
 (a) Hexatrygonidae (b) Plesiobatidae  
 (c) Dasyatidae (d) Potamotrygonidae
68. The venom glands are restricted to the spaces between the serrations on the dorsal/pectoral fin spines, as opposed to being found along the length of the spines, in which of following families of catfishes?  
 (a) Ictaluridae (b) Mochokidae (c) Doradidae (d) Plotosidae
69. Both in *Ictalurus* (Channel catfish) and *Noturus* (Madtoms), there is:  
 (a) An inflicting pectoral spine (b) An inflicting preopercular spine  
 (c) An inflicting cleithral spine (d) An inflicting Dorsal spine
70. Belonging to Family Plotosidae, several marine and estuarine eeltail catfishes inflict stings with which of the following?  
 (a) Pectoral fin spines (b) Dorsal and Pectoral fin spines  
 (c) Dorsal and pelvic fin spines (d) Opercular spines.
71. The venomous apparatus, composed of two hollow dorsal spines and a hollow opercular spine, associated with venom glands, is characteristic to which of the following?  
 (a) Stargazers (b) Rabbitfishes (c) Weeverfishes (d) Toadfishes
72. The most common type of venom apparatus, in the form of the fin ray spines of dorsal, anal and pelvic fins, with grooves on both sides, is found in which of the following?  
 (a) Eeltail catfishes (b) Channel catfishes  
 (c) Scorpionfishes (d) Saber-toothed blennies
73. In which of the following venomous fishes, the venom apparatus consists of the two cleithral spines?  
 (a) Weeverfishes (b) Lionfishes (c) Channel catfishes (d) Stargazers

74. The venom apparatus consisting of Toxic buccal glands associated with canine-like teeth on the dentary are characteristic to which of the following?

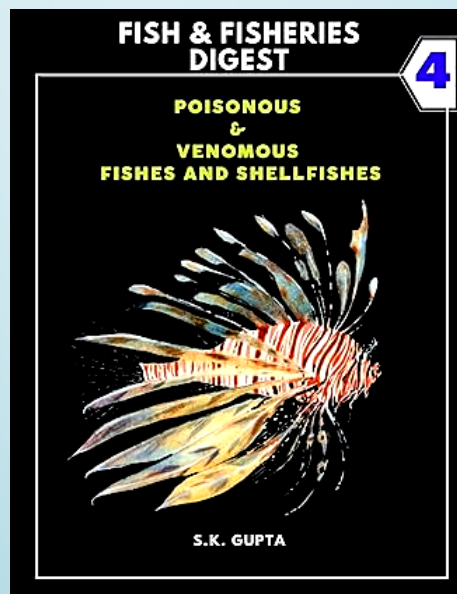
(a) Blenniidae (b) Trachinidae (c) Scorpaenidae (d) Uranoscopidae

75. Scalpel sharp blades, found on the caudal peduncle, are characteristic to which of the following?

(a) Rabbitfishes (b) Surgeonfishes  
(c) Sabre-toothed blennies (d) Weeverfishes

### ANSWERS

1. (d); 2. (c); 3. (a); 4. (a); 5. (a); 6. (c); 7. (a); 8. (b); 9. (b); 10. (a); 11. (d); 12. (a); 13. (a); 14. (b); 15. (a); 16. (c); 17. (a); 18. (b); 19. (c); 20. (c); 21. (d); 22. (a); 23. (d); 24. (d); 25. (d); 26. (a); 27. (c); 28. (b); 29. (a); 30. (c); 31. (a); 32. (c); 33. (c); 34. (b); 35. (d); 36. (a); 37. (d); 38. (b); 39. (a); 40. (d); 41. (d); 42. (b); 43. (b); 44. (c); 45. (a); 46. (d); 47. (b); 48. (b); 49. (c); 50. (a); 51. (c); 52. (a); 53. (d); 54. (b); 55. (b); 56. (d); 57. (d); 58. (c); 59. (a); 60. (b); 61. (c); 62. (a); 63. (d); 64. (b); 65. (a); 66. (c); 67. (d); 68. (c); 69. (a); 70. (b); 71. (d); 72. (c); 73. (d); 74. (a); 75. (b).



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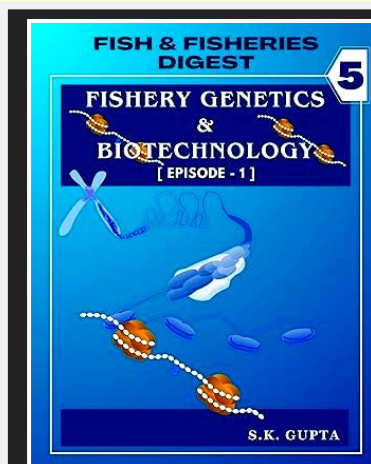
1. FAO recommended the formulation of a global Code of Conduct for Responsible Fisheries (CCRF) and 12 'Articles' were formulated to cover various issues. Which 'Article' is related with 'Aquaculture development' ?  
(a) Article – 9 (b) Article – 6 (c) Article – 5 (d) Article – 10
2. Who coined the term 'Genetics'?  
(a) Carl Correns (b) T.H. Morgan (c) William Harvey (d) William Bateson
3. Which of the following is the 'Amur Carp' ?  
(a) *Cyprinus acutidorsalis* (b) *Cyprinus rubrofuscus*  
(c) *Cyprinus multitaeniatus* (d) *Cyprinus micristius*
4. Who is supposed to have first attempted to count fish chromosomes accurately?  
(a) Theophilus Painter (b) Schwarz (c) Joe Hin Tjio (d) Walter Sutton
5. Who was the first to induce successful nuclear transplantation and triploidy in three-spined stickleback (*Gasterosteus aculeatus*)?  
(a) W. S. Lakra (b) Thomas King (c) J. Gurdon (d) H. Swarup
6. Formerly International Center for Living Aquatic Resources Management (ICLARM), now named as WorldFish. Where is its headquarter located?  
(a) Brazil (b) Japan (c) Malaysia (d) Indonesia
7. Who was awarded the World Food Prize for his research on Genetically Improved Farmed Tilapia (GIFT) in support of food and nutrition security in food-insecure regions?  
(a) K. Gogoi (b) Shakuntala Haraksingh Thilsted  
(c) S. Rajendran (d) Modadugu Vijay Gupta
8. The technology for the generation of the first transgenic fish through adopting novel gene transfer into the fertilized eggs of gold fish (*Carassius auratus*), was adopted by which country?  
(a) China (b) Thailand (c) Japan (d) Phillipines
9. Which has been the first fish with its whole genome sequenced ?  
(a) Japanese Catfish (b) Japanese Carp  
(c) Japanese Killifish (d) Japanese Pufferfish
10. Who coined the term 'chromosome'?  
(a) Heinrich Wilhelm Gottfried (b) Walther Flemming  
(c) Karl Nageli (d) T. Boveri
11. Who first discovered/observed 'B' Chromosomes?  
(a) E. B. Wilson (b) Randolph (c) Tjio and Levan (d) Walther Flemming
12. Which of the following are the chromosome banding patterns so far obtained for fishes world over ?  
(a) Q-, G- and R-bands (b) Q-, C- and NOR-bands  
(c) C-, G- and NOR-bands (d) T- and NOR-bands
13. Which of the following Chromosomal bands primarily highlight GC-rich regions of DNA?  
(a) G-bands (b) R- bands (c) NOR-bands (d) Q-bands
14. The unit of expression of mass of DNA is picograms. In terms of megabases (Mb), what is the value of one picogram?  
(a) 987 Mb (b) 789 Mb (c) 978 Mb (d) 897 Mb
15. For genome sizes, who suggested the use of the term C-value paradox?  
(a) C.A. Thomas (b) H. Swift (c) R. Vendrely (d) C. Vendrely
16. Which of the following is the most popular 'ploidy manipulation' that has been extensively used in aquaculture practices to create sterile individuals ?  
(a) Tetraploidy (b) Hexaploidy (c) Triploidy (d) Diploidy
17. For determining ploidy, which of the following cytological methods measures nuclear volume of erythrocytes ?  
(a) Coulter Channelyzer (b) Flow cytometry (c) Electrophoresis (d) PCR

18. Which of the following pair of fishes, in general, is known to possess the smallest and the largest GENOME SIZE, respectively?
- Protopterus aethiopicus* and *Myxine garmani*
  - Tetraodon nigroviridis* and *Salmo salar*
  - Hydrolagus colliei* and *Rhinobatos schlegelii*
  - Tetraodon nigroviridis* and *Protopterus aethiopicus*
19. What are Homologous genes of different teleost species that share structure and function in a broad set of related taxa, called ?
- Orthologues
  - Paralogues
  - Ohnologues
  - Analogues
20. More recent Whole Genome Duplication events initially lead to the development of what kind of species?
- Haploids
  - Polyploids
  - Triploids
  - Hexploids
21. Which of the following are considered as 'living fossils' because they have not changed much morphologically since the origin of the group?
- Protopterus*
  - Sphyrna*
  - Sturgeons
  - Tetraodon*
22. The evolutionary  $2n$  number of chromosomes in the teleost lineage has remained nearly unchanged during evolution. In the extant species which of the following is such number?
- $2n = 48$  or  $50$
  - $2n = 44$  or  $60$
  - $2n = 58$  or  $60$
  - $2n = 55$  or  $60$
23. Which of the following Cyprinids is reported to have an amazing 446 chromosomes ( $3n$  derivative of already  $6n$ )?
- Acheilognathus gracilis*
  - Ptychobarbus dipogon*
  - Osteochilus hasselti*
  - Acipenser baerii*
24. What will be the approximate Genome size in fishes if polyploidy has occurred?
- $>2.5$  pg
  - $>1.2$  pg
  - $<2.5$  pg
  - $<0.35$  pg
25. Study the following statements with reference to any changed 'ploidy' situation:
- Cytoplasm/nucleus ratio remains constant
  - There is an increase in cytoplasm volume
  - There is an increase in total cell size
  - There is no increase in cytoplasm volume
- Which of the above statements is/are true in case of any changed 'ploidy' situation?
- I & ii
  - I & iv
  - I, ii & iii
  - iii & iv
26. During the course of evolution, most animals, including fishes, have lost their polyploid status through which of the following processes?
- Mutation
  - Diploidization
  - Deletion
  - Centric Fusion
27. Which of the following is the most popular 'ploidy manipulation', that has been extensively used in aquaculture practices to create sterile individuals?
- Androgenesis
  - Hybridogenesis
  - Triploidization
  - Gynogenesis
28. In the light of Flow Cytometry, study the following statements:
- It is used to determine genome size
  - It is used to determine RNA concentration
  - Used to determine gene elimination
  - It is used to determine ploidy level
- Which of the above statement(s) is/are not true for Flow Cytometry?
- i & iv
  - i & ii
  - ii & iii
  - iii & iv
29. When measuring ploidy, DNA content is expressed as DNA Index (DI). Choose the correct option for Diploids:
- DI 0.95 - 1.05
  - DI  $<0.95$
  - DI  $>1.05$
  - DI  $>2.0$ .
30. Which of the following refers to a type of reproductive failure that appears after the  $F_2$  generation of crosses between different species or subspecies?
- Lethality
  - Hybrid breakdown
  - Inbreeding depression
  - Hybrid Sterility

31. Which of the following is a form of parthenogenesis or a system of asexual reproduction, that requires the presence of sperm without the actual contribution of its DNA?  
 (a) Gynogenesis (b) Androgenesis (c) Hybridogenesis (d) Paternal Apomixis
32. In which of the following, the female genome passes unchanged through generations while the male genome is exchanged every generation?  
 (a) Gynogenesis (b) Protogyny (c) Maternal genome recovery (d) Hybridogenesis
33. Which of the following reproduce through a process called sperm-dependent parthenogenesis?  
 (a) Sailfin Molly (b) Atlantic Molly (c) Amazon molly (d) Short Fin Molly
34. The first case of naturally occurring spontaneous androgenesis *sensu stricto* in vertebrates has recently been found in an allopolyploid fish complex of which of the following?  
 (a) *Squalius alburnoides* (b) *Squalus acanthias*  
 (c) *Squalus albicaudus* (d) *Squalius pyrenaicus*
35. A small number of fishes are known to reproduce asexually *i.e.*, without meiotic recombination. What is mostly represented in these so-called 'unisexual lineages'?  
 (a) Only males (b) Only females (c) Mostly Hermaphrodites (d) Mostly sterile males
36. The extinction of a species is regarded as a landmark event and extinction is considered as a final, irreversible endpoint. However, some species remain cryptically 'alive' as hemiclones. Choose the correct term for such species:  
 (a) Living fossil (b) Endangered species (c) Vulnerable species (d) Semi-living fossil
37. Which of the following defines a taxon which is extinct nowadays in the wild but its germline subsists through its hybridogenetic descendant?  
 (a) Ghost Species (b) Endangered species (c) Vulnerable species (d) Living Fossil
38. Which one of the following is considered an agency through which a species can remain 'alive' even when it becomes extinct?  
 (a) Clone (b) Hemiclone (c) Hybrid (d) Haplotype
39. Which of the following refers to the inevitable accumulation of mutations as a consequence of drift in small asexual populations?  
 (a) Muller's ratchet (b) Haldane's Rule (c) Muller's Principle (d) De Vries Rule
40. In which of the following processes, offspring incorporate the haploid genome of the sexual parent, without genetic recombination and is then discarded/eliminated during gametogenesis and replaced during fertilization in the following generation?  
 (a) Androgenesis (b) Hybridogenesis (c) Parthenogenesis (d) Apomixis
41. Which of the following is an example of differentiated gonochorists (primary gonochorism)?  
 (a) *Poecilia reticulata* (b) *Anguilla anguilla* (c) *Cyprinus carpio* (d) *Danio rerio*
42. Which of the following is the first known example, capable of exhibiting bi-directional sex change?  
 (a) Clownfish (b) Okinawa gobiid fish (c) Coral Bogy (d) Wrasses
43. The term proto-sex chromosome is often used to refer to which of the following?  
 (a) Y-chromosomes (b) W-chromosomes (c) A-chromosomes (d) B-chromosomes
44. Which of the following act selfishly by replicating themselves and moving to the germline (= gonotaxis) and avoiding the somatic cells?  
 (a) Sex Chromosomes (b) Proto-sex chromosomes  
 (c) Y-chromosomes (d) B-Chromosomes
45. An alternative function-oriented term 'GENE DRIVE' is used with reference to transmission of which of the following?  
 (a) A-chromosomes (b) B-chromosomes (c) Z-chromosomes (d) W-chromosomes

46. A freshwater relative of Guppy from northern South America has five different 'male morph phenotypes'. Choose the correct option:  
 (a) *Poecilia reticulata* (b) *Poecilia parae* (c) *Poecilia sphenops* (d) *Poecilia latipinna*
47. Study the following statements:  
 (i) Origin of Multiple Sex Chromosome system (MSCh) after fusions between an existing sex chromosome and an autosome.  
 (ii) Origin of MSCh system after centric fission of the X- chromosome in species with XY system.  
 (iii) Origin of MSCh system after centric fission of the Y- chromosome in species with XY system.  
 (iv) Origin of MSCh system after reciprocal translocations between the X-chromosome and an autosome.  
 (v) Origin of MSCh system after reciprocal translocations between the Y-chromosome and an autosome.
- Which of the above statements is/are true about the origin of MSCh system?  
 (a) i, ii, iii & v (b) i, ii & iv (c) iii, iv & v (d) i, ii, iii & v
48. Who coined the term 'polygenic sex determination (PSD)', shortly after PSD was described in platyfish (*Xiphophorus* spp.)?  
 (a) Nettie Stevens (b) Kurt Kosswig (c) C.E. McClug (d) Peter Goodfellow
49. Which of the following is the first master sex-determining gene identified in mammals?  
 (a) *Sry* (b) *dmy* (c) *sox<sup>3Y</sup>* (d) *sd<sup>Y</sup>*
50. While sex determination in most mammals is triggered by the testis-determining gene *sry*, this role is played by which of the following in Japanese Medaka?  
 (a) *cyp<sup>19</sup>* (b) *foxl<sup>2</sup>* (c) *dmy* (d) *figla*
51. Which of the following is/are regarded a set of genes derived by duplication of an ancestral gene?  
 (a) Duplicate Genes (b) Gene family (c) Modified Genes (d) Recombinant Genes
52. Choose the correct option for sex determining gene families categorized as transcription factors:  
 (a) *dmy*, *sox<sup>3</sup>*, *amh*, *cyp<sup>19</sup>* (b) *dmy*, *sox<sup>3</sup>*, *sd<sup>Y</sup>*, *amh<sup>Y</sup>*  
 (c) *dmy*, *sox<sup>3</sup>*, *sd<sup>Y</sup>*, *cyp<sup>19</sup>* (d) *gsdf*, *sox<sup>3</sup>*, *sd<sup>Y</sup>*, *cyp<sup>19</sup>*
53. Choose the correct option for sex determining gene families categorized as members of the TGF- $\beta$  signaling pathway:  
 (a) *amh*, *amh<sup>Y</sup>*, *gsdf*, *gdf<sup>6Y</sup>* (b) *dmy*, *sox<sup>3</sup>*, *gsdf*, *gdf<sup>6Y</sup>*  
 (c) *amh*, *amh<sup>Y</sup>*, *sd<sup>Y</sup>*, *cyp<sup>19</sup>* (d) *amh*, *sox<sup>3</sup>*, *sd<sup>Y</sup>*, *gdf<sup>6Y</sup>*
54. Which of the following sex determining genes plays a key role in male germ cells self-renewal and differentiation, testicular development and spermatogenesis?  
 (a) *Figla* (b) *foxl<sup>2</sup>* (c) *cyp<sup>19</sup>* (d) *dmrt<sup>1</sup>*
55. Acting as a transcription factor, which of the following is the last gene in the genetic cascade that controls sex determination in *Drosophila*?  
 (a) *foxl<sup>2</sup>* gene (b) *cyp<sup>19</sup>* gene (c) *dsx* gene (d) *sd<sup>Y</sup>* gene
56. Which of the following sex determining genes, is often labeled as a key factor involved in the 'battle of the sexes' i.e., promoting female sex determination and repressing male sex determination.  
 (a) *sox<sup>3</sup>* (b) *gsdf* (c) *foxl<sup>2</sup>* (d) *sd<sup>Y</sup>*
57. Which of the following sex determining genes is found highly conserved in all Salmonids?  
 (a) *dmy* (b) *sd<sup>Y</sup>* (c) *gdf<sup>6Y</sup>* (d) *amh<sup>Y</sup>*

58. Which of the following sex determining genes exhibits a unique feature of being inserted in a 'jumping sex locus'?
- (a) *sd<sup>Y</sup>* (b) *dmy* (c) *amh<sup>Y</sup>* (d) *gdf<sup>6Y</sup>*
59. Members of *Transforming Growth Factor-β (TGF-β)* family have emerged as sex determining genes switches in Teleosts. Which of the following is the first one discovered?
- (a) *sd<sup>Y</sup>* (b) *amh* (c) *smad* (d) *sry*
60. Which of the following sex determining genes is known to influence female sex differentiation?
- (a) *Dsx* (b) *Dmrt* (c) *sox<sup>9</sup>* (d) *cyp<sup>19</sup>*
61. The first evidence of temperature-dependent sex determination in fishes comes from which of the following fishes?
- (a) *Oryzias latipes* (b) *Nothobranchius furzeri* (c) *Menidia menidia* (d) *Takifugu rubripes*
62. Which of the following genes are specially important as potential molecular players associated with temperature-dependent sex determination in fishes?
- (a) *cyp<sup>19a</sup>*, *foxl<sup>2</sup>* and *dmrt<sup>1</sup>* (b) *sox<sup>3</sup>*, *gsdf* and *foxl2*  
(c) *amh<sup>Y</sup>*, *sd<sup>Y</sup>* and *cyp<sup>19</sup>* (d) *amh<sup>Y</sup>*, *foxl<sup>2</sup>* and *dmrt<sup>1</sup>*
63. The environmental factors that change the sex bias usually act as stressors. Which of the following is the main glucocorticoid participating in the stress response inducing testis development in a fish with temperature-dependent sex determination?
- (a) Thyroxine (b) Estrogen (c) Cortisol (d) Testosterone
64. Which of the following are a group of intracellular mediator proteins acting as main signal transducers for receptors of *Transforming Growth Factor-β (TGF-β)* family, acting as master sex determining switches in Teleosts?
- (a) *amh<sup>Y</sup>* (b) *gdf<sup>6Y</sup>* (c) *smads* (d) *sd<sup>Y</sup>*
65. Which of the following is the product of the *cyp<sup>19a</sup>* gene, converting androgens into estrogens?
- (a) Cortisol (b) Aromatase (c) Prochloraz (d) Fadzozole
66. Which of the following Releasing Hormones has been found to regulate primordial germ cell proliferation and sex differentiation in Zebrafish?
- (a) *GnRH1* (b) *GnRH2* (c) *GnRH4* (d) *GnRH3*
67. Which of the following is regarded as the germline specific transcription factor, which encodes a germ cell-specific basic helix-loop-helix (*bHLH*) transcription factor, first identified as an activator of oocyte genes?
- (a) *amh<sup>Y</sup>* (b) *Figla* (c) *sd<sup>Y</sup>* (d) *cyp<sup>19</sup>*
68. Which of the following sex determining genes evolved from the duplication of an immune system related gene, the *interferon regulatory factor 9 (irf<sup>9</sup>)*?
- (a) *Figla* (b) *sd<sup>Y</sup>* (c) *cyp<sup>19</sup>* (d) *dmrt*



1. (a); 2. (d); 3. (b); 4. (b); 5. (d); 6. (c); 7. (d); 8. (a); 9. (d); 10. (a); 11. (a); 12. (c); 13. (b); 14. (c); 15. (a); 16. (c); 17. (a); 18. (d); 19. (a); 20. (b); 21. (c); 22. (a); 23. (b); 24. (a); 25. (c); 26. (b); 27. (c); 28. (c); 29. (a); 30. (b); 31. (a); 32. (d); 33. (c); 34. (a); 35. (b); 36. (d); 37. (a); 38. (b); 39. (a); 40. (b); 41. (c); 42. (b); 43. (c); 44. (d); 45. (b); 46. (b); 47. (b); 48. (b); 49. (a); 50. (c); 51. (b); 52. (c); 53. (a); 54. (d); 55. (c); 56. (c); 57. (b); 58. (a); 59. (b); 60. (d); 61. (c); 62. (a); 63. (c); 64. (c); 65. (b); 66. (d); 67. (b); 68. (b).

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