Qualification tests for Master's program "Water Engineering"

1. Surface water sources are:

A. extraction of ground water by riverside wells or sub-surface extraction wells sunk in the bed of a river course
B. The direct supply from an impounding reservoir or lake, supplemented if necessary by gravity feed from an adjacent catchment or pumped inflow from another source
C. Ground water extraction to supplement abstraction from rivers or reservoirs
D. Artificial recharge of aquifers.

2. Amoebic dysentery is caused by:

A. Virus
B. Bacteria
C. Protozoa
D. Fungi

3. Water resources are:

A. Surface water resources.
B. Atmospheric water resources.
C. Underground water resources.
D. Surface and underground water resources.

4. The average abstraction taken from a source over a number of years called:

A. Probability yield
B. Historic yield
C. Average yield
D. Operating yield

5. In general, the water cycle consist of:

A. Condensation and sediments.
B. Evaporation, condensation and sediments.
C. Evaporation and condensation.
D. Condensation and transpiration.

6. Animal cells do not have:

A. Mitochondria
B. Nucleoli
C. Cell wall
D. Lysosomes

7. The accurate numerical method of finding the historic yield is to use the formula:

A. $\text{Yeld} = \dfrac{\text{catchment runoff} + \text{storage}}{\text{length of critical period}}$

B. $\text{Yeld} = \dfrac{\text{daily flows ower a period} + \text{storage}}{\text{length of critical period}}$

C. $\text{Yeld} = \dfrac{\text{inflow ower a period} + \text{storage}}{\text{length of critical period}}$

D. $\text{Yeld} = \dfrac{\text{weekly flows ower a period + storage}}{\text{length of critical period}}$

8. The term Ecology means:

A. Study of the impact of humans in environment
B. Study of interaction of organisms
C. Study of organisms in their natural home interacting with their surroundings
D. Study of surrounding nature

9. The site of cell respiration and ATP production in eukaryotic cells is:

A. Cell membrane
B. Mitochondria
C. Golgi apparatus
D. Endoplasmatic reticulum

10. Which of them is not disinfectant?

A. chlorine ($C1_2$)
B. Oxygen (O_2)
C. Chloramines (NH_2C1, $NHCl_2$)
D. Chlorine dioxide ($C1O_2$);

11. The Ecosystem defines as:

A. Different living organisms living in an environment and exchanging energy and matter.
B. A self-regulating group of biotic communities of species interacting with one another with their non-living environment exchanging energy and matter.
C. Different groups of living organisms interacting with one another.
D. A self-regulating organisms living in an environment and exchanging energy and matter.

12. What is softened of water?

A. Remove of the odor
B. Remove of the sulfur
C. Remove of the turbidity
D. Remove of the Rigidity (Ca, Mg) salts

13. Ground water sources are:

A. Rivers and Lakes
B. Collection of rainfall runoff
C. Abstraction from a river or canal, supplemented if necessary by releases from a storage reservoir;
D. Springs, wells, and boreholes;

14. The sum total of water, air and land and the inter-relationships that exist among them and with the human beings, other living organisms and materials defines as:

A. Ecology
B. Biota
C. Environment
D. Ecosystem

15. Structures formed inside bacterial cells and are released when cells are exposed to adverse environmental conditions called:

A. Spores
B. Oocytes
C. Flagellas
D. Spermatozoids

16. The steady supply that could just be maintained through a repetition of the worst drought on record is called

A. Average yield
B. Probability yield
C. Operating yield
D. Historic yield

17. Clearing of forest cover exposes the soil to wind, rain and storms, thereby resulting in loss of top fertile layer of soil called:

A. Soil erosion
B. Depletion of nutrients
C. Deforestation
D. High Yielding

18. The circular DNA molecules in eukaryotes called:

A. Nucleotides
B. Chromosomes
C. Plasmids
D. Nucleoplasm

19 At any instant of time, spring flow is related to the volume of stored water in the aquifer by the relationship:

A. $Q = kT$
B. $Q = kF$
C. $Q = kS$
D. $Q = kR$

20. The major part of available fresh water is locked up into:

A. Glaciers and Ice
B. Groundwater
C. Lakes
D. Rivers

21. Stickslike bacterias are called:

A. Vibrios
B. Bacilli
C. Cocci
D. Spirilles

22. The theoretical velocity of falling spherical particles in slowly moving water V (mm/s), is:

A. $V = \frac{g}{2.9 \times 10^4}(r-1)\frac{d^2}{\gamma}$

B. $V = \frac{g}{1.8 \text{ x } 10^4}(r-1)\frac{d^2}{\gamma}$

C. $V = \frac{g}{1.8 \text{ x } 10^4}(D-1)\frac{d^2}{\gamma}$

D. $V = \frac{g}{1.8 \text{ x } 10}(r-1)\frac{d^2}{\gamma}$

23. Cholera is caused by:

A. Virus
B. Bacteria
C. Protozoa
D. Fungi

24. What substance is excreted from methantank during digestion?
A. Oxygen
B. Hydrogen sulphide
C. Methane (CH_4)
D. Nitrogen

25. The velocity gradient is defined in terms of power input by the following relationship:

A. $G = \left(\frac{R}{\mu V}\right)^{1/2}$

B. $G = \left(\frac{T}{\mu V}\right)^{1/2}$

C. $G = \left(\frac{F}{\mu V}\right)^{1/2}$

D. $G = \left(\frac{P}{\mu V}\right)^{1/2}$

26. Meeting the needs of the present without compromising the ability of future generations to meet their own needs defined as:

A. Environmental impact statement
B. Impact prediction
C. Mitigation
D. Sustainable development

27. All algae contains:

A. Chlorophyll
B. Chrizophyll
C. Neutrophil
D. Basophil

28. The useful power input of hydraulic mixers is related to head loss by the equation:

A. P = Q ρgh
B. P = Q ρgr

C. $P = Q \rho g f$
D. $P = Q \rho g t$

29. The raw form in which the energy resources occur in nature are:

A. Secondary energy resources
B. Transformation resources
C. Primary energy resources
D. Motion energy resources

30. Structures made from woven stainless steel or polyester wires with a pore size ranging from 15 to 45 µm called:

A. Roughing filters
B. Microstrainers
C. Prechlorinators
D. Ozonators

31. Direct inflows is:

A. Inflows that enter the sewer system continuously
B. The inflows that result in an increase of flow in the sewer almost immediately after the beginning of rainfall
C. Infiltration and inflows collectively
D. Inflows that enter the sewer system continuously

32. A submicroscopic agent of infectious disease that requires a living cell for its multiplication is:

A. Virus
B. Worm
C. Protozoa
D. Crustacea

33. The sustained peak flow rate is:

A. The smallest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
B. The largest total flow that accumulates over a day as obtained from an exhaustive length of flow record
C. The largest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
D. The flow rate that is sustained or exceeded for a specified number of consecutive time periods as obtained from an exhaustive length of flow record

34. An obstruction that is used to back up a flowing stream of liquid is:

A. Plate
B. Duce
C. Weir
D. Filter

35. Infiltration-inflow is:

A. Inflows that enter the sewer system continuously
B. The inflows that result in an increase of flow in the sewer almost immediately after the beginning of rainfall
C. Infiltration and inflows collectively
D. Inflows that enter the sewer system continuously

36. The portion in a venturi meter, Parshall flume, or Palmer–Bowlus flume where the cross section is progressively expanded

A. Cipolleti zone
B. Converging zone
C. Control zone
D. Diverging zone

37. The peak hourly flow rate is:

A. The smallest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
B. The largest total flow that accumulates over a day as obtained from an exhaustive length of flow record
C. The largest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
D. The flow rate that is sustained or exceeded for a specified number of consecutive time periods as obtained from an exhaustive length of flow record

38. Cavitation is:

A. The velocity head at the discharge of a pumping system
B. A state of flow where the pressure in the liquid becomes equal to its vapor pressure
C. Value of the efficiency that corresponds to the best operating performance of the pump.
D. A head loss due to loss of internal energy

39. Steady inflows is:

A. Inflows that enter the sewer system continuously
B. The inflows that result in an increase of flow in the sewer almost immediately after the beginning of rainfall
C. Infiltration and inflows collectively
D. Inflows that enter the sewer system continuously

40. Pump loss is:

A. Head losses incurred outside the pump casing
B. A head loss due to loss of internal energy
C. Head losses incurred inside the pump casing
D. Head losses in valves and fittings

41. The minimum hourly flow rate is:

A. The smallest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
B. The largest total flow that accumulates over a day as obtained from an exhaustive length of flow record
C. The largest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
D. The flow rate that is sustained or exceeded for a specified number of consecutive time periods as obtained from an exhaustive length of flow record

42. The sum of the outlet velocity head and outlet manometric head of a pump

A. The sum of the inlet velocity head and inlet manometric head of a pump.
B. Outlet dynamic head
C. The manometric level at the inlet to a pump
D. Outlet manometric head

43. Delayed inflows is:

A. Inflows that enter the sewer system continuously
B. The inflows that result in an increase of flow in the sewer almost immediately after the beginning of rainfall
C. Infiltration and inflows collectively
D. Inflows that enter the sewer system continuously

44. Static suction head is:

A. The vertical distance from the elevation of the inflow liquid level above the pump centerline to the centerline of the pump
B. The vertical distance from the elevation of the inflow liquid level below the pump centerline to the centerline of the pump
C. the relationship of discharge and the associated head requirement that excludes the pump assembly
D. The vertical distance from the pump centerline to the elevation of the discharge liquid level

45. The maximum daily flow rate is:

A. The smallest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
B. The largest total flow that accumulates over a day as obtained from an exhaustive length of flow record
C. The largest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record
D. The flow rate that is sustained or exceeded for a specified number of consecutive time periods as obtained from an exhaustive length of flow record

46. The zone where the thickened sludge from the thickening zone is further compressed, compacted, and consolidated

A. Compression zone
B. Critical section
C. Compression settling
D. Clarification zone

47. A unit operation in which solids are drawn toward a source of attraction is:

A. Flotation
B. Screening
C. Retenting
D. Settling

48. Transition losses is:

A. Head losses incurred outside the pump casing
B. A head loss due to loss of internal energy
C. Head losses incurred inside the pump casing
D. Head losses in expansions, contractions, bends, and the like

49. Which of them is not physical characterisation of water?

A. Turbidity
B. Color
C. Alkalinity
D. Temperature

50. In a settling or thickening process, the zone where the sludge is concentrated called

A. Sludge zone
B. Thickening zone
C. Settling zone
D. Outlet zone

51. Gravity filter normally operated at a rate of 1.0 to 10 $m^3/d \cdot m^2$ called:

A. Slow-sand filter
B. Leaf filter
C. Rapid-sand filter
D. Perforated filter

52. Layer of dirt that collects on top of slow-sand filters called:

A. Smutzdecke
B. Backwash
C. Plate-and-frame press
D. Specific cake

53. The measure of the extent to which suspended matter in water either absorbs or scatters radiant light energy impinging upon the suspension is:

A. Biochemical oxygen demand
B. Turbidity
C. Total organic carbon
D. Alkalinity

54. A self-regulating group of biotic communities of species interacting with one another with their non-living environment exchanging energy and matter is:

A. Biocenosis
B. Ecosystem
C. Environment
D. Biosphere

55. Adsorbent is:

A. The solute adsorbed onto the surface of a solid
B. Carbon with enhanced adsorption characteristic
C. The solid that adsorbs the adsorbate
D. Carbon with decreasing adsorption characteristic

56. Sheet-like barriers made out of high-capacity, highly cross-linked ion exchange resins that allow passage of ions but not of water

A. Cation membrane
B. Electrodialysis membrane
C. Anion membrane
D. Apolar membrane

57. Secondary treatment is:

A. Treatment is brought about by physical processes such as screening and sedimentation
B. Removing debris and coarse materials that may clog equipment in the plant
C. Biological and chemical unit processes are used to treat wastewater.

D. Unit operations and chemical unit processes are used to further remove BOD, nutrients, pathogens, and parasites

58. Acidity is:

A. The ability of a substance to neutralize a base
B. The ability of a substance to act both as an acid and as a base
C. The ability of a substance to neutralize an acid.
D. The ability of a substance to neutralize alcohol

59. Psychrophiles is bacteria that:

A. Grow best at temperatures between 45˚C and 60˚C
B. Grow best at temperatures between 25˚C and 40˚C
C. Grow best at temperatures from about 80˚C to near boiling
D. Grow best at temperatures below 20˚C

60. Heterotrophic organisms are:

A. The microorganisms which rely only on light for energy
B. The microorganisms which use organic material as a supply of carbon
C. The microorganisms which require only CO_2 to supply their carbon
D. The microorganisms which extract energy from organic or inorganic oxidation/ reduction reactions

61. The process of purification of water by evaporation and condensation called:

A. Filtration
B. Transpiration
C. Distillation
D. Adsorption

62. Which of them cannot classified as centrifugal pumps?

A. Axial flow pumps
B. Rotary flow pumps
C. Radial flow pumps
D. Mixed flow pumps

63. Conversion the small colloidal particles into larger particles called:

A. Sediments
B. Coagulants
C. Flocs
D. Precipitates

64. Bacteria that grow best at temperatures below 20˚C are called:

A. Hyperthermophiles
B. Psychrophiles
C. Thermophiles
D. Mesophylls

65. The inflows that result in an increase of flow in the sewer almost immediately after the beginning of rainfall called:

A. Direct inflows
B. Steady inflows
C. Delayed inflows

D. Infiltration-inflow

66. The process of purification of water by absorption called:

A. Filtration
B. Transpiration
C. Distillation
D. Sedimentation

67. The ratio of the density of the liquid to the density of water called:

A. Specific gravity
B. Specific volume
C. Specific rate
D. Specific flow

68. Ion exchange is:

A. A reversible reaction in which a colloidal particle is exchanged for a similarly particle
B. A reversible reaction in which a molecule is exchanged for a another molecule
C. A reversible reaction in which a suspended mater is exchanged for a similarly mater
D. A reversible reaction in which a charged ion in solution is exchanged for a similarly charged ion electrostatically attached to an immobile solid particle

69. Bacteria that grow best at temperatures between 25°C and 40°Care called:

A. Hyperthermophiles
B. Psychrophiles.
C. Thermophiles
D. Mesophylls

70. Infiltration-inflow comes from:

A. Residential area
B. Commercial area
C. Rainfall and groundwater
D. Institutional area

71. The Darcy's law is expressed as:

A. $Q = \frac{KA(h_1 - h_2)}{\Delta\rho}$

B. $Q = \frac{KA(h_1 - h_2)}{\Delta q}$

C. $Q = \frac{KA(h_1 - h_2)}{\Delta h}$

D. $Q = \frac{KA(h_1 - h_2)}{\Delta r}$

72. The viscosity of a liquid is:

A. Measure of the liquid's density
B. Measure of the liquid's rate
C. Measure of the liquid's gravity
D. Measure of the liquid's resistance to the flow

73. The microorganisms which use organic material as a supply of carbon called:

A. Heterotrophic organisms
B. Autotrophic organisms
C. Chemotrophic organisms
D. Lithotrophic organisms

74. Bacteria that grow best at temperatures 45˚C and 60˚Care called:

A. Hyperthermophiles
B. Psychrophiles.
C. Thermophiles
D. Mesophylls

75. The smallest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record is:

A. Maximum daily flow rate
B. Minimum hourly flow rate
C. Maximum hourly flow rate
D. Minimum daily flow rate

76. The relative average length of a flow path called:

A. Heterogeneity
B. Permeability
C. Tortuosity
D. Homogeneity

77. The pressure of the liquid at a certain temperature when the liquid and its vapor are in equilibrium called:

A. Gravity pressure
B. Kinematic pressure
C. Vapor pressure
D. Dynamic pressure

78. The microorganisms which require only CO_2 to supply their carbon needs called:

A. Heterotrophic organisms
B. Autotrophic organisms
C. Chemotrophic organisms
D. Lithotrophic organisms

79. Bacteria that grow best at temperatures from about 80˚C to near boiling are called:

A. Hyperthermophiles
B. Psychrophiles.
C. Thermophiles
D. Mesophylls

80. The largest total flow that accumulates over a day as obtained from an exhaustive length of flow record is:

A. Maximum daily flow rate
B. Minimum hourly flow rate

C. Maximum hourly flow rate
D. Minimum daily flow rate

81. The high molecular weight organic chains with ionic or other functional groups incorporated at intervals along the chains called:

A. Ionomeric flocculants
B. Isomeric flocculants
C. Heterogenic flocculants
D. Polymeric flocculants

82. P_A/γ – one of the three components of liquid energy at A is:

A. Pressure energy due to the liquid flow or pressure
B. Kinetic energy due to the flow velocity
C. Potential energy due to the elevation
D. Static energy due to the flow velocity

83. The microorganisms which extract energy from organic or inorganic oxidation/reduction reactions called:

A. Heterotrophic organisms
B. Autotrophic organisms
C. Chemotrophic organisms
D. Lithotrophic organisms

84. The spent water after homes, commercial establishments, industries, Public institutions, and similar entities defined as:

A. Clearwater
B. Blackwater
C. Wastewater
D. Bluewater

85. Infiltration and inflows are collectively called

A. Direct inflows
B. Steady inflows
C. Delayed inflows
D. Infiltration-inflow

86. The gently stirring the water to cause more small particles to bump into each other and stick together, forming larger particles called:

A. Flocculation
B. Absorption
C. Sedimentation
D. Adsorption

87. $V_A^2/2g$ - one of the three components of liquid energy at A is:

A. Static energy due to the flow velocity
B. Kinetic energy due to the flow velocity
C. Potential energy due to the elevation
D. Pressure energy due to the liquid flow or pressure

88. The microorganisms which rely only on light for energy are called:

A. Heterotrophic organisms
B. Autotrophic organisms
C. Phototrophic organisms
D. Lithotrophic organisms

89. The branch of science that deals with the composition, structure, and properties of substances and the transformation that they undergo defined as:

A. Geology
B. Physics
C. Biology
D. Chemistry

90. The largest accumulation of flow in an hour during a particular day as obtained from an exhaustive length of flow record is:

A. Maximum daily flow rate
B. Minimum hourly flow rate
C. Maximum hourly flow rate
D. Peak hourly flow rate

Literature

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