Biotechnology Engineering (1068)

1. In Agarose gel electrophoresis, a gel is polymerized using one of the following macromolecules, for separation of DNA
A) Protein B) Nucleic acid C) Carbohydrate D) Polyethylene glycol

2. BT cotton consists of an insecticidal component
A) Vir A B) Dry C) Cry D) sma

3. Chi square test is an example of
A) Parametric test B) Non parametric test
C) Standard test D) Variable test

4. Which of the following will be the first step of a researcher
A) Collection of data set B) Tabulating and Editing
C) Selection of a problem D) Experimentation

5. Which of the following is not an inhibitor of glucose catabolic pathway
A) Fluoride B) Iodoacetate C) Fluoroacetate D) Chloramphenicol

6. A continuous reactor has a dilution rate of 0.5 h^{-1}. Its residence time would be
A) ln (2)/0.5 B) ln (2) x 0.5 C) 0.5 h D) 2 h

7. Transfer of a vector containing exogenous DNA can be done by which treatment method?
A) X-rays B) Cell lysis
C) Electroporation D) Heating at 100 degree Celsius

8. Most suitable reactor for an autocatalytic reaction is
A) Plug flow B) CSTR
C) Recycle reactor D) CSTRs in series

9. For an enzyme that displays Michaelis-Menten kinetics, the reaction velocity (as a fraction of V_{max}) observed at $[S] = 2 K_M$ will be
A) 0.09 B) 0.33 C) 0.66 D) 0.91

10. Saccharomyces cerevisiae has following applications except
A) Baker's yeast
B) Production of excretory nucleases
C) A host for production of recombinant proteins
D) Alcohol production

11. *Mycobacterium tuberculosis* organism causes a highly infectious disease. Organism is difficult to treat and resides in which of the following cells
A) T-Lymphocytes B) B-lymphocytes C) Macrophages D) Dendritic cells

12. In tissue culture, callus can be induced to form shoot or root by altering the ratio of

A) Auxin to cytokinin
B) Cytokinin to ethylene
C) Auxin to gibberellins
D) Gibberellin to cytokinin

13. If an enzyme has to be added in animal cell culture for release of adherent cells then it is sterilized by
A) Autoclaving
B) 0.22 µm pore size filtration
C) 0.44 µm pore size filtration
D) Heating at 60ºC for half an hour

14. Solubilisation of a protein with addition of salts is called
A) Ion exchange chromatography
B) Dye –exclusion chromatography
C) Salting –in
D) Salting –out

15. Cholesterol can be reduced in the blood by administration of an inhibitor of the regulatory enzyme of cholesterol biosynthesis, the enzyme is
A) Cholesterol reductase
B) Cholesterol oxidase
C) HMG-CoA reductase
D) HMG-CoA synthetase

16. Semi-synthetic penicillins are produced by using an enzyme called
A) Penicillinase
B) Penicillin acylase
C) Penicillin reductase
D) Penicilloic acid oxidase

17. Size of human genome is approximately
A) 8-billion base pairs
B) 3- billion base pairs
C) 3-trillion base pairs
D) 8-trillion base pairs

18. Which of the following molecule produces the largest number of ATPs by aerobic metabolism (on mole basis)
A) Glucose
B) Galactose
C) Palmitic acid
D) Amino acid

19. Density of cell culture is measured in spectrophotometer, based on the principle of
A) Light reflection
B) Light diffraction
C) Light absorption
D) Light scattering

20. Transmission electron microscopy (TEM) is highly useful for high magnification viewing of
A) Internal structure of fixed cells
B) Internal structure of live, motile cells
C) Surface structure of fixed cells
D) Surface membranes of live, motile cells

21. International Rice Research Institute (IRRI) headquarter is located at
A) Geneva
B) Philippines
C) Paris
D) India

22. For gene cloning a host cell, an exogenous gene is inserted in a suitable vector/plasmid. The enzyme used to open the plasmid/vector is

A) Phosphodiesterase B) Restriction Endonuclease
C) Exonuclease D) Ribonuclease

23. Which of the following is not a "Graphic representation"?
A) Pie Chart B) Bar Chart C) Table D) Histogram

24. Ribonucleic acid molecule having a catalytic activity is called
A) Ribose B) Deoxyribose C) Abzyme D) Ribozyme

25. The four subunits of the hemoglobin (Hb) represent protein's
A) Primary structure B) Secondary structure
C) Tertiary structure D) Quaternary structure

26. Three dimensional structure of t-RNA is
A) X-shaped B) T-shaped C) Clover leaf D) L-shaped

27. For an enzyme that displays Michaelis-Menten kinetics, the reaction velocity (as a fraction of V_{max}) observed at [S] = 2 K_M will be
A) 0.09 B) 0.33 C) 0.66 D) 0.91

28. Most suitable reactor for an autocatalytic reaction is
A) Plug flow B) CSTR C) Recycle reactor D) CSTRs in series

29. Which of the following immunoglobulin types is most abundantly present in blood?
A) IgA B) IgD C) IgM D) IgG

30. Which one of the following sequence is called Kozak sequence
A) 5'-ACCAUGG-3' B) 5'-ATCAAGG-3'
C) 5'-GAATCTT-3' D) 5'-CCGAATG-3'

31. During translation an amino acid is coded by three nucleotide and is called
A) Codon B) Intron C) Cistron D) Muton

32. Multiple sequence alignment is used to predict
A) Protein or nucleotide similarity B) Bacterial identity
C) To obtain new sequences D) Tertiary structures

33. C^{14}- Radiolabelled molecule of glucose emits radiations of the type
A) α-particles B) β-particles C) γ-radiations D) X-rays

34. In transgenic animals, in order to express heterologous protein in animal milk, gene must be expressed under which promoter
A) LacZ B) Preproinsulin
C) β lactoglobulin D) β chain of hemoglobin

35. Opsonization term is related with

A) Antibody or complement mediated phagocytosis of antigens
B) Complement mediated phagocytosis of antibody
C) Antibody mediated viral inactivation
D) Antibody mediated degranulation

36. Cloning vector differ from expression vector in not having
A) An ori sequence
B) Marker genes
C) Control elements
D) Multiple cloning sites

37. Which of the following proteins is the most abundant protein in nature
A) Fibroin B) Collagen C) Rubisco D) Chymotrypsin

38. In two Dimensional gel electrophoresis the order of the separation is
A) I^{st} Isoelectric Focussing followed by SDS-PAGE in 2^{nd} dimension
B) I^{st} Isoelectric Focussing followed by native PAGE in 2^{nd} dimension
C) I^{st} SDS-PAGE followed by in Isoelectric Focussing 2^{nd} dimension
D) I^{st} native -PAGE followed by in Isoelectric Focussing 2^{nd} dimension

39. A single stranded DNA molecule is allowed to anneal under proper laboratory conditions and the changes in DNA conformation to form a double helix can be followed by the change in absorption at 260 nm. It will lead to
A) Hyperchromicity
B) Hypochromicity
C) Isochromicity
D) Ionochromicity

40. Mass –spectrometry can be used for all of the following except
A) Mass fingerprinting
B) Primary sequence determination
C) Identification of proteins in a complex
D) Secondary structure determination

41. ExPASy stands for
A) Expert protein analysis server
B) Exponential protein analysis server
C) Expert protein analysis system
D) Exponential protein analysis system

42. The respiratory chain complexes acting as proton pump are
A) I, II and III B) I, II and IV C) I, III and IV D) I and II

43. In tissue / bacterial culture for sterilization of medias, glassware etc which one of the following procedure is carried out
A) Water bath at 100° C
B) Dry air oven at 100° C
C) Autoclave
D) Dehumidifier

44. Which one of these molecules is synthesized in rough endoplasmic reticulum
A) Cellular Proteins
B) Secretory proteins

C) Phospholipids D) Carbohydrates

45. Which of the following is the smallest amino acid
A) Aspartic acid B) Tyrosin C) Isoleucine D) Alanine

46. Which of the following is an anticancer drug and produced by microorganism
A) Amphotericin B B) Doxorubicin C) Nystatin D) Methotrexate

47. The respiratory chain complexes acting as proton pump are
A) I, II and III B) I, II and IV C) I, III and IV D) I and II

48. Haploid plant cultures are got from
A) Leaves B) Root tip C) Pollen grain D) Buds

49. Southern hybridization experiment involve following steps
1= Electrophoresis 2 = x-ray film 3 = Radioactive probe
4=Membrane transfer 5 = Digestion with restriction enzyme
Which one is the correct sequence of these steps?
A) 5, 4 , 1, 3, 2 B) 5, 1, 4, 3, 2 C) 5, 1, 4, 2, 3 D) 1, 5, 4, 2, 3

50. Size of okazaki fragments in eukaryotes is
A) 22 B) 500 C) 1000 D) 2000

x-x-x

Chemical Engineering (1068)

1. A first-order reaction has a rate constant of 7.5×10^{-3} /s. The time required for the reaction to be 60% complete is

A) 3.8×10^{-3} s B) 6.9×10^{-3} s C) 68 s D) 122 s

2. In a heat exchanger with steam outside the tubes, a liquid gets heated to 45°C, when its flow velocity in the tubes is 2 m/s. If the flow velocity is reduced to 1 m/s, other things remaining the same, the temperature of the exit liquid will be

A) More than 45°C
B) Equal to 45°C
C) Less than 45°C
D) Initially decreases and remains constant thereafter

3. The heat loss from a fin is 6W. The effectiveness and the efficiency of the fin is 3 and 0.75, respectively. The heat loss (in W) from the fin is the entire fin surface is maintained at base temperature is

A) 5 W B) 10W C) 8W D) 2 W

4. A hollow cylinder has length L, inner radius r_1, outer radius r_2, and thermal conductivity k. The thermal resistance of the cylinder for radial conduction is

A) $\frac{\ln(\frac{r_2}{r_1})}{2\pi rL}$ B) $\frac{\ln(\frac{r_1}{r_2})}{2\pi rL}$ C) $\frac{2\pi rL}{\ln(\frac{r_2}{r_1})}$ D) $\frac{2\pi rL}{\ln(\frac{r_1}{r_2})}$

5. Hydrotreating is used for

A) Removal of water from crude oil
B) Treatment of crude oil with water
C) Improving octane number of gasoline
D) Removal of sulphur and nitrogen from petroleum fractions

6. The terminal settling velocity of a 6 mm diameter glass sphere (ρ= 2500 kg/m^3) in a viscous Newtonian liquid (ρ =1500 kg/m^3) is 100 μm/s . If the particle Reynolds number is small and the value of acceleration due to gravity is 9.81 m/s^2, then the viscosity of the liquid (in Pa-s) is

A) 100 B) 196.2 C) 245.3 D) 490.5

7. A packed tower containing Berl saddles is operated with a gas-liquid system in the counter-current mode. Keeping the gas flow rate constant, if the liquid flow rate is continuously increased

A) The void fraction available for the gas to flow will decrease beyond the loading point
B) The gas pressure drop will decrease
C) Liquid will continue to flow freely down the tower beyond the loading point
D) The entrainment of liquid in the gas will considerably decrease near the flooding point

8. In a co-current double pipe heat exchanger used for condensing saturated steam over the inner tube, if the entrance and exit conditions of the coolant are interchanged, then the rate of condensation will

A) Increase

B) Remain unchanged
C) Either increase or decrease; depends on the coolant flow rate
D) Decrease

9. In Biot number, the characteristic length used is the ratio of the _____ of the solid.
A) Perimeter to surface area
B) Surface area to volume
C) Volume to surface area
D) Surface area to perimeter

10. For gas absorption the height of a transfer unit, based on the gas phase, is given by (G = superficial molar gas velocity; L = superficial molar liquid velocity; F_G = mass transfer coefficient in mol/m^2 -s; a = interfacial area per unit volume of tower).
A) $\frac{G}{F_G a}$
B) $\frac{F_G}{Ga}$
C) $\frac{Ga}{F_G}$
D) $\frac{L}{F_G G}$

11. The dimensionless group in mass transfer that is equivalent to Prandtl number in heat transfer is
A) Nusselt number
B) Sherwood number
C) Schmidt number
D) Stanton number

12. A saturated liquid at 1500 kPa and 500 K, with an enthalpy of 750 kJ/kg is throttled to a liquid-vapour mixture at 150 kPa and 300 K. At the exit conditions, the enthalpy of the saturated liquid is 500 kJ/kg and the enthalpy of the saturated vapour is 2500 kJ/kg. The percentage of the original liquid, which vaporizes, is
A) 87.5%
B) 67%
C) 12.5%
D) 10%

13. Steel is heated at about 875° C where the structure consists of entirely austenite. It is then cooled suddenly at a temperature of about 250° C to 525° C. This process of heat treatment is known as
A) Martempering
B) Normalising
C) Austempering
D) Annealing

14. Water enters a thin walled tube (L=1 m, D=3 mm) at an inlet temperature of 97^oC and mass flow rate 0.015 kg/s. The tube wall is maintained at constant temperature of 27^oC. Given the following data for water, Density 1000 kg/m^3, Viscosity = 489×10^{-6} Ns/m^2 , Cp = – 4184 J/kg K, Inside heat transfer coefficient h = 12978 W/ m^2K ,outlet temperature of water in ^oC is
A) 28
B) 37
C) 62
D) 96

15. If the baffle spacing in a shell and tube heat exchanger increases, then the Reynolds number of the shell side fluid
A) Remains unchanged
B) Increases
C) Increases or decreases depending on number of shells passes

D) Decreases

16. The isomerization of cyclopropane follows first order kinetics. The rate constant at 700 K is 6.20×10^{-4} min^{-1}, and the half-life at 760 K is 29.0 min. Calculate the activation energy for this reaction.

A) 5.07 kJ/mol B) 27.0 kJ/mol C) 50.7 kJ/mol D) 270 kJ/mol

17. The commonly used solvent in supercritical extraction is

A) Methyl - ethyl – ketone B) Water
C) Carbon tetrachloride D) Carbon dioxide

18. For a reversible exothermic gas phase reaction, $A + B \leftrightarrow C$, the equilibrium conversion will increase with

A) Increase in pressure and increase in temperature
B) Decrease in pressure and increase in temperature
C) Increase in pressure and decrease in temperature
D) Decrease in pressure and decrease in temperature

19. A process stream of dilute aqueous solution flowing at the rate of 10 kg/s is to be heated. Steam condensate at 95^{o}C is available for heating purpose, also at a rate of 10 kg/s. A 1-1 shell and tube heat exchanger is available. The best arrangement is

A) Counter flow with process stream on shell side
B) Counter flow with process stream on tube side
C) Parallel flow with process stream on shell side
D) Parallel flow with process stream on tube side

20. The process used for relieving the internal stresses previously set up in the Metal and for increasing the machinability of steel is

A) Spheroidising B) Annealing C) Normalising D) Full annealing

21. Which of the following can change if only the catalyst is changed for a reaction system?

A) Enthalpy of reaction B) Activation energy
C) Free energy of the reaction D) Equilibrium constant

22. Given the following statements listed from (P) to (T), select the correct combination of true statements from the choices that follow this list.

(P) Plate columns are preferred when the operation involves liquids containing suspended solids.
(Q) Packed towers are preferred if the liquids have a large foaming tendency.
(R) The pressure drop through packed towers is more than the pressure drop through plate columns designed for the same duty.
(S) Packed columns are preferred when large temperature changes are involved in distillation operations.
(T) Packed towers are cheaper than plate towers if highly corrosive fluids are handled.

A) T, S, P B) P, Q, T C) S, R, T D) R, Q, S

23. Which one of the following is not a major constituent of crude oil?
A) Paraffins B) Olefins C) Naphthenes D) Aromatics

24. _____ heat exchanger is also known as 'hair pin type' exchanger
A) Double pipe B) Plate type C) Finned D) Regenerative

25. A plot of ln k against $1/T$ (T measured in K) for a reaction is linear with a gradient of -1.20×10^4 K. The activation energy, E_a, for the reaction is therefore:
A) 99.8 J mol^{-1} B) 1.44 kJ mol^{-1} C) 99.8 kJ mol^{-1} D) 693 J mol^{-1}

26. Which of the following methods of depreciation calculations results in book values greater than those obtained with straight line method?
A) Declining balance method B) Multiple straight line method
C) Sinking fund method D) Sum of the years digit method

27. Consider one-dimensional steady state heat conduction along x –axis ($0 \le x \le L$), through a plane wall with the boundary surfaces (x=0 and x=L) and maintained at temperatures of 0^oC and100^oC. Heat is generated uniformly throughout the wall. Choose the Correct statement.
A) The direction of heat transfer will be from the surface at 100 Cc to the surface at 0^oC.
B) The maximum temperature inside the wall must be greater than 100^oC.
C) The temperature distribution is linear within the wall.
D) The temperature distribution is symmetric about the mid-plane of the wall

28. In second order underdamped system
A) Decay ratio = overshoot
B) Decay ratio = $(\text{overshoot})^2$
C) Overshoot increases for increasing damping co-efficient
D) Large damping co-efficient means smaller damping

29. Three solid objects of the same material and of equal masses-a sphere, a cylinder (length = diameter) and a cube are at 500^oC initially. These are dropped in a quenching bath containing a large volume of cooling oil each attaining the bath temperature eventually. The time required for 90% change of temperature is smallest for
A) Cube B) Cylinder C) Sphere D) Equal for all the three

30. Thermal well made of _____ gives the fastest speed of response, while measuring temperature by thermocouples.
A) Steel B) Vycor (a glass) C) Nichrome D) Inconel

31. Zeolites used in zeolite softening process for the treatment of hard water gets exhausted after certain time of usage but can be regenerated by flushing it with
A) 10 percent calcium chloride solution B) 10 percent magnesium sulphate solution
C) 10 percent magnesium chloride solution D) 10 percent sodium chloride solution

32. All the organic liquids are combustible except
A) Benzene B) Carbon tetrachloride

C) Toluene D) Cyclohexane

33. U-tube manometer filled with mercury is an example of
A) Undamped second-order system B) Overdamped second-order system
C) Underdamped second-order system D) Critically damped

34. The purpose of providing bleed points in the evaporator is to
A) Remove the product B) Admit the feed
C) Facilitate removal of non-condensable gases D) Create vacuum

35. Aniline point test of an oil qualitatively indicates the _____ content of an oil.
A) Aromatic B) Olefin C) Paraffin D) Naphthene

36. Which of the following has the highest flash point of all?
A) Diesel B) Kerosene C) Petrol D) Furnace oil

37. Which of the following thermocouples has the least temperature measurement range?
A) Copper-constantan B) Chromel-alumel
C) Platinum-platinum/rhodium D) Iron-constantan

38. System with a double pole at the origin is unstable since corresponding term in the time domain
A) Is a constant B) Grows exponentially with time
C) Grows linearly with time D) Decays linearly with time

39. Working principle of mercury in glass thermometer is based on volumetric expansion of mercury with increase in temperature. Which of the following undergoes minimum volumetric expansion for a given temperature change
A) Water B) Mercury
C) Methyl alcohol D) Carbon-tetrachloride

40. Two large diffuse gray parallel plates, separated by a small distance, have surface temperatures of 400 K and 300 K. If the emissivity of the surfaces are 0.8 and the Stefan-Boltzmann constant is 5.67×10^{-8} W/m^2K^4, the net radiation heat exchanges rate in kW/m^2 between the two plates is
A) 0.66 B) 0.79 C) 0.99 D) 3.96

41. The Grashof number is defined as the ratio of
A) Buoyancy to inertial forces B) Buoyancy to viscous forces
C) Inertial to viscous forces D) Buoyancy to surface tension forces

42. In a condenser of a power plant, the steam condenses at a temperatures of 60^oC. The cooling water enters at 30^oC and leaves at 45^oC. The logarithmic mean temperature difference (LMTD) of the condenser is
A) 16.2 ^oC B) 21.6 ^oC C) 30 ^oC D) 37.5 ^oC

43. Which one of the following reactions is not an exothermic
A) Absorption of sulphur troixide by 98.5% sulphuric acid

B) Oxidation of sulphur trioxide
C) Oxidation of sulphur to sulphur dioxide
D) Thermal dissociation of iron pyrites

44. Grignard reagent is
A) Ethyl magnesium chloride
B) Ethyl chloride
C) Sodium sulphate
D) Sodium carbonate

45. A sand mixture was screened through a standard 10-mesh screen. The mass fraction of the oversize material in feed, overflow and underflow were found to be 0.38, 0.79 and 0.22 respectively. The screen effectiveness based on the oversize is
A) 0.50 B) 0.58 C) 0.68 D) 0.62

46. A balloon containing an ideal gas is initially kept in an evacuated and insulated room. The balloon ruptures and the gas fills up the entire room. Which one of the following statements is TRUE at the end of above process?
A) The internal energy of the gas decreases from its initial value, but the enthalpy remains constant
B) The internal energy of the gas increases from its initial value, but the enthalpy remains constant
C) Both internal energy and enthalpy of the gas remain constant
D) Both internal energy and enthalpy of the gas increase

47. In the window air conditioner, the expansion device used is
A) Capillary tube
B) Thermostatic expansion valve
C) Automatic expansion valve
D) Float valve

48. Orlan fibre which is used as a wool sub stitute is
A) Polymethylmethacrylate (PMMA)
B) An amorphous polymer
C) A natural polymeric fibre
D) Polyacrylonitrile.

49. For turbulent flow past a flat plate, when no form drag is present, the friction factor f and the Chilton-Colburn factor j_D are related as
A) f and j_D cannot be related
B) f is equal to j_D
C) f is greater than j_D
D) f is less than j_D

50. The pressure, dry bulb temperature and relative humidity of air in a room are 1 bar, 30^{o}C and 70%, respectively. If the saturated pressure at 30^{o}C is 4.25 kPa, the specify humidity of the room air in kg water vapour/kg dry air is
A) 0.0083 B) 0.0101 C) 0.0191 D) 0.0232

x-x-x

1. Which one of the following equations correctly gives the relationship between the specific gravity of soil grains (*G*) and the hydraulic gradient (*i*) to initiate 'quick' condition in sand having a void ratio of 0.5?

A. $G = 0.5\ i + 1$

B. $G = i + 0.5$

C. $G = 1.5\ i + 1$

D. $G = 1.5\ i - 1$

2. Horizontal stiffeners are needed in plate girders if the thickness of web is(where *d* = distance between the flanges and *L* = span)

A. < 6 mm

B. $< d/200$

C. $< L/500$

D. Bearly equal to flange thickness

3. Consider the following statements:

A grillage base is checked for

1. Bending
2. Shear
3. Compression
4. Web crippling

Which of these statements are correct?

A. 1 and 4

B. 1 and 3

C. 2, 3 and 4

D. 1, 2 and 4

4. A footing is resting on a fully saturated clayey strata. For checking the initial stability, shear parameters are used from which one of the following ?

A. Consolidated non-drained test

B. Unconsolidated drained test

C. Unconsolidated non-drained test

D. Unconsolidated non-drained test with pore pressure measurement

5. Which of the following are associated with alum coagulation?

1. A decrease of alkalinity in treated water
2 .Formation of hydroxide flocs of aluminium
3. A slight decrease of pH in treated water
4. An increase of permanent hardness

Select the correct answer using the codes given below :

A. 1, 2 and 3

B. 1, 3 and 4

C. 1, 2, 3 and 4

D. 2 and 4

6. For Froude number of a hydraulic jump is 5.5. The jump can be classified as a/an:

A. Undularjump

B. Oscillating jump

C. Weak jump

D. Steady jump

7.The displacement thickness of a boundary layer is

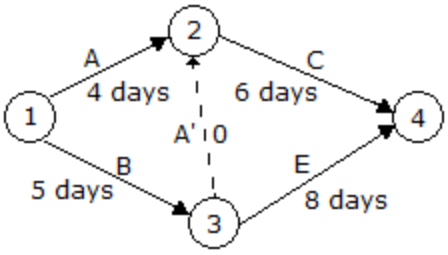
A. The distance to the point where $(v/V) = 0.99$

B. The distance where the velocity v is equal to the shear velocity $V*$ that is where $v = V*$

C. The distance by which the main flow is to be shifted from the boundary to maintain the continuity equation

D. One-half the actual thickness of the boundary layer

8. The given figure shows the arrow diagram for a particular project. The arrow '*A*' is known as



A. Critical activity

B. Sub-critical activity

C. Logic arrow

D. Dummy activity

9. Tongue plates are provided in a steel girder at

A. The upper flange

B. The lower flange

C. The upper end of the web

D. The upper and lower ends of the web.

10. Putty is made up of

A. White lead and turpentine

B. Powdered chalk and raw linseed oil

C. Red lead and linseed oil

D. Zinc oxide and boiled linseed oil

11. What should be the minimum grade of reinforced concrete in and around sea coast construction?

A. M 35

B. M 30

C. M 25

D. M 20

12. What does the wind Rose Diagram (WRD) for orientation of airport runway give?

A. Direction of wind

B. Direction and duration of wind

C. Direction, duration and intensity of wind

D. None of the above

13. For the movement of vehicles at an intersection of two roads without any interference, which type of grade separation is generally preferred?

A. Delta

B. Diamond

C. Trumpet

D. Cloverleaf

14. Sewage sickness occurs when

A. Sewage contains pathogenic organisms

B. Sewage enters the water supply system

C. Sewers get clogged due to accumulation of solids

D. Voids of soil get closed due to continuous application of sewage on a piece of land

15. In a plane truss, if 'M' is the number of members, 'R' is the number of reactions and 'J' is the number of joints, then for this truss to be determinate

A. $J = M + R$

B. $J = 2M + R$

C. $3J = M + 2R$

D. $2J = M + R$

16. The two-peg test in the adjustment of a dumpy level employs the principle that

A. Equal lengths at back sight and fore sight do not affect the difference in level.

B. Reciprocal levelling eliminates errors of non-parallel instrument and collimation axes.

C. Two readings from the same station will minimize errors in bubble tube axis.

D. Correction is made for verticle axis at one peg and for horizontal axis at the other peg.

17. A good brick when immersed in water bath for 24 hours, should not absorb more than

A. 20% of its dry weight

B. 30% of its saturated weight

C. 10% of its dry weight

D. 20% of its saturated weight

18. What are the phenomena of global warming and acid rain formation attributed to ?

A. SO_2 and CO_2 respectively

B. CO and SO_2, respectively

C. CO_2 and SO_2, respectively

D. CO and CO_2, respectively

19. Why are gate valves provided in distribution system ?

A. To minimize the flow pressure in the network

B. To maximize the usage of the distribution system

C. To control the flow in the pipe network

D. To identify the loss through illegal connections

20. The map projection in which the angle between any pair of short lines is represented correctly is called

A. Conformal projection

B. Equidistant projection

C. Azimuthal projection

D. Equal area projection

21. What is the BOD_5 at 20°C of a waste that yields an oxygen consumption of 2 mg/*l* from a 0.5% diluted sample?

A. 50 mg/*l*

B. 400 mg/*l*

C. 200 mg*l*

D. 250 mg*l*

22. The optimum number of revolutions over which concrete is required to be mixed in a mixer machine, is

A. 10

B. 20

C. 50

D. 100

23. Which one of the following statements is correct ?
Cant deficiency is the difference between

A. Actual cant provided at the time of construction and at the time of renewal.

B. The equilibrium cant necessary for the maximum permissible speed and actual cant provided.

C. Cant required at maximum speed and minimum speed

D. Two parallel rails after 10 years.

24. In a fillet weld the weakest section is the

A. Smaller side of the fillet

B. Throat of the fillet

C. Side perpendicular to force

D. Side parallel to force

25. What is the time by which the completion of an activity can be delayed without affecting the start of succeeding activities, called?

A. Total float

B. Interfering float

C. Independent float

D. Free float

26. Which one of the following is the angular distance between the observer's meridian and the vertical circle passing through a star measured along the celestial horizon?

A. Right ascension

B. Azimuth

C. Declination

D. Hour angle

27. For complete hydration of cement the *W/C* ratio needed is

A. Less than 0.25

B. More than 0.25 but less than 0.35

C. More than 0.35 but less than 0.45

D. More than 0.45 but less than 0.60

28. The magnitude of acceleration is given by the

A. Slope of distance-time curve

B. Length of velocity-time curve

C. Slope of velocity-time curve

D. Length of distance-time curve

29. A buttress in a wall is intended to provide

A. Lateral support to roof slab only

B. Lateral support to wall

C. To resist vertical loads only

D. Lateral support to roof beams only

30. For the design of a simply supported RCC T-beam, the ratio of the effective span to the overall depth of the beam should not exceed

A. 10

B. 20

C. 30

D. 40

31. Which one of the following sections performs better on the ductility criterion ?

A. Balanced section

B. Over-reinforced section

C. Under-reinforced section

D. Non-prismatic section

32. What does high COD to BOD ratio of an organic pollutant represent ?

A. High biodegradability of the pollutant

B. Low biodegradability of the pollutant

C. Presence of free oxygen for aerobic decomposition

D. Presence of toxic material in the pollutants

33. Which is the best sewer material to resist hydrogen sulphide corrosion ?

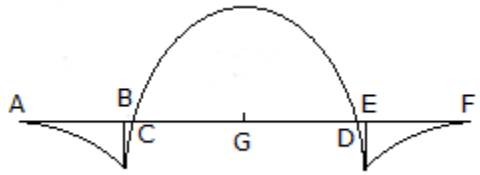
A. Glazed stone ware

B. Glazed earthen ware

C. R.C.C.

D. Brick masonry

34. The bending moment diagram for an overhanging beam is shown in the given figure The points of contraflexure would include



A. *A* and *F*

B. *B* and *E*

C. *C* and *D*

D. *A* and *D*

35. Zero hardness of water is achieved by :

A. Using lime soda process

B. Excess lime treatment

C. Ion exchange method

D. Using excess alum dosage

36. Accidental or compensating errors of length *L* are proportional to

A. *L*

B. *L*

C. $\sqrt[3]{L}$

D. 1/*L*.

37. In a closed traverse, sum of south latitudes exceeds the sum of north latitudes and the sum of east departures exceeds the sum of west departures, then, the closing line will lie in

A. North-west quadrant

B. North east quadrant

C. South-east quadrant

D. South- west quadrant.

38. In a prestressed beam carrying an external load *W* with a bent tendon is having angle of inclination θ and prestressed load *P*. The net downward load at the centre is

A. $W - 2P \cos \theta$

B. $W - P \cos \theta$

C. $W - P \sin \theta$

D. $W - 2P \sin \theta$

39. The cement becomes useless if its absorbed moisture content exceeds

A. 1%

B. 2%

C. 3%

D. 5%

40. The impurity of mixing water which affects the setting time and strength of concrete, is

A. Sodium sulphates

B. Sodium chlorides

C. Sodium carbonates and bicarbonates

D. Calcium chorides

41. A table with all possible value of a random variable and its corresponding probabilities is called

A. Probability Mass Function
B. Probability Density Function
C. Cumulative distribution function
D. Probability Distribution

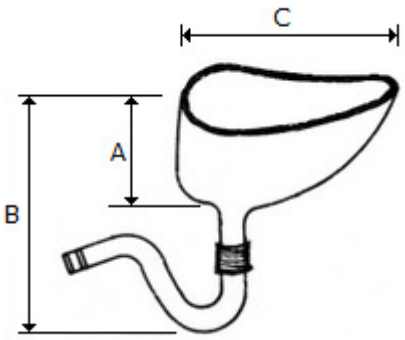
42. If 'p', 'q' and 'n' are probability pf success, failure and number of trials respectively in a Binomial Distribution, what is its Standard Deviation?

A. $(np)^{1}/_{2}$
B. $(pq)^{1}/_{2}$
C. $(np)^{2}$
D. $(npq)^{1}/_{2}$

43. Discuss minimum value of $f(x,y)=x^2 + y^2 + 6x + 12$

A. -3
B. 3
C. -9
D. 9

44. The value of '*A*' of Indian type W.C. shown in the given figure is :



A. 25 cm

B. 30 cm

C. 40 cm

D. 45 cm

45. Queen closer may be placed

A. in header course

B. in stretcher course

C. in header course next to first brick

D. in stretcher course next to first brick

46. Which type of light energy is effectively absorbed by CO_2 in the lower boundary of the troposphere?

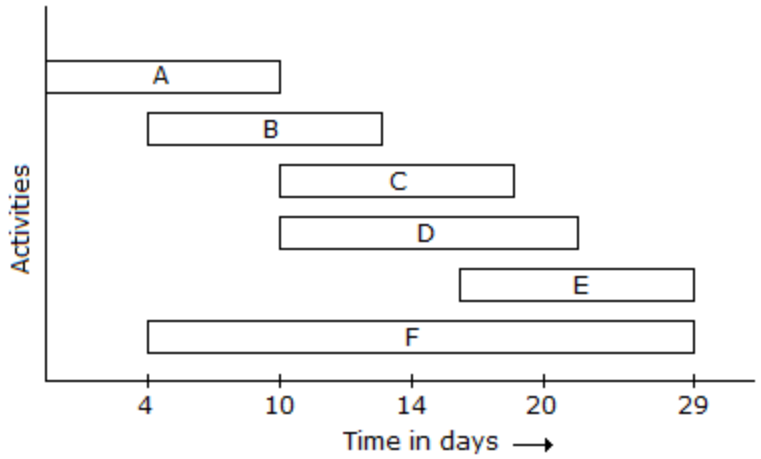
A. X - rays

B. UV - rays

C. Visible light

D. Infra-red rays

47. Which are the critical activities of the bar chart shown above ?



A. Activities *B* and *E*

B. Activities *A, D* and *F*

C. Activities *A, C* and *E*

D. Activities *A* and *F*

48. In geo thermal power plants waste water is

A. Discharged back to earth.
B. Discharged into the sea.
C. Recirculated after cooling in cooling towers.
D. Evaporated in ponds.

49. The Intensity scale of the earthquake is called?

A. Mercalli scale
B. Ritcher scale
C. Number scale
D. None of the above

50. The most potent greenhouse gas among the following is __?

A. Carbon dioxide
B. Methane
C. Water Vapor
D. Ozone

x-x-x

Computer Science & Engineering (1068)

1. A member of the population is called
A) Element B) Census C) Sample D) Group

2. Sample value is called
A) Parameter B) Core Value C) Statistic D) Variable

3. Probability sampling is otherwise called
A) Multiple choice B) Univariate Analysis
C) Random Sampling D) Bi-variate Analysis

4. Sending Questionnaire to a respondent with a request to complete and return by post is called
A) Mail Survey B) Interview C) Observation D) Panel

5. Schedule is used as a
A) Questionnaire B) Tool C) Method D) technique

6. The first and second derivatives of a quadratic Polynomial at x = 1 are 1 and 2 respectively. Then the value of f(1) – f(0) Is given by
A) $^3\!/_2$ B) $^1\!/_2$ C) 1 D) 0

7. If $f(x, y) = \frac{x^3 + y^3}{x^{99} + y^{98}x + y^{99}}$ find the value of f_y at (x,y) = (0,1)
A) 101 B) -96 C) 210 D) 0

8. f(x, y) = sin(y⁄x)x^3 + x^2y find the value of f_x + f_y at (x,y)=(4,4)
A) 0 B) 78 C) 4^2 . 3(sin(1) + 1) D) -12

9. If a block can be placed anywhere in the cache, the cache is said to be
A) Direct mapped B) Set Associative C) Fully Associative D) Both B & C

10. Let the size of congestion window of a TCP connection be 32KB when a timeout occurs. The round trip time of the connection is 100 msec and the maximum segment size used is 2 KB. The time taken(in msec) by the TCP connection to get back to 32KB congestion window is
A) 1100 to 1300 B) 800 to 1000 C)1400 to 1600 D) 1500 to 1700

11. In a RSA cryptosystem, a participant A uses two prime numbers p=13 and q=11 to generate his public and private keys. If the public key of A is 37, then the private key of A is
A) 13 B) 35 C) 17 D) 11

12. The 8 queens problem is solved using the following algorithms design technique

A) Dynamic Programming B) Back Tracking

C) Divide and Conquer D) Greedy method

13. Binary Search tree can be used for sorting integers using which of the following transversal techniques

A) Postorder transversal B) Inorder transversal

C) Preorder transversal D) Breadth-first transversal

14. The address of a class B host is to be split into subnets with a 6 bit subnet number. What is the maximum number of subnets and the maximum number of hosts in each subnet?

A) 62 subnets and 262142 hosts B) 64 subnets and 262142 hosts

C) 62 subnets and 1022 hosts D) 64 subnets and 1024 hosts

15. Which is the mean overhead of a pipeline with 5 stages band an execution time per stage of 1 cycle?

A) 2 cycles B) 3 cycles C) 4 cycles D) None of these

16. What is stored in a translation Lookaside Buffer?

A) System dumps B) Physical Addresses

C) Program Data D) Operating system log files

17. The periods of time when the unit is idle is called as

A) Stalls B) Bubbles C) Hazards D) Both Stalls and Bubbles

18. Congestion control and quality of service is qualities of the

A) ATM B) PVC C) Frame Relay D) SONET

19. Port number used for POP3 is

A) 110 B) 23 C) 25 D) None of these

20. What is an optimal Huffman code for the alphabet p of the following set of frequencies p: 25, q:15,r: 30, s:5, t:40, u: 50

A) 101 B) 0101 C) 1000 D) 1001

21. White Box techniques are also classified as

A) Design based testing B) Structural testing

C) Error guessing technique D) None of the mentioned

22. What is testing process' first goal?

A) Bug prevention B) Testing C) Execution D) Analyses

23. Which of the following is not a part of Execution Flow during debugging?

A) Step Over B) Step Into C) Step Up D) Step Out

24. Which one is not a phase of "bath tub curve" of hardware reliability
A) Burn-in B) Useful life C) Wear-out D) Test-out

25. Which regression test selection technique exposes faults caused by modifications?
A) Efficiency B) Precision C) Generality D) Inclusiveness

26. The Ricart & Agrawala distributed mutual exclusion algorithm is
A) More efficient and more fault tolerant than a centralized algorithm
B) More efficient but less fault tolerant than a centralized algorithm
C) Less efficient but more fault tolerant than a centralized algorithm
D) Less efficient and less fault tolerant than a centralized algorithm

27. Which one of the following is not true about SONET?
A) Frames of lower rate can be synchronously time division multiplexed into a higher rate frame
B) Multiplexing is synchronous TDM
C) All clocks in the network are locked to a master clock
D) None of the mentioned

28. A machine has only one register file write port, but the pipeline wants to perform two writes in a clock cycle, which hazard prevents parallel execution in this piope?
A) Control hazard B) Data hazard C) Memory hazard D) Structural hazard

29. Congestion control and quality of service is qualities of the
A) ATM B) PVC C) Frame Relay D) SONET

30. Port number used for POP3 is?
A) 110 B) 23 C) 25 D) None of these

31. Which of the following is not a data mining functionality?
A) Characterization and Discrimination B) Classification and regression
C) Selection and interpretation D) Clustering and Analysis

32. Strategic value of data mining is
A) Cost sensitive B) Work sensitive
C) Time sensitive D) Technical sensitive

33. The full form of KDD is
A) Knowledge Database B) Knowledge Discovery Database
C) Knowledge Data House D) Knowledge Data Definition

34. AES uses a _____ bit block size and a key size of ___ bits
A) 128; 128 or 256 B) 64; 128 or 192
C) 256; 128, 192 or 256 D) 128; 128, 192 or 256

35. Which algorithm among- MARS, Blowfish, RC6, Rijndael and Serpent -was chosen as the AES algorithm?

A) MARS B) Blowfish C) RC6 D) Rijndael

36. What is the expanded key size of AES-192?

A) 44 words B) 60 words C) 52 words D) 36 words

37. For the AES-128 algorithm there are _____ similar rounds and _____ round is different.

A) 2 pair of 5 similar rounds ; every alternate
B) 9 ; the last
C) 8 ; the first and last
D) 10 ; no

38. In the RSA algorithm, we select 2 random large values 'p' and 'q'. Which of the following is the property of 'p' and 'q'?

A) p and q should be divisible by Φ(n) B) p and q should be co-prime
C) p and q should be prime D) p/q should give no remainder

39. In RSA, Φ(n) = _____ in terms of p and q.

A) (p)/(q) B) (p)(q) C) (p-1)(q-1) D) (p+1)(q+1)

40. The purpose of a 'tweak' in XTS-AES mode is to

A) Secure the public key B) Provide security
C) Provide variability D) All of the mentioned

41. Which of the following is essential concept related to Cloud?

A) Reliability B) Productivity C) Abstraction D) All of these

42. Which of the following is Cloud Platform by Amazon?

A) Azure B) AWS C) Cloudera D) All of these

43. The technology used to distribute service requests to resources is referred to as :

A) Load performing B) Load scheduling
C) Load balancing D) All of these

44. Which of the following software can be used to implement load balancing?

A) Apache mod_balancer B) Apache mod_proxy_balancer
C) F6's BigIP D) All of these

45. Which of the following is highest degree of integration in cloud computing?

A) CaaS B) AaaS C) PaaS D) SaaS

46. Communication between services is done widely using _____ protocol.

A) REST B) SOAP C) RESTful D) None of these

47. According to analysts, for what can traditional IT systems provide a foundation when they're integrated with big data technologies like Hadoop?
A) Big data management and data mining
B) Data warehousing and business intelligence
C) Management of Hadoop clusters
D) Collecting and storing unstructured data

48. Hadoop is a framework that works with a variety of related tools. Common cohorts include:
A) MapReduce, Hive and HBase
B) MapReduce, MySQL and Google Apps
C) MapReduce, Hummer and Iguana
D) MapReduce, Heron and Trumpet

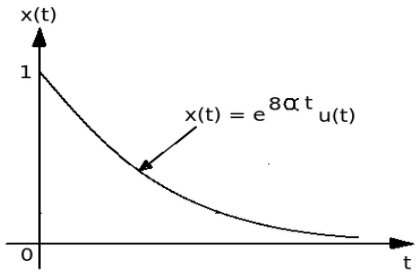
49. _____ has the world's largest Hadoop cluster.
A) Apple
B) Datamatics
C) Facebook
D) None of these

50. You can delete a column family from a table using the method _____ of HBAseAdmin class.
A) delColumn()
B) removeColumn()
C) deleteColumn()
D) All of these

x-x-x

Electronics & Communication Engineering (1068)

1. What would be the value of normalized energy for the causal exponential pulse shown below?



Causal Exponential Pulse

A) 8α B) b. 1 / 8α C) c. -1 / 8α D) d. -8α

2. Which among the following are the stable discrete time systems?

1. y(n) = x(4n)
2. y(n) = x(-n)
3. y(n) = ax(n) + 8
4. y(n) = cos x(n)

A) 1 & 3 B) 2 & 4 C) 1, 3 & 4 D) 1, 2, 3 & 4

3. Determine the value of transconductance for N-channel JFET with I_{DSS} = 9 mA, V_p = -2V, V_{GS} = -1 V.

A) 7.5 mS B) 6.5 mS C) 4.5 mS D) 5.5 mS

4. Which current source is connected between collector and base terminals in order to supervise the consequences of base control in an active region DC Model of BJT?

A) αI_B B) βI_B C) αI_E D) βI_E

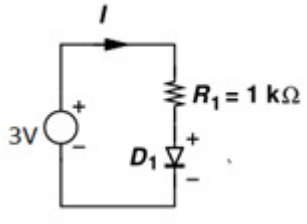
5. Which register usually store the output generated by ALU in several arithmetic and logical operations?

A) Accumulator B) Special Function Register
C) Timer Register D) Stack Pointer

6. Which device plays a significant role in connection of ac source without affecting or causingany sort of perturbation to dc biasing while applying AC to DC biased transistor?

A) Inductor B) Resistor
C) Coupling Capacitor D) Filter

7. The current I through the circuit if we consider diode in constant voltage drop model is (Take VD as 0.5V)



A) 2mA B) 2.5mA C) 3.5mA D) 1mA

8. Which waveshaping circuits are preferred or selected for the transmission of specific part of any arbitrary waveform by allocating the reference level?

A)Clipping Circuits B) Clamping Circuits
C) Voltage Regulating Circuits D) Sampling Gate Circuits

9. Determine the Bandwidth of a FM wave when the maximum deviation allowed is 75KHz and the modulating signal has a frequency of 10KHz.

A) 170 KHz B) 200 KHz C) 100 KHz D) 1000 KHz

10. For a three stage cascade amplifier, calculate the overall noise figure when each stage has a gain of 12dB and noise figure of 8dB.

A) 12 B) 24 C) 13.55 D) 8

11. Calculate the dissipation in power across 20Ω resistor for the FM signal

$v(t)= 20 \cos(6600t+ 10\sin 2100t)$

A) 5W B) 20W C) 10W D) 400W

12. An AM broadcast station transmits modulating frequencies up to 6 kHz. If the AM station is transmitting on a frequency of 894 kHz, the values for maximum and minimum upper and lower sidebands and the total bandwidth occupied by the AM station are:

A) 900 KHz, 888 KHz, 12 KHz B) 894 KHz, 884 KHz, 12 KHz
C) 894 KHz, 888 KHz, 6 KHz D) 900 KHz, 888 KHz, 6 KHz

13. When AM signal is of 25KHz, calculate the number of channels required in Medium Frequency (MF) band of 300KHz-3000KHz.

A) 94 B) 69 C) 85 D) 54

14. For the transfer function given below, where does the zero of the system lie?
$G(s) = 5s - 1 / s^2 + 5s + 4$

A) $s = -1$ & $s = -1/4$ B) $s = -4$ & $s = -1$
C) $s = 1/5$ D) $s = -1/5$

15. The s plane and z plane are related as
A) $z = e^{sT}$ B) $z = e^{2sT}$ C) $z = 2e^{sT}$ D) $z = e^{sT}/2$

16. For a system function H(s) to be stable
A) The zeros lie in left half of the s plane
B) The zeros lie in right half of the s plane
C) The poles lie in left half of the s plane
D) The poles lie in right half of the s plane

17. The region of convergence of $x/ (1+2x+x^2)$ is
A) 0 B) 1 C) Negative D) Positive

18. If a fiber operates at 1400nm with the diameter of about 10 μm, $n_1 = 1.30$, $\Delta = 0.80\%$, $V = 3.5$, then how many modes will it have?
A) 6.125 B) 9.655 C) 12.95 D) 16.55

19. Assuming that the channel is noiseless, if TV channels are 8 kHz wide with the bits/sample = 3Hz and signalling rate = 16×10^6 samples/second, then what would be the value of data rate?

A) 16 Mbps B) 24 Mbps C) 48 Mbps D) 64 Mbps

20. For fixed symbol rate, increase in bits/symbol ultimately improves r_b/B bits/s/Hz & hence, regarded as _____.
A) Power efficiency B) Spectral efficiency
C) Transmission efficiency D) Modulation efficiency

21. In an inverting ideal integrator, which component exhibits the feedback path connection?
A) Resistor B) Inductor C) Capacitor D) Diode

22. Basically, response time is defined as the time acquired by the comparator to accomplish _____of its transition corresponding to the voltage step at the input.

A) 20% B) 50% C) 70% D) 100%

23. An antenna is formed of four array antenna, each of which has a gain of _____ if the total gain of these antenna arrays is 30 dB.

A) 12 dB B) 13 dB C) 14 dB D) 15 dB

24. What is the approximate effective length of an antenna at 10 MHz
A) 2.65 m B) 9.55 m C) 4.62 m D) 8.6 m

25. Is used to increase the current at the base of the antenna, and also to make the current distribution more uniform.
A) Amplifier B) Top loading C) Booster D) None of these

26. If a waveguide is filled with a lossless material of relative permeability 2, then the wave impedance in the TEM mode is:
A) 188.5 Ω B) 170 Ω C) 123 Ω D) 345 Ω

27. If the dielectric loss of a medium is 0.2 Np/m with a wave number of 12, then the value of loss tangent is:
A) 0.0334 B) 0.05 C) 0.08 D) 0.09

28. Scattering matrix for a reciprocal network is:
A) Symmetric B) Unitary C) Skew symmetric D) Identity matrix

29. For a half wave or full wave rectifier the Peak Inverse Voltage of the rectifier is always
A) Greater than the input voltage
B) Smaller than the input voltage
C) Equal to the input voltage
D) Greater than the input voltage for full wave rectifier and smaller for the half wave Rectifier

30. What is the maximum possible range of bit-count specifically in n-bit binary counter consisting of 'n' number of flipflops?

A) 0 to 2n B) 0 to 2n-1 C) 0 to 2n+1 D) 0 to 2n+1 / 2

31. What is the required relationship between number of flipflops and the timing signals in Johnson Counter?
A) No. of flipflops = 1/2 x No. of timing signals
B) No. of flipflops = 2/3 x No. of timings signals
C) No. of flipflops = 3/4 x No. of timing signals
D) No. of flipflops = 4 x No. of timing signals

32. If a system is subjected to step input, which type of static error coefficient performs the function of controlling steady state error?
A) Position B) Velocity C) Acceleration D) Retardation

33. If a pole is located at s = -5 in left-hand plane (LHP), how will it be represented in Laplace domain?
A) 1/ s + 5 B) 1/ s – 5 C) s/ s + 5 D) s/ s – 5

34. In polar plots, if a pole is added at the origin, what would be the value of the magnitude at $\Omega = 0$?

A) Zero B) Infinity C) Unity D) Unpredictable

35. If the system is specified by open loop transfer function $G(s)H(s) = k / s(s+3)(s+2)$, how many root loci proceed to end at infinity?

A) 2 B) 3 C) 5 D) 6

36. What would be the nature of roots for undamped type of circuits with sustained oscillations?

A) Purely imaginary

B) Real, equal & negative

C) Complex conjugate with negative real part

D) Real, unequal & negative

37. Suppose that a network consists of purely resistive elements, what will be the value of propagation constant (generated output) in terms of attenuation constant and phase constant from the following?

A) $\gamma = \alpha + j0$ B) $\gamma = 0 + j\beta$ C) $\gamma = 0 - j\beta$ D) $\gamma = \alpha - j0$

38. Suppose that $x_a(t)$ is bandlimited to 8 kHz (that is, $X_a(f) = 0$ for $|f| > 8000$), then what is the Nyquist rate for $x_a(t)$?

A) 16 KHz B) 4 KHz C) 8 KHz D) 12 KHz

39. A complex bandpass signal $x_a(t)$ with $X_a(f)$ nonzero for 10 kHz < f < 12 kHz is sampled at a sampling rate of 2 kHz. The resulting sequence is $x(n) = \delta(n)$, then $x_a(t)$ will be

A) $x_a(t) = (1/2000)(\text{Sin}(2000\pi t)/(\pi t))ej2\pi(11000)t$

B) $x_a(t) = (1/2000)(\text{Sin}(2000\pi t)/(\pi t))e\text{-}j2\pi(11000)t$

C) $x_a(t) = (1/2000)(\text{Cos}(2000\pi t)/(\pi t))ej2\pi(11000)t$

D) $x_a(t) = (1/2000)(\text{Cos}(2000\pi t)/(\pi t))e\text{-}j2\pi(11000)t$

40. Two digital filters can be operated in cascade. Or, the same effect can be achieved by

A) Adding their coefficients

B) Subtracting their coefficients

C) Convolving their coefficients

D) Averaging their coefficients and then using a Blackman window

41. What is FIR filter?

A) FIR filters are “finite” there is a specific limit to the number of times that any delayed sample is added to a new input sample.

B) FIR filters are “finite” there is a specific limit to the number of times that any delayed sample is added to a new output sample.

C) A & B

D) None of above

42. FIR filters have ……., and IIR filters have …….
A) Zeros, poles & zeros B) Poles & zeros, Zeros
C) Zeros, zeros D) None of above

43. Data rate depends upon
A) Bandwidth B) Level of signals C) Level of noise D) All of above

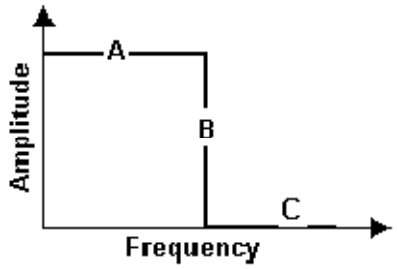
44. The line code has a zero dc component for pulse transmission of random binary data is
A) NRZ B) RZ
C) Alternate mark inversion D) None of the mentioned

45. The auto-correlation of white noise is
A) A delta function B) A constant
C) Gaussian D) None of these

46. Example for antipodal bandpass signalling is
A) BPSK B) ASK C) FSK D) MSK

47. In M-ary FSK as M tends to infinity, probability of error tends to
A) Infinity B) Unity C) Zero D) None of these

48. This frequency response graph is for a



A) Lowpass filter B) Highpass filter C) Bandpass filter D) Bandstop filter

49. Which waveforms are also called as line codes?
A) PCM B) PAM C) FM D) AM

50. Information can be represented as a sequence of
A) Byte patterns B) Characters C) Bit patterns D) Images

x-x-x

Electrical & Electronics Engineering (1068)

1. A single –phase , 230 V ,50 Hz , 4 pole , capacitor –start induction motor has the following standstill impedances
Main winding $Z_m = 6.0 + j4.0\ \Omega$
Auxiliary winding $Z_a = 8.0 + j6.0\ \Omega$
The value of the starting capacitor required to produce 90^o phase difference between the current in the main and auxiliary winding will be
A) 176 .84 μ F B) 187.24 μ F C) 265.26 μ F D) 2780 .86μ F

2. A 3-phase star /delta transformer has per phase turn ratio 'K' and line voltage ratio 'K_1' If the voltage of delta winding lags the voltage of star winding by an angle ϕ then K, K_1 and ϕ are related as
A) $K_1 = K$ and $\phi = -30^\circ$ B) $K_1 = k/\sqrt{3}$ and $\phi = -30^\circ$
C) $K_1 = \sqrt{3}\,K$ and $\phi = -30^\circ$ D) $K_1 = \sqrt{3}K$ and $\phi = -30^\circ$

3. A 400 V , 50 Hz , 4 pole 1400 rpm , stat connected squirrel cage induction motor has the following parameters referred to the stator :
$R_r' = 1.0\ \Omega$, $X_s = X_r' = 1.5\ \Omega$
Neglect stator resistance and core and rotational losses of the motor. The motor is controlled from a 3 phase voltage source inverter with constant V/f control. The stator line to line voltage (rms) and frequency to obtain the maximum torque at starting will be:
A) 20.6 V , 2.7 Hz B) 133.3 V, 16.7Hz
C) 266.6V, 33.3 Hz D) 323.3 V, 40.3 Hz

4. The field current of a synchronous motor is increased while its load is constant. How will its power angle and power factor change?
A) Power angle decreases and power factor improves
B) Power angle remains same throughout but power factor improves
C) Power angle increases while its power factor gradually decreases
D) Power angle and power factor both increase

5. For a given power delivered , if the working voltage of a distributor line is increased to n times the cross- sectional area A of the distributor line would be reduced to
A) 1/n A B) $1/n^2$ A C) $1/2n^2$ A D) 1/2n A

6. For a transmission line with negligible losses, the lagging reactive power (VAR) delivered at the receiving –end , for a given receiving –end voltage, is directly proportional to the
A) Square of the line voltage drop B) Line voltage drop-
C) Line inductive reactance D) Line capacitive reactance

7. The incremental cost characteristic of the two units in a plant are given by ;
$1C_1 = Rs\ .\ (0.1\ P_1 + 0.8)$ per MWh
$1C_2 = Rs\ .\ (0.15\ P_2 + 3.0)$ per MWh
The optimum sharing of load when the total load is 100 MW is

A) $P_1 = 60$ MW and $P_2 = 400$ MW B) $P_1 = 33.3$ MW and $P_2 = 66.7$ MW
C) $P_1 = 40$ MW and $P_2 = 60$ MW D) $P_1 = 66.7$ MW and $P_2 = 33.3$ MW

8. At a 220 V Substation of a power system , it is given that the three – phase fault level is 4000 MVA and single –line to ground fault level is 5000 MVA . Neglect the resistance and the shunt susceptances of the system. The positive sequence driving point reactance at the bus is
A) 2.5 Ω B) 4.033Ω C) 5.5Ω D) 12.1Ω

9. A 50 Hz alternator is rated 500 MVA, 20 KV with $X_d = 1.0$ per unit and $X_d'' = 0.2$ Per unit. It supplies a purely resistive load of 400 MWA at 20 KV . The load is connected directly tothe generator terminals .when a symmetrical fault occurs at the load terminals . The initial rms current in the generator in per unit is
A) 7.22 B) 6.4 C) 3.22 D) 5.1

10. A long –distance overhead transmission line of 220 KV rating is to be protected against faults between phases and ground. The fault resistance including that of the ground is found to vary over a wide range. Which one of the following types of relays will give the best performance under the situation indicated above ?
A) Over current relay B) Differential relay with percentage bias
C) Reactance type distance relay D) Impedance type distance relay

11. A string insulator has 4 units . The voltage across the bottom – most unit is 33.33% of the total voltage . Its string efficiency is
A) 25% B) 33.33% C) 66.67% D) 75%

12. Protection scheme used for detection of loss of excitation of a very large generating unit Feeding power into a grid employs
A) Under – voltage relay B) Offset mho relay
C) Under –frequency relay D) Percentage differential relay

13. A power system consists of 300 buses out of which 20 buses are generator bus, 25 buses are ones with reactive power support and 15 buses are the ones with fixed shunt capacitor All the other buses and load buses, it , is proposed to perform a load flow analysis for the System using Newton –Raphson method . The size of the Newton –Raphson Jacobian Matrix is
A) 553 × 553 B) 540 × 540 C) 555 × 555 D) 554 × 554

14. For a 12 pulse operation of HVDC convertors , the most troublesome set of harmonics on The ac side is .
A) 23^{rd} and 25^{th} B) 12^{th} and 24^{th} C) 11^{th} and 13^{th} D) 5^{th} and 7^{th}

15. A generator is connected through a 20 MVA , 13.8/138 KV step down transformer, to a

Transmission line . At the receiving end of the line a load is supplied through a step down Transformer of 10 MVA , 138 /69 KV rating . A 0.72 pu load , evaluate on load side trans-Former rating as base values , is supplied from the above system . For system base values Of 10MVA 69KV in the load circuit , the load (in per unit)in generator circuit will be

A) 36 B) 1.44 C) 0.72 D) 0.18

16. A 3 Phase , fully controlled , converter is feeding power into a d.c load at a constant of 150 A The rms current through each thyristor of the converter is

A) 50 A

B) 100 A

C) $\frac{150\sqrt{2}A}{\sqrt{3}}$

D) $\frac{150\ A}{\sqrt{3}}$

17. Kelvin double bridge is best suited for the measurement o f;

A) Resistance of very low value B) Low value capacitance

C) Resistance of very high value D) High value capacitance

18. A DC ammeter has a resistance of 0.1 ohms and its current range is 0-100 A, if the range is to be Extended to 0-500 A, then meter requires the following shunt resistance

A) 0.010 ohm B) 0.011 ohm C) 0.025 ohm D) 1.0 ohm

19. A certain oscilloscope with 4cm by 4cm screen has its own sweep output fed to its input. If the x and y sensitivities are same, the oscilloscope will display a

A) Triangular wave B) Diagonal line C) Sine wave D) Circle

20. For a unity feedback system with open loop transfer function G(s) = 9/s(s+2)' the damping ratio is

A) 1/3 B) ½ C) 1 D) 2

21. For what value of x will the matrix given below become singular?

$$\begin{pmatrix} 8 & \times & 20 \\ 4 & 0 & 2 \\ 12 & 6 & 0 \end{pmatrix}$$

A) 4 B) 6 C) 8 D) 12

22. The solution of the differential equation

$dy/dt + 2xy = e^{-x2}$ with y (o) = 1 is

A) $(1 + x)\, e^{+x2}$ B) $(1 + x)\, e^{-x2}$ C) $(1 + x)\, e^{+x2}$ D) $(1 + x)\, e^{-x2}$

23. If a fair coin is tossed four times. What is the probability that two heads and two tails will Result?

A) 3/8 B) ½ C) 5/8 D) ¾

24. The inverse Laplace transform of $1/(s^2+s)$ is

A) $1 + e^{t}$ B) $1 - e^{t}$ C) $1 - e^{-t}$ D) $1 + e^{-t}$

25. In a thyristor, the ratio of holding current to latching current is
A) 0.6 B) 2.5 C) 1.0 D) 4.0

26. For dynamic equalizing circuit used for series connected SCRs, the choice of C (Capacitor) is based on
A) Reverse recovery characteristic B) Turn-off characteristics
C) Rurn-on characteristics D) Rise-time characteristics

27. In a single phase half wave circuit with RL load, and a freewheeling diode across the load extinction angle β is more than π. For a firing angle α, the SCR and freewheeling diode would conduct, respectively, for
A) $\pi - \alpha, \beta$ B) $\pi - \alpha, \beta - \pi$ C) $\beta - \alpha, \pi - \alpha$ D) $\beta - \alpha, \alpha$

28. Commutation overlap in the phase controlled ac to dc converter is due to
A) Load inductance B) Switching operation in the converter
C) Harmonic content of load current D) Source inductance

29. In a 3 ph full converter, the six SCRs are fired at an interval of
A) 30^0 B) 90^0 C) 60^0 D) 120^0

30. The characteristic polynomial $F(z) = 2z^4 + 7z^3 + 10z^2 + 4z + 1$ is
A) Stable B) Marginally stable C) Unstable D) None of these

31. Zero of which compensator is located nearest to origin
A) Lead compensator only B) Both lead and lag compensator
C) Lag compensator only D) None of these

32. The steady-state error of a feedback control system with an acceleration input becomes finite in a
A) Type zero system B) Type two system
C) Type one system D) Type three system

33. If the slope of the regression line is calculated to be 2.5 and the intercept is 16, then the value of Y, When X is 4=
A) 16 B) 2.5 C) 26 D) 66.5

34. R^2 is the mathematical notation for
A) Co-efficient of variation B) Co-efficient of correlation
C) Co-efficient of determination D) Any of the above

35. Orthogonal array is
A) Balanced Array B) Unbiased Array
C) Effective in experimentation D) All of the above

36. If the standard deviation of the population is 35 and the sample size is 9 then the standard deviation of sampling distribution is

A) 12.67 B) 11.67 C) 13.67 D) 14.67

37. In statistical analysis, the sample size is considered large if

A) n > or = 30 B) n < or = 30 C) n > or = 50 D) n < or = 50

38. The methods in statistics that uses sample statistics to estimate the parameters of the population are considered as

A) Inferential statistics B) Absolute statistics

C) Coverage statistics D) Random sample statistics

39. In sample distribution, the degree of freedom is calculated as

A) df = n- 2 B) df = n- 1 C) df = n- 3 D) f = n- 5

40. How many experiments can be performed with L9 OA without repetition?

A) 9 B) 18 C) 3 D) 6

41. Which of the following statement/statements is/are correct in connection with inverters?

A) VSI and CSI both require feedback diodes

B) GTOs can be used in CSI

C) Only CSI requires feedback diodes

D) Only VSI requires feedback diodes

42. A single-phase full-bridge VSI operating in square-wave mode supplies a purely inductive load. If the inverter time period is T, then the time duration for which each of the feedback diodes conduct in a cycle is

A) T B) T/4 C) T/2 D) T/8

43. The open loop transfer function of a unity-gain feedback control system is given by, G(s) = K/(s+1)(s+2), the gain margin of the system in dB is given by

A) Zero B) Two C) One D) Infinity

44. For a feedback control system with a characteristics equation 1+K/s(s+1)(s+2)=0. The branches originating at s = 0 and s = -1, will break away on real axis as K increases on a point

A) -1.577 B) -0.423 C) -0.605 D) -0.005

45. For ANOVA Following assumptions are true

A) Populations follow normal distribution

B) It may be associated with Type I and Type II error

C) Both of these are correct

D) None of these are correct

46. ANOVA uses

A) t-test B) Chi-square test C) F-test D) None of these

47. A system is stable if
A) All the poles of the transfer function have positive real parts
B) All the poles of the transfer function have zero real parts
C) All the poles of the transfer function have negative real parts
D) Stability does not depend on the nature of poles of a system

48. The initial slope of Bode plot for a transfer function having simple pole at origin is
A) 20dB/decade B) -20dB/decade C) -40dB/decade D) Zero

49. For a given system, its transfer function depends on
A) Input only B) Initial conditions C) Output only D) None of these

50. Peak overshoot explicitly indicative of
A) Settling time B) Rise time C) Natural frequency D) Damping ratio

x-x-x

Food Technology

1.	What is Hypothesis?			
	(A)	Prediction of a relationship between certain variables	(B)	An experiment that tests certain predictions
	(C)	An independent variable	(D)	A dependent variable
2.	Research is:			
	(A)	A systematic enquiry	(B)	A procedure
	(C)	A laboratory experiment	(D)	A report
3.	The thermal diffusivity is expressed as:			
	(A)	m/s	(B)	Pa.s
	(C)	m^2/s	(D)	Dimensionless number
4.	Food laws are essential to:			
	(A)	Control food poisoning	(B)	Limit the sale of sub standard products
	(C)	Promote the health products	(D)	All of the above
5.	The law governing the cream separation in milk is:			
	(A)	Newtons law	(B)	Bernoullis law
	(C)	Stokes law	(D)	Ficks law
6.	The unit of viscosity is expressed as:			
	(A)	erg	(B)	Pa
	(C)	$N.s/m^2$	(D)	N.s
7.	Jam may be classified as:			
	(A)	Newtonian	(B)	Solid
	(C)	Viscoelastic	(D)	None of the above
8.	Which one of these technologies are useful for removal of microbes only from surfaces of the foods?			
	(A)	Infrared heating	(B)	Microwave
	(C)	High pressure processing	(D)	UV light
9.	The SI units of force is:			
	(A)	$m.kg.s^{-2}$	(B)	$mol.kg.s^{-1}$
	(C)	$m2.kg.s^{-1}$	(D)	None of the above
10.	Solvent extraction of oil follow			
	(A)	Diffusion process	(B)	Leaching
	(C)	Centrifugation	(D)	Osmosis
11.	Y = exp (-k t) is a:			
	(A)	Linear equation	(B)	Non-linear equation
	(C)	Quadratic equation	(D)	Polynomial equation
12.	Which one is not a food packaging material			

	(A)	Polyethylene	(B)	Polypropylene
	(C)	Bi-axially oriented	(D)	Acetylene
13.	The products of fermentation of sugar are ethanol and :			
	(A)	Oxygen	(B)	water
	(C)	Sulphur dioxide	(D)	Carbon dioxide
14.	Animal fat is extracted by			
	(A)	Distillation	(B)	Mechanical extraction
	(C)	Rendering	(D)	None of the above
15.	The most heat resistant microorganism is			
	(A)	Str. cremoris	(B)	Saccharomyces cerevase
	(C)	Lactobacillus bulgaricus	(D)	Clostridium botulinum
16.	Potassium metabisulfite in processed food acts as			
	(A)	Antioxidant	(B)	Preservative
	(C)	Color additive	(D)	Favoring compound
17.	Lecithin is the by-product of			
	(A)	Sugar industry	(B)	Wine industry
	(C)	Oil industry	(D)	Meat industry
18.	Hedonic test pertains to:			
	(A)	Total solids evaluation	(B)	Total soluble solids evaluation
	(C)	Sensory evaluation	(D)	Total size evaluation
19.	Bulging of can is due to			
	(A)	H_2 gas production	(B)	Expansion of food product
	(C)	N_2 production	(D)	CO_2 production
20.	Maillard browning is due to			
	(A)	non-enzymatic browning	(B)	Reaction of amino acid and sugar
	(C)	reaction of glucose and amino acid	(D)	all of the above
21.	Which of the following analytical methods can be used to distinguish flavor compounds?			
	(A)	Polarimetry	(B)	Gas chromatography
	(C)	Spectroscopy	(D)	Hydrometry
22.	Chemical name of pectin is			
	(A)	Methoxyl ester of poly-galactouronic acid	(B)	Methyl ester of poly-galactouronic acid
	(C)	Methyl ester of glutamic acid	(D)	Methoxyl ester of glutamic acid
23.	Caffeine is absent in			
	(A)	Tea	(B)	Coffee

	(C)	Fresh fruit juice	(D)	Cola drinks
24.	Heat sensitive foods should preferably be processed:			
	(A)	Below atmospheric pressure	(B)	At atmospheric pressure
	(C)	Above the atmospheric pressure	(D)	None of these
25.	The Reynolds number for turbulent fluid flow in a pipe is:			
	(A)	Less than 2100	(B)	Greater than 2100
	(C)	Greater than 4000	(D)	Greater than 10,000
26.	80^{o}C is equal to:			
	(A)	156F	(B)	166F
	(C)	176F	(D)	186F
27.	One atmospheric pressure is equal to:			
	(A)	100.135 kPa	(B)	101.325 kPa
	(C)	1 kPa	(D)	1000 kPa
28.	Which of the following process results in least residual oil content in oil bearing materials:			
	(A)	Ghani	(B)	Expeller
	(C)	Solvent extraction	(D)	Hydraulic press
29.	Drying takes place only when dry bulb temperature of hot air is:			
	(A)	Less than its wet bulb temperature	(B)	Equal to its wet bulb temperature
	(C)	Greater than wet bulb temperature	(D)	Zero
30.	Various properties of air vapour mixture are given in			
	(A)	P-V chart	(B)	Hasley's Chart
	(C)	Psychrometric Chart	(D)	None of these
31.	Which of the following is a non-distilled beverage:			
	(A)	Rum	(B)	Whisky
	(C)	Brandy	(D)	Beer
32.	PET is:			
	(A)	Polyethylene terepthalate	(B)	Para ethyl toluene
	(C)	Poly ethylene tube	(D)	None of the above
33.	'Yield stress' term is related with			
	(A)	Leaching	(B)	Rheology
	(C)	Newtonian fluids	(D)	Solids
34.	Which one of them is a gram positive bacteria?			
	(A)	Pseudomonas	(B)	Salmonella
	(C)	Proteus	(D)	Bacillus
35.	The SPC per ml of the pasteurized milk should be:			

	(A)	less than 10000	(B)	Less than 20000
	(C)	Less than 30000	(D)	Less than 40000
36.	The current production of wheat in India is approximately:			
	(A)	200 million tonnes	(B)	300 million tonnes
	(C)	50 million tonnes	(D)	95 million tonnes
37.	*C. botulinum* does not grow in foods having pH below:			
	(A)	4.0	(B)	4.6
	(C)	5.0	(D)	5.5
38.	Parboiling of rice is a :			
	(A)	Thermal treatment	(B)	Blanching treatment
	(C)	Pressure treatment	(D)	Hydrothermal treatment
39.	Viscosity of water is:			
	(A)	1 mPa.s	(B)	100 mPa.s
	(C)	1 MPa.s	(D)	100 MPa.s
40.	The SI units of measurement is:			
	(A)	ft, lb, s, ^{o}F	(B)	cm, g, s, ^{o}C
	(C)	m, kg, s, K	(D)	m, kg, s, ^{o}C
41.	Kitchen-top microwave oven operates at:			
	(A)	915 MHz	(B)	9150 MHz
	(C)	245 MHz	(D)	2450 MHz
42.	Water activity of foods during constant rate of drying is:			
	(A)	=1	(B)	<1
	(C)	>1	(D)	0
43.	Recommended dryer for strawberry is:			
	(A)	Tray dryer	(B)	Fluidized bed dryer
	(C)	Deep bed dryer	(D)	Freeze dryer
44.	Activation energy is computed using:			
	(A)	Fick's law	(B)	Arrhenius law
	(C)	Fourier's law	(D)	Charl's law
45.	Activation energy is expressed in:			
	(A)	kJ/mol	(B)	kJ/kg
	(C)	kJ/L	(D)	kJ/mol.K
46.	Pasteurization of milk is carried out to			

	(A)	Destroy all microorganisms	(B)	Destroy all pathogens
	(C)	Destroy enzymes	(D)	Delay growth of microorganisms
47.	Ratio of convective heat transfer to heat transfer due to conduction is			
	(A)	Reynolds number	(B)	Nusselt number
	(C)	Prandtl number	(D)	Grasshoff number
48.	Ratio of molecular diffusivity of momentum to molecular diffusivity of heat is			
	(A)	Reynolds number	(B)	Nusselt number
	(C)	Prandtl number	(D)	Grasshoff number
49.	Mango is			
	(A)	Climacteric fruit	(B)	Non-Climacteric fruit
	(C)	Both Climacteric & Non-Climacteric fruit	(D)	None of these
50.	Following gas is responsible for ripening of fruits			
	(A)	Oxygen	(B)	Carbon dioxide
	(C)	Nitrogen	(D)	Ethylene

x-x-x

Industrial Chemistry (1068)

1. Research and Development become the index of development of country. Which of the following reasons are true with regards to this statement?

A) Because R&D reflect the true economic and social conditions prevailing in a country
B) Because R&D targets the human development
C) Because R&D can improve the standard of living of the people in a country
D) All of the above

2. Bibliography means

A) Foot notes B) Quotations C) List of books D) Biography

3. Research is

A) Searching again and again
B) Finding solution to any problem
C) Working in a scientific way to search for truth of any problem
D) None of the above

4. What is opposite of a variable?

A) Constant B) An extraneous variable
C) A dependent variable D) A data set

5. Why do you need to review the existing literature?

A) To give your dissertation a proper academic appearance, with lots of references
B) Because without it, you could never reach the required word-count
C) To find out what is already known about your area of interest
D) To help in your general studying

6. A successful teacher is one who is

A) Compassionate and disciplinarian B) Quite and reactive
C) Tolerant and dominating D) Passive and active

7. Solve the following equation for x, y, and z:

$$x - y + z = -1, \quad -x + y + z = -1, \quad x + 2y - 2z = 5$$

A) $x = 1, \quad y = 1, \quad z = -1$ B) $x = 5/3, \quad y = 7/6, \quad z = -1/2$
C) $x = -2/3, \quad y = -2/3, \quad z = -1$ D) $x = -1, \quad y = 1, \quad z = 1$

8. Solve the following equation for the two roots of x: $-x^2 + 5x = -6$

A) $x = 2, 3$ B) $x = -1, -5$ C) $x = -1, 6$ D) $x = -0.742, 6.74$

9. The function $f(x) = x^3 - 6x^2 + 9x + 25$ has

A) A maxima at x= 1 and a minima at x = 3
B) A maxima at x = 3 and a minima at x = 1
C) No maxima, but a minima at x = 1

D) A maxima at x = 1, but no minima

10. The following has highest energy?

A) Blue Light B) Violet Light C) Cyan Light D) Green Light

11. Butterfly has ____ numbers of legs.

A) Four B) Six C) Eight D) Ten

12. What is the Silicon Valley of United States of America famous for?

A) Textiles B) Steel industries

C) Tourism D) Electronics

13. Diabetes is caused by the malfunctioning of

A) Liver B) Pancreas C) Kidney D) Lungs

14. On the surface of the moon, the

A) Mass and weight become lesser

B) Mass remains constant and only weight is lesser

C) Only mass is lesser

D) Mass and weight both remain unchanged

15. With rise in gas temperature, dynamic viscosity of most of the gases

A) Increases B) Decreases

C) Does not change significantly D) None of these

16. A piece of metal of specific gravity 7 floats in mercury of specific gravity 13.6. What fraction of its volume is under mercury?

A) 0.75 B) 0.4 C) 0.515 D) 0.85

17. Crude oil of kinematic viscosity 2.25 stokes flows through a 20 cm diameter pipe, the rate of flow being 1.5 litres/sec. The flow will be

A) Laminar B) Turbulent C) Uncertain D) None of these

18. For laminar flow in a pipe, V is equal to

A) U_{max} B) 0.5 U_{max} C) 0.25 U_{max} D) $2U_{max}$

19. The coefficient of discharge (C_d) of an orifice varies with

A) Reynolds number B) Weber number

C) Froude number D) Mach number

20. Natural convection is characterized by

A) Grashhoff number B) Peclet number

C) Reynolds number D) Prandtl number

21. Prandtl number is the ratio of

A) Momentum diffusivity to mass diffusivity
B) Momentum diffusivity to thermal diffusivity
C) Thermal diffusivity to mass diffusivity
D) Thermal diffusivity to momentum diffusivity

22. It is desired to concentrate a 20% salt solution (20 kg of salt in 100 kg of solution) to a 30% salt solution in an evaporator. Consider a feed of 300 kg/min at 30 ^{0}C. The boiling point of the solution is 110 ^{0}C, the latent heat of vaporization is 2100 kJ/kg and the specific heat of the solution is 4 kJ/kgK. The rate at which the heat has to be supplied in (kJ/min) to the evaporator is

A) 3.06×10^5 B) 6.12×10^5 C) 7.24×10^5 D) 9.08×10^5

23. Hot water (0.01 m^3/min) enters the tube side of a counter current shell and tube heat exchanger at 80 ^{0}C and leaves at 50 ^{0}C. Cold oil (0.05 m^3/min) of density 800 kg/m^3 and specific heat of 2 kJ/kg K enters at 20 ^{0}C. The log mean temperature difference in ^{0}C is approximately

A) 32 B) 37 C) 45 D) 50

24. Baffles in the shell side of a shell and tube heat exchanger

A) Increase the cross section of the shell side liquid
B) Force the liquid to flow parallel to the bank
C) Increase the shell side heat transfer coefficient
D) Decrease the shell side heat transfer coefficient

25. At the same gas flow rate, the pressure drop in a packed tower being irrigated with liquid as compared to that in dry packed tower is

A) Greater B) Lower C) Same D) Uncertain

26. Penetration theory relates average mass transfer coefficient (K) with diffusivity (D) as

A) $K \alpha D$ B) $K \alpha D^{0.5}$ C) $K \alpha D^{1.5}$ D) $K \alpha D^2$

27. Fick's first law of diffusion for the z direction is

A) $J_A = D_{AB}\frac{\partial C_A}{\partial Z}$ B) $J_A = - D_{AB}\frac{\partial C_A}{\partial Z}$

C) $J_A = D_{AB}\frac{\partial^2 C_A}{\partial Z^2}$ D) $J_A = - D_{AB}\frac{\partial^2 C_A}{\partial Z^2}$

28. Dry bulb temperature of the gas as compared to the wet bulb temperature is

A) Less B) More C) Equal D) Uncertain

29. Cox chart is used in the design of

A) Distillation column B) Condenser
C) Heat exchanger D) Crystallizer

30. A mixture of A and B conforms closely to Raoult's law. The pure component vapor pressures P_A^S and P_B^S in kPa at t ^{0}C are given by

$$\ln P_A^S = 14.27 - \frac{2945}{t+224} \text{ and } \ln P_B^S = 14.20 - \frac{2973}{t+209}$$

If bubble point of a certain mixture of A and B is 76 ^{0}C at a total pressure of 80 kPa, then first vapor will contain

A) 52.5% A B) 72.5% A C) 82.5% A D) 92.5% A

31. An exothermic reaction is one in which heat is

A) Absorbed B) Evolved
C) Converted into electricity D) None of these

32. Equation $C_p - C_v = R$, is true for

A) An ideal gas only B) Any real gas
C) Ideal as well as real gases D) None of these

33. The most recent process for the manufacture of sulphuric acid is

A) Lead chamber process
B) Contact process
C) Double contact double absorption (DCDA)
D) Magma process

34. Kaoline is a/an

A) Refractory material B) Synthetic resin
C) Artificial abrasive D) Blue pigment

35. Non fibrous raw material is

A) Resin B) Cotton rag C) Reused pulp D) Paper pulp

36. Black liquor is concentrated in

A) Multiple effect evaporator
B) Multiple effect evaporator combined with crystallizer
C) Single effect evaporator
D) Single effect evaporator combined with crystallizer

37. Hydrogenation of oil

A) Removes double bonds B) Raises its melting point
C) Improves its resistance to oxidation D) All of these

38. Specific gravity of Teflon is

A) 1.04 – 1.06 B) 1.14 – 1.25 C) 1.42 – 1.45 D) 2.1 – 2.3

39. Chemical name of natural rubber is

A) cis 1,4-polyisoprene B) trans 1,4-polyisoprene

C) 1,2 - polyisoprene D) 3,4 – polyisoprene

40. The role of carbon black in rubber is
A) Reinforcing agent B) Extender
C) Vulcanizing agent D) Accelerator

41. Silicon carbide is a/an
A) Adhesive B) Abrasive C) Type of glass D) Brittle

42. Salt cake is
A) Na_2SO_4 B) $CaSO_4.1/2\ H_2O$ C) $MgSO_4$ D) NaOH

43. Anion exchanger is regenerated usually with
A) NaOH B) H_2SO_4 C) Hydrazine D) Alum solution

44. Chemical name of aspirin is
A) Acetylsalicylic acid B) Nictonic acid
C) Calcium acetate D) Methyl salicylate

45. Hydrogenation of edible vegetable oil
A) Is an exothermic reaction B) Increases their melting point
C) Is done in the presence of nickel catalyst D) All of these

46. The main aim of cracking is to produce
A) Gasoline B) Lube oil C) Petrolatum D) Coke

47. Reaction of orthophosphoric acid with phosphate rock produces
A) Superphosphate B) Triple superphosphate
C) Metaphosporic acid D) Monoammonium phosphate

48. Operating principle of cyclone separator is based on the action of _____ dust particles.
A) Diffusion of B) Centrifugal force on
C) Gravitational force on D) Electrostatic force on

49. Tri-sodium phosphate is used in boiler water treatment to reduce
A) Turbidity B) Caustic embrittlement
C) Suspended silica D) Dissolved oxygen

50. Inhalation of silica dust causes a disease called
A) Bronchitis B) Silicosis C) Pneumonia D) None of these

x-x-x

Information & Technology Engineering (1068)

1. _____ is used to choose between incrementing the PC or performing ALU operations.
A) Conditional codes
B) Multiplexer
C) Control unit
D) None of these

2. Number of CPU registers in a system depends on _____.
A) Operating system
B) Computer Architecture
C) Computer Organization
D) None of these

3. How many address lines are needed to address each memory location in a 2048X4 memory chip?
A) 11
B) 10
C) 12
D) 8

4. If the sender is a host and wants to send a packet to another host on the same network, the logical address that must be mapped to a physical address is _____.
A) The destination IP address in the datagram header
B) The IP address of the router found in the routing table
C) The source IP address
D) None of these

5. A CPU has 24-bit instructions. A program starts at address 300 (in decimal). Which one of the following is a legal program counter (all values in decimal)?
A) 400
B) 500
C) 600
D) 700

6. Determine the maximum length of the cable (in km) for transmitting data at a rate of 500 Mbps in an Ethernet LAN with frames of size 10,000 bits. Assume the signal speed in the cable to be 2,00,000 km/s.
A) 1
B) 2
C) 2.5
D) 5

7. The output of following program segment is:
```
cout<<(-10%-3);
```
A) 1
B) -1
C) Compile time error
D) None of these

8. The output of the following program segment:
```
inti, j = 7;
for(i = 0; i<= j; i ++ )
  {      if(i == 5 )      {  continue;      }
cout<<i<<"," ;     }  }
```

A) 0,1,2,3,4,6,7 B) 0,1,2,3,4,5,6 C) 8 D) None of these

9. The class whose objects can be created is known as:
A) Concrete class B) Abstract class C) Base class D) Derived class

10. The value of j at the end of the execution of the following C program

```
intincr (inti)
{
staticint count = 0;
count = count + i;
return (count);
}
main ( ) {
inti,j;
for (i = 0; i<=4; i++)
j = incr(i);
}
```

is
A) 10 B) 4 C) 6 D) 7

11. Consider the following C-program

```
void foo (int n, int sum)
{
int k = 0, j = 0;
if (n = = 0) return;
k = n % 10;
j = n / 10;
sum = sum + k;
foo (j, sum);
printf("%d\", k);
}
int main ( )
{
int a = 2048, sum = 0;
foo(a, sum);
printf ("%d\n", sum);
}
```

What does the above program print?

A) 8, 4, 0, 2, 14 B) 8, 4, 0, 2, 0
C) 2, 0, 4, 8, 14 D) 2, 0, 4, 8, 0

12. A binary tree T has n leaf nodes. The number of nodes of degree 2 in T is
A) $\log_2 n$ B) n – 1 C) n D) 2^n

13. What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.
A) 2 B) 3 C) 4 D) 5

14. The time complexity of computing the transitive closure of a binary relation on a set of n elements is known to be
A) O(n) B) O(n log n) C) $O(n^{3/2})$ D) $O(n^3)$

15. The postfix equivalent of the prefix: * + AB – CD is:
A) AB + CD - * B) AB CD + - *
C) AB + CD * - D) AB + - CD *

16. Linked lists are not suitable data structures of which one of the following problems?
A) Insertion sort B) Binary search
C) Radix sort D) Polynomial manipulation

17. Which resources are typically provided by an Infrastructure as a Service cloud computing delivery model?
A) Applications B) Virtual machines
C) Virtual private networks D) Middleware software stacks

18. When will cloud computing provide the most value?
A) A company has several thousands of documents that need to be indexed in many months
B) A company has several hundreds of documents that need to be indexed in a few minutes
C) A company has to process their payroll actives at the end of each pay period in batch mode
D) A company has purchased additional hardware in order to process their payroll activities faster at the end of each pay period

19. What advantage is there for an enterprise to adopt a virtual private cloud model?
A) Reduce costs by adopting a flexible pricing model for the entire operation
B) Reduce infrastructure costs since all data centers will be managed in a third party cloud
C) Manage sensitive data in a compliant and secure manner and benefit from flexible pricing models for select services or infrastructure

D) Obtain maximum control over aspects such as security and performance since the entire infrastructure will be managed within the IT department

20. Process of using known to estimate unknown is called

A) Interchange B) Interpolation C) Extrapolation D) Estimation

21. The base of image pyramid contains

A) Low resolution B) High resolution C) Intensity D) Blurred portion

22. Discarding every sample is called

A) Up sampling B) Filtering C) Down sampling D) Blurring

23. Which of the following statements are TRUE about an SQL query?

P: An SQL query can contain a HAVING clause even if it does not have a GROUP BY clause

Q: An SQL query can contain a HAVING clause only if it has a GROUP BY clause

R: All attributes used in GROUP BY clause must appear in the SELECT clause

S: Not all attributes used in the GROUP BY clause need to appear in the SELECT clause

A) P and R B) P and S C) Q and R D) Q and S

24. An index is clustered, if

A) It is on a set of fields that form a candidate key

B) It is on a set of fields that include the primary key

C) The data record of the file are organized in the same order as the date entries of the index

D) The data records of the file are organized not in the same order as the data entries of the index

25. Which of the following is used at the end of the view to reject the tuples which do not satisfy the condition in where clause?

A) With B) Check C) With check D) All of these

26. Which of the following is TRUE?

A) Every relation in 3NF is also in BCNF

B) A relation R is in 3NF if every non-prime attribute of R is fully functionally dependent on every key of R.

C) Every relation in BCNF is also in 3NF

D) No relation can be in both BCNF and 3NF

27. A counting semaphore was initialized to 10. Then 6 P (wait) operations and 4V (signal) operations were completed on this semaphore. The resulting value of semaphore is

A) 0 B) 8 C) 10 D) 12

28. When might it be appropriate to conduct a multivariate analysis test?

A) If the relationship between two variables might be spurious

B) If there could be an intervening variable

C) If a third variable might be moderating the relationship

D) All of these

29. Which of the following is true?

A) SRAM is faster than DRAM

B) DRAM is faster than SRAM

C) Both SRAM and DRAM have equal speed

D) None of these

30. Process P1 needs 50 frames and Process P2 needs 100 frames and there are only 70 frames available? Then how many frames will be allocated to the process P1 and P2?

A) 41, 58 B) 45, 39 C) 23, 46 D) None of these

31. The number of elements in the power set of (A U B), where A = {2, 3, 5, 7} and B = {2, 5, 8, 9} are

A) 256 B) 64 C) 16 D) 4

32. Let T(n) be the function defined by T(n) = 1 and T(n)= 2T(n/2) $+\sqrt{n}$, which of the following is TRUE ?

A) $T(n) = O(\sqrt{n})$ B) $T(n) = O(\log_2 n)$ C) $T(n) = O(n)$ D) $T(n) = O(n^2)$

33. Which of the following statement is false?

A) Every tree is a bipartite graph

B) A tree contains a cycle

C) A tree with n nodes contain n-1 edges

D) A tree is a connected graph

34. A coin is tossed twice. What is the probability that the head occurs at least once?

A) 4/4 B) 2/4 C) ¾ D) 0

35. Consider a schema R(A, B, C, D) and functional dependencies $A \rightarrow B$ and $C \rightarrow D$. Then the decomposition R1(A, B) and R2(C, D) is

A) Dependency preserving but not lossless join

B) Dependency preserving and lossless join

C) Lossless Join but not dependency preserving

D) Lossless Join

36. Multi- valued dependency among attributes is checked at which level?

A) 2 NF B) 3 NF C) 4 NF D) 5 NF

37. Which of the following is/are example(s) of stateful application layer protocols?

(i) HTTP
(ii) FTP
(iii) TCP
(iv) POP3

A) (i) and(ii)only B) (ii) and(iii)only C) (ii) and(iv)only D) (iv)only

38. Express a period of 100 ms in microseconds,

A) 10^3 μs B) 10^4 μs C) 10^5 μs D) 10^6 μs

39. The maximum window size for data transmission using the selective reject protocol with n-bit frame sequence numbers is

A) 2n B) 2^{n-1} C) 2n-1 D)2^{n-2}

40. A subnet has been assigned a subnet mask of 255.255.255.192. What is the maximum number of hosts that can belong to this subnet?

A) 14 B) 30 C) 62 D) 126

41. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), which one of the First-fit, Best-fit, and Worst-fit algorithms able to place the processes of 212K, 417K, 112K, and 426K (in order) in memory?

A) Both First fit and Best fit B) First fit only
C) Best fit only D) None of these

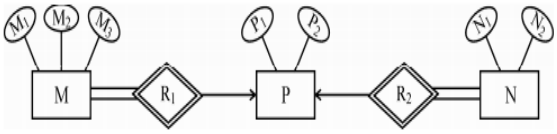
42. Aging is technique used to

A) Increase the priority of processes that are waiting for long time
B) Decrease the priority of processes that are waiting for long time
C) Increase the priority of processes that are currently running
D) Decrease the priority of processes that are currently running

43. Assume transaction A holds a shared lock R. If transaction B also requests for a shared lock on R, it will

A) Result in a deadlock situation B) Immediately be granted
C) Immediately be rejected D) Be granted as soon as it is released

44. Consider the following ER diagram :



The minimum number of tables required to represent M, N, P, R1, R2 is

A) 2 B) 3 C) 4 D) 5

45. A relation R in {1,2,3,4,5,6} is given by {(1,2),(2,3),(3,4),(4,4),(4,5)}. This relation is:

A) Reflexive

B) Symmetric

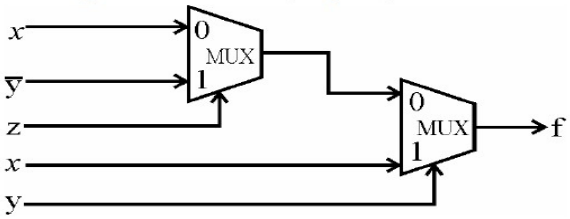
C) Transitive

D) Bot reflexive, not symmetric and not transitive

46. A Boolean function F is called self-dual if and only if $F(x_1,x_2,\ldots x_n)= F(x_1',x_2',\ldots x_n')$. How many Boolean functions of degree n are self-dual ?

A) 2^n B) $(2)^{2^n}$ C) $(2)^{n^2}$ D) $(2)^{2^{n-1}}$

47. Consider the circuit given below and find the output function f(x, y, z).



(A) $x\bar{z} + xy + \bar{y}z$

(B) $x\bar{z} + xy + \bar{y}\,\bar{z}$

(C) $xz + xy + \bar{y}\,\bar{z}$

(D) $xz + x\bar{y} + \bar{y}z$

48. Which one is the characteristic equation of JK flip flop?

A) Q(t+1) = J'Q+K'Q B) Q(t+1) = JQ+K'Q'

C) Q(t+1) = KQ'+JK D) None of these

49. The amount of ROM needed to implement a 4 bit multiplier is

A) 64 bits B) 128 bits C) 1k bits D) 2k bits

50. The processing speeds of pipeline segments are usually :

A) Equal B) Unequal C) Greater D) None of these

x-x-x

Mechanical Engineering (1068)

1. A planar closed kinematic chain is formed with rigid links PQ = 2.0m, QR = 3.0m, RS = 2.5m and SP = 2.7m with all revolute joints. The link to be fixed to obtain a double rocker (rocker-rocker) mechanism is

A) PQ B) QR C) RS D) SP

2. In a cantilever, the bending moment is maximum at the

A) Free end B) Mid span C) Fixed end D) None of these

3. A shaft is subjected to torsion when

A) Torque is applied at its one end

B) Equal torques are applied at its two ends

C) Equal and opposite torques applied at its two ends

D) None of these

4. Which one of the following welding processes uses non consumable electrode

A) Gas metal arc welding B) Submerged arc welding

C) Gas Tungsten arc welding D) Flux coated arc welding

5. If a bar of length, *l*, cross-sectional area, *A*, weighing, *W* is fixed vertically at its upper end, its elongation is equal to

A) $\frac{Wl}{2AE}$ B) $\frac{Wl}{AE}$ C) $\frac{2AE}{2Wl}$ D) $\frac{AE}{Wl}$

6. A flywheel connected to a punching machine has to supply energy of 400 Nm while running at a mean angular speed of 20radians/s. If the total fluctuation of speed is not to exceed ±2%, the mass moment of inertia of the flywheel in kg-m^2 is

A) 25 B) 50 C) 100 D) 125

7. In involute gears, the pressure angle

A) Dependent on the size of teeth B) Dependent on the size of gears

C) Always constant D) Always variable

8. In orthographic projections, the rays are assumed to

A) Diverge from station point B) Converge from station point

C) Be parallel D) None of these

9. The mean kinetic energy of a flywheel is equal to

A) $I\omega^2$ B) $\frac{I\omega^2}{2g}$ C) $\frac{I\omega^2}{2}$ D) $\frac{I\omega^2}{4}$

10. A metric thread of pitch 2mm and thread angle 60º is inspected for its pitch diameter using 3-wire method. The diameter of the best size wire in mm is

A) 0.86 B) 1.0 C) 1.15 D) 2.0

11. Which is closest to the purest form of the iron

A) Cast Iron B) Wrought Iron C) Pig Iron D) Steel

12. For same compression ratio and for same heat added

A) Otto cycle is more efficient than Diesel cycle

B) Diesel cycle is more efficient than Otto cycle

C) Efficiency depends on other factors

D) Both Otto and Diesel cycles are equally efficient

13. The efficiency of Diesel cycle with decrease in cut off

A) Increases B) Decreases

C) Remains unaffected D) First increases and then decreases

14. A small rocket having a specific impulse of 200 s produces a total thrust of 98kN, out of which 10 kN is the pressure thrust. Considering the acceleration due to gravity to be 9.8m /s^2, the propellant mass flow rate in kg/s is

A) 55.1 B) 44.9 C) 50 D) 60.2

15. BHP of an engine is determined by a formula

A) $\frac{2\Pi NT}{4500}$ B) $\frac{4\Pi NT}{4500}$ C) $\frac{\Pi NT}{4500}$ D) $\frac{2\Pi RNT}{4500}$

16. The method of joining metal surface by introducing a non ferrous alloy with melting point above 400 ^{0}C is known as

A) Soldering B) Brazing C) Welding D) None of these

17. Turbo propeller has the following additional feature over the turbojet

A) Propeller B) Diffuser

C) intercooler D) Turbine and combustion chamber

18. According to Prevost theory of heat exchange

A) It is impossible to transfer heat from low temperature source to t high temperature source

B) Heat transfer by radiation requires no medium

C) All bodies above absolute zero emit radiation

D) Heat transfer in most of the cases takes place by combination of conduction, convection and radiation

19. Emissivity of a white polished body in comparison to a black body is

A) Higher B) Lower

C) Same D) Depends upon the shape of body

20. In heat exchangers, degree of approach is defined as the difference between temperatures of

A) Cold water inlet and outlet

B) Hot medium inlet and outlet

C) Hot medium outlet and cold water inlet

D) Hot medium outlet and cold water outlet

21. In terms of theoretical stress concentration factor (Kt) and fatigue stress concentration factor (Kf), the notch sensitivity 'q' is expressed as

A) (Kf -1) (Kt -1) B) (Kf -1) (Kt +1)

C) (Kt -1) (Kf -1) D) (Kf +1) (Kt +1)

22. Routing prescribes the

A) Flow of material in the plant B) Proper utilization of man power

C) Proper utilization of machines D) Inspection of final product

23. PERT has following time estimate

A) One time estimate B) Two time estimate

C) Three time estimate D) Four time estimate

24. The type of threads used to transmit power in one direction only is

A) Acme B) Trapezoidal C) Buttress D) V thread

25. If the body is at thermal equilibrium, then the

A) Emissivity = absorptivity B) Emissivity > absorptivity

C) Emissivity < absorptivity D) None of these

26. Cost reduction

A) Is carried out by top management

B) Is carried out by workers

C) Involves slightly lower quality of the product

D) Starts with product design

27. It is desired to measure the Young's modulus and the Poisson's ratio of a given homogeneous, isotropic material. A bar of length 20cm and square cross section 10mm x 10 mm mm of this material is subjected to a tensile load of 40kN. Under this load, length increases to 20.1 cm while the cross-section reduces to 9.98mm x 9. 98mm. Young's modulus and Poisson's ratio of the material are:

A) 80 GPa and 0.4 respectively B) 40 GPa and –0.4 respectively

C) 80 GPa and –0.2 respectively D) 40 GPa and 0.2 respectively

28. Environment friendly refrigerant R134 is used in the new generation domestic refrigerators. Its chemical formula is

A) $CHClF_2$ B) $C_2Cl_3F_3$ C) $C_2Cl_2F_4$ D) $C_2H_2F_4$

29. The dry bulb temperature lines of psychrometric chart are

A) Vertical B) Horizontal C) Inclined D) Curved

30. The working fluid in Bell Coleman cycle is

A) Freon-12 B) Carbon dioxide C) Ammonia D) Air

31. The efficiency of an ideal machine is

A) $Mechanical \quad Advantage \times Velocity \quad Ratio$ B) $\frac{Mechanical \quad Advantage}{Velocity \quad Ratio}$

C) $\frac{Velocity \quad Ratio}{Mechanical \quad Advantage}$ D) $1 + \frac{Mechanical \quad Advantage}{Velocity \quad Ratio}$

32. If mercury in a barometer is replaced by water, the height of 3.75 cm of mercury will be following cm of water

A) 51 cm B) 50 cm C) 52 cm D) 52.2 cm

33. The resultant upward pressure of a fluid on a floating body is equal to the weight of the fluid displaced by the body. This definition is according to

A) Buoyancy

B) Equilibrium of a floating body

C) Archimedes' principle

D) Bernoulli's theorem

34. The fins on the condenser tubes will be useful, if the Biot number is

A) Less than one B) Equal to one

C) More than one D) None of these

35. In a spring mass system, the mass of the system is made half and the spring stiffness is doubled. The natural frequency of longitudinal vibrations

A) Is halved B) Is doubled C) Is quadrupled D) Remains unaffected

36. A shaft is rotating at a speed less than the critical speed. The phase difference between displacement and centrifugal force would be

A) 0^0 B) 45^0 C) 90^0 D) 180^0

37. A vibrating machine is isolated from the floor using springs. If the ratio of excitation frequency of vibration of machine to the natural frequency of the isolation system is equal to 0.5, then transmissibility ratio of isolation is

A) 1/2 B) 3/4 C) 4/3 D) 2

38. The ratios of the laminar hydrodynamic boundary layer thickness to thermal boundary layer thickness of flows of two fluids P and Q on a flat plate are ½ and 2 respectively. The Reynolds number based on the plate length for both the flows is 10^4. The Prandtl and Nusselt numbers for P are 1/8 and 35 respectively. The Prandtl and Nusselt numbers for Q are respectively

A) 8 and 140 B) 8 and 70 C) 4 and 40 D) 4 and 35

39. The meaning of 'Payoffs' in Game Theory is

A) Outcome of a game when different alternatives are adopted by players

B) No. of players involved in a game

C) Value of a game

D) Strategies used by players

40. The North West Corner rule

A) Is used to find an initial feasible solution

B) Is used to find an optimal solution

C) Is based on the concept of minimizing opportunity cost

D) None of these

41. The boundary conditions for a rod with circular cross-section, under torsional vibration, are changed from fixed-free to fixed-fixed. The fundamental natural frequency of the fixed-fixed rod is k times that of fixed-free rod. The value of k is

A) 1.5 B) p C) 2.0 D) 0.5

42. The ratios of the laminar hydrodynamic boundary layer thickness to thermal boundary layer thickness of flows of two fluids P and Q on a flat plate are ½ and 2 respectively. The Reynolds number based on the plate length for both the flows is 10^4. The Prandtl and Nusselt numbers for P are 1/8 and 35 respectively. The Prandtl and Nusselt numbers for Q are respectively

A) 8 and 140 B) 8 and 70 C) 4 and 70 D) 4 and 35

43. The clearance angle is provided on the tools with a view to

A) Strength the tool

B) Shear off the metal

C) Facilitate easy flow of chips

D) Prevent the tool from rubbing on workpiece

44. On a lathe machine, the spindle speed is lowest during

A) Taper turning B) Threading C) Parting off D) Knurling

45. The stream function for a two dimensional flow is given by $\psi = 2xy$ + constant, The flow between stream lines at (1, 1) and (2, 2) would be

A) 3 units B) 5 units C) 6 units D) 10 units

46. The values of enthalpy of steam at the inlet and outlet of a steam turbine in a Rankine cycle are 2800kJ/kg and 1800kJ/kg respectively. Neglecting pump work, the specific steam consumption in kg/kW-hour is

A) 3.60 B) 0.36 C) 0.06 D) 0.01

47. The capacity of a refrigerator is expressed in

A) Tons of refrigeration

B) Term of lowest temperature attained

C) Term of weight of the machine

D) Term of the volume of a space to be cooled

48. A column has a rectangular cross-section of 10mm x 20mm and a length of 1m. The slenderness ratio of the column is close to

A) 200 B) 346 C) 477 D) 1000

49. The kinetic energy of a body is stated to increase by 300 percent. The corresponding increase in momentum of the body will be

A) 50 B) 100 C) 200 D) 300 percent

50. When a rectangular beam is loaded transversely, the maximum tensile stress is developed on the

A) Top layer B) Bottom layer C) Neutral axis D) Every cross-section

x-x-x