Examination: **M.Tech. Environmental Engineering and Management**

Section 1 - Section 1

Question No.1 4.00

Bookmark

Whenever a system in equilibrium is disturbed the system will adjust itself in such a way that the effect of the change will be reduced or moderated. Who proposed this principle?

- Gibbs
- Le Chatelier
- Lowry
- Newton

Question No.2 4.00

Bookmark

Which of the following is used in the treatment of lead poisoning?

- EBT
- Zeise salt
- Cis platin
- EDTA

Question No.3 4.00

Bookmark

Montreal protocol is related to

- Ozone layer depletion
- Sustainable development
- Food security
- Global warming

Question No.4 4.00

Bookmark

Calculate $\lim x \rightarrow 1[(x^x - 1) / (x\log(x))]$ a) e^e

- 1
- 2
- 0
- -1

Question No.5 4.00

Bookmark

Choose the best antonym of the italicized word.
The task assigned to him was *arduous.*

- plain
- good
- easy
- absorbing

Question No.6 4.00

Bookmark

A right circular cone has a height of 40 cm and its semi vertical angle is 45^o, then its base circle radius is

- 80 cm
- 60 cm
- 20 cm
- 40 cm

Question No.7 4.00

Bookmark

Correct the error in the italicized part of the sentence by choosing the most appropriate option.
Whenever the two sisters *go out for shopping,* they take their pet dog with them.

- go out to shopping
- go out shopping
- go out on shopping
- go out of shopping

Question No.8 4.00

Bookmark

These poultry belong to Mr. Kishen, our new neighbor
The underlined word is a _____noun.

- proper
- collective
- common
- abstract

Question No.9 4.00

Bookmark

The organisms such as *Alexandrium fundyense , Alexandrium catenella , Karenia brevis* are all algal groups which could spread or be carried long distances by winds, currents, storms, or ships and they result in a phenomenon called as.

- Red tides
- Green waves
- Blue tides
- Oligotrophic lakes

Question No.10 4.00

Bookmark

The curve which represents the reduction in dissolved oxygen and the increase in biological oxygen demand in an aquatic ecosystem due to industrial effluent discharge is called as.

- BOD curve
- Oxygen sag curve
- Logarithmic curve
- Oxygenation curve

Question No.11 4.00

Bookmark

Identify the adverb in the following sentence:
We looked upwards and saw a bright shooting star

- shooting
- looked
- upwards
- bright

Question No.12 4.00

Bookmark

The Minamata Convention is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of a heavy metal namely -

- Iron
- Mercury
- Lead
- Chromium

Question No.13 4.00

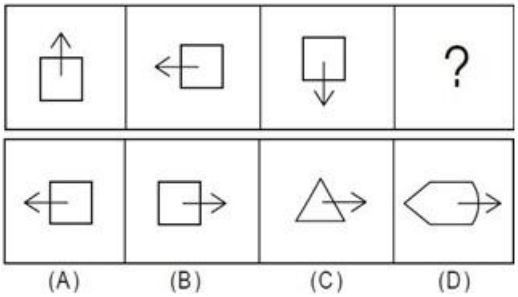
Bookmark

Rusting of iron in sea water is

- Slower due to the absence of electrolyte in sea water
- Slower due to the presence of electrolyte in sea water
- Rapid due to the presence of electrolyte in sea water
- Rapid due to the absence of electrolyte in sea water

Question No.14 4.00

Bookmark



- C
- B
- D
- A

Question No.15 4.00

Bookmark

Due to _____, the subways were closed all morning.

- its flooding
- floods
- are flooded
- flood

Question No.16 4.00

Bookmark

Following are the fundamental forces from which all other forces are derived

- Electromagnetic, physical and chemical
- Nuclear, gravitational and chemical
- Nuclear, gravitational and physical
- Electromagnetic, nuclear and gravitational

Question No.17 4.00

Bookmark

If a particle is moving in uniform circular motion, which of the following is true?

- $v = \omega r^2$
- There is no tangential acceleration
- Speed is not constant
- Velocity is constant

Question No.18 4.00

Bookmark

Which of the following is not a thermometer?

- Thermotube
- Thermocouple
- Thermistor
- Radiation thermometer

Question No.19 4.00

Bookmark

If $\tan\tau + ab\cot\tau = a + b$ then $\tan\tau =$

- a
- $\pi/4$
- b
- a or b

Question No.20 4.00

Bookmark

India's maiden Ocean Thermal Energy Conversion (OTEC) project planned for India to be executed by 2019, off the south-western coast after almost three and a half decades of initial plans.The place proposed for the same is

- Kavaratti,Lakshadweep
- Nicobar
- Cochin
- Andaman

Question No.21 4.00

Bookmark

Maximum potential is produced in a voltaic cell, when the two metals connected have

- Same standard reduction potential values
- Different standard reduction potential values
- Lesser difference in standard reduction potential values
- Greater difference in standard reduction potential values

Question No.22 4.00

Bookmark

Calculate the electronic polarizability of an argon atom whose εr = 1.0024 at NTP and N = 2.7×10^{25} atoms/m^3.

- $6.1\text{x}10^{40}Fm^2$
- $8.7\text{x}10^{40}Fm^2$
- $5.2\text{x}10^{40}Fm^2$
- $7.87\text{x}10^{40}Fm^2$

Question No.23 4.00

Bookmark

can posses a non-trivial solution then λ =

- 6
- 3
- 2
- 1

Question No.24 4.00

Bookmark

The mother gripped her child's arm_____ he be trampled.

- lest
- if not
- if
- unless

Question No.25 4.00

Bookmark

The enthalpy of formation of compounds A, B, C and D are -90, +25, +10, - 26 kJ/mol respectively.
The increasing order of stability of compounds is

- C < B < D < A
- A < D < C < B
- A < D < B < C
- B < C < D < A

Question No.26 4.00

Bookmark

Bristle : Brush

- Art: Sculpture
- Arm : Leg
- Stage: Chairs
- Key: Piano

Question No.27 4.00

Bookmark

Given the following entropy values (Al_2O_3 is 51.00; Al(s) is 28.32; $H_2O(g)$ is 188.7; $H_2(g)$ is 130.6), determine dS for the reaction:$Al_2O_3(s) + 3H_2(g) \rightarrow 2Al(s) + 3H_2O(g)$

- 179.9K
- 17.99J/K
- 179.9J/K
- 179.9J

Question No.28 4.00

Bookmark

Find lt $(x,y,z,w) \rightarrow (0,0,0,0)$ $x^{-6}.y^{2}.(z.w)^{3}/x+y^{2}+z-w$

- ∞
- Does Not Exist
- 900
- 0

Question No.29 4.00

Bookmark

The probability that at least one of the events M and N occur is 0.6. If M and N have probability of occurring together as 0.2, then P(~M) + P(~N) is

- 3
- 1.2
- 2
- 1

Question No.30 4.00

Bookmark

Find the area of a function $f(x) = x^2 + xCos(x)$ from x = 0 to a, where , a>0

- $a^3/_3 + Cos(a) + Sin(a) - 1$
- $a^3/_3 + aSin(a) + Cos(a)$
- $a^3/_3 + aSin(a) + Cos(a) - 1$
- $a^2/_2 + aSin(a) + Cos(a) - 1$

Question No.31 4.00

Bookmark

The graph in the xy plane represented by $x = 3 + 2 \sin t$ and $y = 2 \cos t - 1$, for $-\pi \leq t \leq \pi$ is

- half of an ellipse
- a semicircle
- a circle
- an ellipse

Question No.32 4.00

Bookmark

A hose lying on the ground has water coming out of it at a speed of 5.4 meters per second. You lift the nozzle of the hose to a height of 1.3 meters above the ground. At what speed does the water now come out of the hose?

- 1.0m/s
- 0.6m/s
- 1.9m/s
- 0.9m/s

Question No.33 4.00

Bookmark

When gas expands into vacuum,

- Work is done on the gas
- No work is done
- Work is done by the gas
- Work done by the gas is maximum

Question No.34 4.00

Bookmark

On the interval $1 < x < 2$, f(x)equals

- -x-2
- -x-4
- -x+2
- -x-3

Question No.35 4.00

Bookmark

How is charge carriers produced in intrinsic semiconductors?

- By impure atoms
- By holes
- By electrons
- By pure atoms

Question No.36 4.00

Bookmark

Rachel Carson's book, first published in 1962, alerted readers to how the widespread use of chemical pesticides was posing a serious threat to public health and leading to the destruction of wildlife. The title of the book is

- Population bomb
- Desert Solitaire
- The end of nature
- Silent Spring

Question No.37 4.00

Bookmark

Reduction in fluid pressure that results when a fluid flows through a constricted section of a pipe

- Viscosity effect
- Venturi effect
- Bernoulli effect
- Pascal effect

Question No.38 4.00

Bookmark

Based on the information given, answer the below question.
1. A,B,C,D,E and F are travelling in a bus.
2. There are two reporters, two mechanics, one photographer and one writer in the group.
3. Photographer A is married to D who is a reporter.
4. The writer is married to B who is of the same profession as that of F.
5. A,B,C,D are two married couples and no one in this belong to the same profession.
6. F is the brother of C.

Which of the following is the pair of reporters?

- DE
- Cannot be determined
- DF
- AE

Question No.39 4.00

Bookmark

The internal energy of an ideal gas does not change if volume and pressure change, but does change if temperature changes.

- Bernoulli's second law
- Bernoulli's first law
- Joule's first law
- Joule's second law

Question No.40 4.00

Bookmark

X is twice as good a workman as Y and together they finish a piece of work in 18 days. In how many days will X alone finish the work?

- 26
- 28
- 27
- 25

Question No.41 4.00

Bookmark

If a 2.34 g substance at 22^{o}C with a specific heat of 3.88 cal/g-^{o}C is heated with 124 cal of energy, what is the new temperature of the substance?

- 3.57^{o}C
- 30.7^{o}C
- 25.7^{o}C
- 35.7^{o}C

Question No.42 4.00

Bookmark

An organic compound (A) with molecular formula $C_8H_{16}O_2$ was hydrolyzed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of C with chromic acid also produced B. On dehydration, C gives but-2-ene. What is A?

- Alcohol
- Ketone
- Ester
- Ether

Question No.43 4.00

Bookmark

Assertion: Crude oil is abundantly found in nature

Reason: It is the main raw material for all automobiles

- Both A and R are true and R is the correct explanation of A
- Both A and R are true and R is not the correct explanation of A
- A is false but R is true
- A is true but R is false

Question No.44 4.00

Bookmark

If length of an arc is 52 cm and θ is 45^o, radius should be

- 56cm
- 55cm
- 60cm
- 66.21cm

Question No.45 4.00

Bookmark

Study the following information carefully and answer the question below it:

Aasha, Bhuvnesh,Charan, Danesh, Ekta, Farhan, Ganesh and Himesh are sitting around a circle, facing the centre. Aasha sits fourth to the right of Himesh while second to the left of Farhan. Charan is not the neighbour of Farhan and Bhuvnesh. Danesh sits third to the right of Charan. Himesh never sits next to Ganesh.

Who is to the immediate left of Aasha?

- Bhuvnesh
- Aasha
- Charan
- Ganesh

Question No.46 4.00

Bookmark

For the function $f(x) = \sin(x)/x^2$ How many points exist in the interval $[0, 7\pi]$ Such that $f'(c) = 0$

- 8
- 5
- 7
- 6

Question No.47 4.00

Bookmark

Which one of the following soil is the least porous?

- peaty
- silty
- loamy
- clayey

Question No.48 4.00

Bookmark

Consider the vertical cone. The minimum value of the function in the region f(x,y) = c is

- 1
- 0
- -1
- Constant

Question No.49 4.00

Bookmark

Surface tension of sea water is --------- that of fresh water.

- Equal to
- Lesser than
- Higher than
- Not related to

Question No.50 4.00

Bookmark

Which of the following solution is an example for acidic buffer

- Ammonium hydroxide and ammonium chloride
- Ammonia and ammonium chloride
- Ethanoic acid and sodium ethanoate
- Ethanoic acid and hydrochloric acid

Question No.51 4.00

Bookmark

Which of the following mentioned standard Probability density functions is applicable to discrete Random Variables ?

- Rayleigh Distribution
- Poisson distribution
- Gaussion Distribution
- Exponential Distribution

Question No.52 4.00

Bookmark

Study the following information carefully and answer the question below it

(i) There is a group of five persons- A, B, C, D and E
(ii) One of them is manual scavenger, one is sweeper, one is watchman, one is human scarecrow and one is grave-digger
(iii) Three of them – A, C and grave-digger prefer tea to coffee and two of them – B and the watchman prefer coffee to tea
(iv) The human scarecrow and D and A are friends to one another but two of these prefer coffee to tea.
(v) The manual scavenger is C's brother

Which of the above statements is unnecessary?

- (ii)
- (iv)
- (iii)
- Nill

Question No.53 4.00

Bookmark

If 50 joules of energy is supplied in 5 seconds, the power produced is

- 1 Watt
- 25 Watts
- 5 Watts
- 10 Watts

Question No.54 4.00

Bookmark

The law which is an explicit formula for the solution of a system of linear equations with as many equations as unknowns, valid whenever the system has a unique solution is termed as

- Associative law
- Commutative law
- Distributive law
- Cramer's rule / law

Question No.55 4.00

Bookmark

Value of $\lim_{x \to 0}(1+\mathrm{Sin}(x))^{\mathrm{Cosec}(x)}$

- -1
- 0
- 1
- e

Question No.56 4.00

Bookmark

Which of the following is not an aminoacid?

- Serine
- Aspartic acid
- Proline
- Terephthalic acid

Question No.57 4.00

Bookmark ☐

What will happen to the rate of an Exothermic reaction when the temperature is decreased?

- increases
- decreases
- No change
- None of the above

Question No.58 4.00

Bookmark ☐

$\tan^{-1}(\tan 4) - \tan^{-1}(\tan(-6)) + \cos^{-1}(\cos 10) =$

- 16
- π
- $5\pi-12$
- $-\pi$

Question No.59 4.00

Bookmark ☐

The acronym CSR stands for

- Corporate Social Reality
- Corporate Sensitive Reliability
- Corporate Search and Rescue
- Corporate Social Responsibility

Question No.60 4.00

Bookmark ☐

Which solid will precipitate first if an aqueous solution of Na_2CrO_4 at 25^oC is slowly added to an aqueous solution containing 0.001 M $Pb(NO_3)_2$ and 0.100 M $Ba(NO_3)_2$ at 25^oC?

- $NaNO_3$
- $PbCrO_4$
- $BaCrO_4$
- $Pb(NO_3)_2$

Question No.61 4.00

Bookmark ☐

Anand is heavier than Gopal.Mohan is lighter than Jagan.Pandian is heavier than Jagan but lighter than Gopal. Who is the heaviest of all ?

- Jagan
- Pandian
- Anand
- Gopal

Question No.62 4.00

Bookmark ☐

A gardener pushes a lawn roller through a distance of 20m. If he applies a force of 20kg weight in a direction inclined at 60^o to the ground, find the work done by him. (g=9.8m/s^2)

- 1960 joules
- 19 joules
- 160 joules
- 196 joules

Question No.63 4.00

Bookmark ☐

Choose the missing term: SHG, RIF, QJE, PKD, ?

- NMD
- MLB
- OLC
- OLD

Question No.64 4.00

Bookmark ☐

A theorem in fluid dynamics relating the speed of fluid flowing out of an orifice to the height of fluid above the opening

- Torricelli theorem
- Bernoulli theorem
- Pascal theorem
- Archimedes theorem

Question No.65 4.00

Bookmark ☐

Study the following information carefully and answer the question below it

The Director of an MBA college has decided that six guest lectures on the topics of Motivation, Decision Making, Quality Circle, Assessment Centre, Leadership and Group Discussion are to be organised on each day from Monday to Sunday.
(i) One day there will be no lecture (Saturday is not that day), just before that day Group Discussion will be organised.
(ii) Motivation should be organised immediately after Assessment Centre.
(iii) Quality Circle should be organised on Wednesday and should not be followed by Group Discussion
(iv) Decision Making should be organised on Friday and there should be a gap of two days between Leadership and Group Discussion

Which of the pairs of lectures were organised on first and last day?

- Quality Circle and Motivation
- Group Discussion and Quality Circle
- Group Discussion and Decision Making
- None of these

Question No.66 4.00

Bookmark ☐

For a reaction A + B → Product, the rate law is given by $r = K [A]^{1/2} [B]^2$. What is the order of the reaction?

- 1
- 2.5
- 1.5
- 2

Question No.67 4.00

Bookmark ☐

The third international conference on sustainable development aimed at reconciling the economic and environmental goals of the global community.This conference is called as

- Earth Summit 2012
- Kyoto meet
- Montreal meet
- IPCC

Question No.68 4.00

Bookmark ☐

As per Earth system research laboratory's report of March 2018, the global CO_2 level in the atmosphere has passed about

- 600ppm
- 300 ppm
- 400ppm
- 200ppm

Question No.69 4.00

Bookmark ☐

The process that uses electric current to reduce the dissolved metal cations so that they form a thin coherent metal coating on an electrode is called as.

- reduction
- Coating
- Deposition
- Electroplating

Question No.70 4.00

Bookmark ☐

Liquid water at 100^{o}c and 1 bar has an internal energy(on an arbitrary scale) at 460KJ/Kg and a specific volume of 1.044 cm^3/g. Calculate the enthalpy.

- 406.1044
- 46.01044
- 460.1044
- 40610.44

Question No.71 4.00

Bookmark

The clouds in the winter polar stratosphere at altitudes of 15,000–25,000 meters (49,000–82,000 ft) which are best observed during civil twilight when the sun is between 1 and 6 degrees below the horizon as well as in winter and in more northerly latitudes which are implicated in the formation of ozone holes are called

- cirrostratus
- cirrus
- cirrocumulus
- nacreous clouds

Question No.72 4.00

Bookmark

A 2 kg ball on a string is rotated about a circle of radius 10 m. The maximum tension allowed in the string is 50 N. What is the maximum speed of the ball?

- 15.4 m/s
- 13.8 m/s
- 12.8 m/s
- 15.8 m/s

Question No.73 4.00

Bookmark

If the system of equations $x + ky + 3z = 0$, $3x + ky - 2z = 0$, $2x + 3y - 4z = 0$ has non-trivial solution, then $xy/z^2 =$

- -5/6
- 5/6
- 6/5
- -6/5

Question No.74 4.00

Bookmark

The increase in internal energy of a system is equal to the work done in the system. Which process does the system undergo?

- adiabatic
- Isobaric
- Isothermal
- Isochoric

Question No.75 4.00

Bookmark

A solution of $CuSO_4$ is electrolyzed for 600 s with a current of 1.5 A. The mass of Cu deposited at the cathode is

- 2.938 g
- 2.938 mg
- 0.2938 g
- 0.2938 mg

Question No.76 4.00

Bookmark

The outer ends of two bars A and B are at $100^{o}C$ and 50^{o} respectively. Calculate the temperature at the welded joint if they have the same cross-section and the same length and their thermal conductivities are in the ratio of A:B = 7:5

- $78.166^{o}C$
- $79.166^{o}C$
- $89.166^{o}C$
- $77.166^{o}C$

Question No.77 4.00

Bookmark

The equations x + 2y + 3z = 1, 2x + y + 3z = 2, 5x + 5y + 9z = 4 have

- No solution
- Unique solution
- Infinity solutions
- Cannot say anything

Question No.78 4.00

Bookmark

The rate constant unit of a zero order reaction is

- $Mol\,l^{-1}\,s^{-1}$
- s^{-1}
- $Mol^{-1}\,s^{-1}$
- $Mol^{-1}\,l\,s^{-1}$

Question No.79 4.00

Bookmark

The by-product in the working of the Hydrogen-oxygen fuel cell is

- ethanol
- methanol
- Water
- CO_2

Question No.80 4.00

Bookmark

The temperature at which a real gas obeys the ideal gas laws at fairly wide range of pressure is called as

- Critical temperature
- Boyle's temperature
- Inversion temperature
- Constant temperature

Question No.81 4.00

Bookmark

How many points of discontinuity does f '(x) have on the interval -6 < x < 7?

- 3
- 5
- 2
- 4

Question No.82 4.00

Bookmark

The maximum lift provided by a 700 kg airplane is 10000 N. If the plane travels at 100 m/s, what is its shortest possible turning radius?

- 700
- 600
- 70
- 7000

Question No.83 4.00

Bookmark

The organisms which may benefit from higher CO_2 conditions in the ocean, as they require CO_2 to live just like plants on land are namely.

- oysters, clams
- deep sea corals, and calcareous plankton
- sea urchins, shallow water corals
- Photosynthetic algae and seagrasses

Question No.84 4.00

Bookmark

Choose the best synonym of the italicized word.
Reena has an *insatiable* love for music.

- unchanging
- unquenchable
- undesirable
- irreconcilable

Question No.85 4.00

Bookmark

Which of the following are used in food preservation?

- Ethanoic acid and methanoic acid
- Sodium benzoate and ethanoic acid
- Acetic acid and benzoic acid
- Sodium benzoate and methanoic acid

Question No.86 4.00

Bookmark

The Navier–Stokes equations form a vector continuity equation describing the conservation of

- Angular velocity
- Linear velocity
- Linear momentum
- Angular momentum

Question No.87 4.00

Bookmark

As a country, the United States is _____ that there are five time zones.

- too big
- very big
- much big
- so big

Question No.88 4.00

Bookmark

To how many places is the symmetric difference accurate when it is used to approximate f ' (0) for f (x) = 4' and h = 0.08?

- 4
- 2
- 1
- 3

Question No.89 4.00

Bookmark

The maximum number of points into which 4 circles and 4 straight lines intersect is

- 56
- 26
- 72
- 50

Question No.90 4.00

Bookmark

A gas occupies one litre under atmospheric pressure. What will be the volume of the same amount of gas under 730 mm of Hg at the same temperature?

- 141.1L
- 141.1mL
- 1041.1L
- 1041.1mL

Question No.91 4.00

Bookmark

Alpha diversity means

- Genetic diversity
- Species diversity
- Diversity among plants
- Community and ecosystem diversity

Question No.92 4.00

Bookmark

$\sin^{-1}(\sin 10)$ is

- $10-3\pi$
- $3\pi-10$
- $2\pi-10$
- 10

Question No.93 4.00

Bookmark

Species are classified by the IUCN Red List into nine groups. As per this classification, CR refers to

- Known only to survive in captivity
- Extremely high risk of extinction in the wild
- Likely to become endangered in the near future
- High risk of endangerment in the wild

Question No.94 4.00

Bookmark

What is the n-factor of H_3PO_3?

- 3
- 2
- -1
- 0

Question No.95 4.00

Bookmark

Under sub-adiabatic conditions (ELR < ALR), there exists limited vertical mixing and environment is slightly stable, the plume which is not suitable for dispersion of pollutants. Such plume is called as

- Coning plume
- Fanning plume
- Looping plume
- Neutral plume

Question No.96 4.00

Bookmark

Which of the following is not an effect of electric current?

- Physical effect
- Heating effect
- Magnetic effect
- Chemical effect

Question No.97 4.00

Bookmark

If Milk is water, water is sugar, sugar is road, road is sky and sky is track where do aeroplanes fly?

- Sky
- Road
- Sugar
- Milk

Question No.98 4.00

Bookmark

In the following question, the first two words (given in italics) have a definite relationship. Choose one word out of the given four alternatives which will fill the blank space and showthe same relationship with the third word as between the first two.

Truthfulness is to *Liar* as *Loyalty* is to ……?…….

- Falsehood
- Traitor
- Worker
- Devotion

Question No.99 4.00

Bookmark

Find the standard Gibbs energy change for the reaction

$$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$$

The ΔG_f° values for the three components of this reaction system are $CaCO_3(s)$: $-1128\ kJ\ mol^{-1}$, $CaO(s)$: $-603.5\ kJ\ mol^{-1}$, $CO_2(g)$: $-137.2\ kJ\ mol^{-1}$.

- 300.3KJ mol^{-1}
- 387.3KJ mol^{-1}
- 87.3KJ mol^{-1}
- 307.3KJ mol^{-1}

Question No.100 4.00

Bookmark

Angles between 0^o and 90^o lies in

- 2nd quadrant
- 3rd quadrant
- 4th quadrant
- 1st quadrant