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Grade 50.00 out of 60.00 (83%)

Question 1

Complete

Mark 1.00 out of 1.00

Which are the two wastes that do not have management guidelines / rules in India at present ?

Select one:

- ☒ waste solar panels and agro-wastes
- ☐ waste solar panel and construction and demolition wastes
- ☐ scrap automobiles and e-waste
- ☐ fly ash and agro-wastes

The correct answer is: waste solar panels and agro-wastes

Question 2

Complete

Mark 1.00 out of 1.00

The bulk density of the raw mixed MSW of Indian cities is about -----

Select one:

- ☐ 50 to 100 kg/m³
- ☐ 500 to 700 kg/m³
- ☒ 150 to 300 kg/m³
- ☐ 300 to 500 kg/m³

The correct answer is: 150 to 300 kg/m³

Question 3

Complete

Mark 1.00 out of 1.00

The main strategy to reduce the formation of dioxins and furans in a MSW incineration plant is

Select one:

- ☐ avoid burning of plastics like HDPE & LDPE
- ☐ avoid burning of plastics like polystyrene and polypropylene
- ☐ avoid very high furnace temperature
- ☒ avoid burning of chlorinated plastics

The correct answer is: avoid burning of chlorinated plastics

Question 4

Complete

Mark 1.00 out of 1.00

As per the Solid Wastes Management Rules 2016, the biodegradable matter (wet waste) should be

Select one:

- ☐ treated by composting or vermi-composting only
- ☐ treated by bioprocessing preferably in centralized facilities
- ☒ treated by bioprocessing preferably in a decentralized facilities
- ☐ never mixed with the components for incineration

The correct answer is: treated by bioprocessing preferably in a decentralized facilities

Question 5

Complete

Mark 1.00 out of 1.00

Since the implementation of the Solid waste management rules of 2016, various processing technologies became -

Select one:

- ☐ more affordable to the municipalities/corporations
- ☐ more difficult to choose due to the segregation requirements
- ☒ complimentary to one another
- ☐ readily available for the treatment of MSW

The correct answer is: complimentary to one another

Question 6

Complete

Mark 1.00 out of 1.00

The most suitable species of earthworms for vermi-composting is *Eisenia Foetida* (red worms). This is because -----

Select one:

- ☐ They live much longer than other type of earthworms
- ☒ They have good tolerance to adverse environmental conditions
- ☐ The vermicompost produced will be of superior quality
- ☐ They can feed on all kind of food wastes

The correct answer is: They have good tolerance to adverse environmental conditions

Question 7

Complete

Mark 0.00 out of 1.00

Vermi-composting is usually carried out under a shelter. This is because

Select one:

- ☐ they are highly sensitive to *uv*-radiations / sunlight
- ☒ earthworms may be taken away by birds
- ☐ it takes time to separate the worms from the compost
- ☐ they cannot tolerate high temperature, but can manage low temperatures

The correct answer is: they are highly sensitive to *uv*-radiations / sunlight

Question 8

Complete

Mark 0.00 out of 1.00

In mechanical composting, the Rotating Kiln is rotated -----.

Select one:

- ☐ 2-3 times a second
- ☐ 2-3 times a day
- ☐ 2-3 times an hour
- ☒ 2-3 times a minute

The correct answer is: 2-3 times a day

Question 9

Complete

Mark 1.00 out of 1.00

MSW (of ultimate analysis: C = 35 kg, H = 9 kg, O₂ = 20 kg, S = 2 kg, N = 4 kg and inerts = 10 kg) is being incinerated @ 1200 tons/day. How much is the ash generation from this plant ?

Select one:

- ☐ 120 tons/day
- ☐ 10 tons/day
- ☒ 150 tons/day
- ☐ 96 tons/day

The correct answer is: 150 tons/day

Question 10

Complete

Mark 0.00 out of 1.00

A waste (of ultimate analysis: C = 55%, H = 9 %, O₂ = 30%, S = 2% and N = 4%) is being burnt completely. Following the simple combustion equations ($C + O_2 \rightarrow CO_2$; $H_2 + O \rightarrow H_2O$; $S + O_2 \rightarrow SO_2$, assume all Nitrogen goes out unreacted), estimate how much CO₂ is generated (per kg of this waste) ?

Select one:

- ☒ 201.7
- ☐ 2.02
- ☐ 0.76
- ☐ 24.2

The correct answer is: 2.02

Question 11

Complete

Mark 1.00 out of 1.00

As per the Solid Waste Management Rules of 2016, the used sanitary pads to be wrapped and to be deposited into the -----

Select one:

- ☐ hazardous waste container as used pads can be infectious and dangerous
- ☐ biomedical waste containers as it is actually not MSW
- ☒ dry waste container as it gets emptied every day
- ☐ wet container as the pads become wet due to body fluids

The correct answer is: dry waste container as it gets emptied every day

Question 12

Complete

Mark 1.00 out of 1.00

With the Tanner diagram that is used to demonstrate incinerability of MSW, what is the significance of the extreme left corner point ?

Select one:

- ☐ it represents the 'most incinerable' MSW
- ☒ it corresponds to MSW with 100% inerts and 0% volatiles
- ☐ it corresponds to MSW with 100% water content and 0% inerts
- ☐ it represents the 'just incinerable' MSW

The correct answer is: it corresponds to MSW with 100% inerts and 0% volatiles

Question 13

Complete

Mark 1.00 out of 1.00

With all kind of biological treatment facilities, there is some amount of uncertainty. Why ?

Select one:

- ☒ It is difficult to predict how the living organisms behave in certain environmental conditions
- ☐ The theoretical expressions/equations developed cannot actually capture the biological processes.
- ☐ All the biological reactions are relatively slow and unsteady
- ☐ The availability of food (substrate) is an issue with all types of biological reactors

The correct answer is: It is difficult to predict how the living organisms behave in certain environmental conditions

Question 14

Complete

Mark 0.00 out of 1.00

RDF (refuse derived fuel) has been properly classified now in India into 4 types. This classification is mostly depending on the -----

Select one:

- ☐ ability to burn fast with minimum auxiliary fuel resulting minimum damage to the environment.
- ☐ ability to generate minimum steam as it can cause quenching effect in the furnace.
- ☐ different components present in the original MSW.
- ☒ intended use of the RDF like co-combustion and the storage requirements.

The correct answer is: ability to burn fast with minimum auxiliary fuel resulting minimum damage to the environment.

Question 15

Complete

Mark 0.00 out of
1.00

Out of the 3 T's of good combustion (Turbulence, residence Time and Temperature), Turbulence is supposed to be most crucial in an incineration plant. Why ?

Select one:

- ☒ It is very difficult to achieve high turbulence in the furnace
- ☐ The statement in the question is actually wrong.
- ☐ Turbulence affects the combustion efficiency more than the temperature and residence time.
- ☐ It is difficult to quantify turbulence and hence less control on that parameter

The correct answer is:

It is difficult to quantify turbulence and hence less control on that parameter

Question 16

Complete

Mark 1.00 out of
1.00

Cyclonic separator is an air pollution control equipment used to remove particles. When is that used in a series (multiple cyclones) ?

Select one:

- ☐ When we need to remove particles and acidic gases from the flue gas
- ☐ When we need to remove light particles and heavy particles from the flue gas
- ☒ When we need to remove particles of different sizes from the flue gas
- ☐ When we need to remove aerosol particles and acidic gases from the flue gas

The correct answer is: When we need to remove particles of different sizes from the flue gas

Question 17

Complete

Mark 1.00 out of
1.00

In a MSW incineration facility, wastewater generated from a venturi scrubber can be reused after -----

Select one:

- ☒ Neutralization followed by settling / sedimentation
- ☐ pH adjustments followed by activated sludge process
- ☐ Sedimentation followed by alum treatment
- ☐ any biological treatment process followed by settling / sedimentation

The correct answer is: Neutralization followed by settling / sedimentation

Question 18

Complete

Mark 1.00 out of
1.00

When the Solid waste management rules of 2016 were implemented, 'raw MSW incinerators' became 'Integrated Waste management facilities'. Why ?

Select one:

- ☐ Based on the rules, MSW incinerators are integrated with Biomedical waste incineration (up to only 20% biomedical waste).
- ☐ Based on the rules, MSW incinerators are integrated with hazardous waste incineration (up to only 5%).
- ☐ Now there are separation and treatment facilities taking care of the different types of wastes of a municipality
- ☒ Now there are separation and treatment facilities taking care of the different components of the raw MSW

The correct answer is: Now there are separation and treatment facilities taking care of the different components of the raw MSW

Question 19

Complete

Mark 1.00 out of
1.00

Public acceptability is an issue with any waste management facility, especially incineration plants. How to take care of this issue (at least up to some extent) ?

Select one:

- ☐ Allow the public to visit the plant anytime they want
- ☒ Involve public right from the planning stage
- ☐ Monitor the emissions on a continues basis
- ☐ Ensure no land value goes down near the facilities

The correct answer is: Involve public right from the planning stage

Question 20

Complete

Mark 1.00 out of
1.00

An engineered landfill is a containment for the waste with proper arrangements for -----

Select one:

- ☐ waste mixing and leachate collection facilities
- ☐ waste mixing and odour control facilities
- ☐ landfill gas collection and odour control facilities
- ☒ leachate collection and landfill gas collection facilities

The correct answer is: leachate collection and landfill gas collection facilities

Question 21

Complete

Mark 1.00 out of
1.00

In the tables giving general characteristics of the different components of raw MSW (like % moisture content, heat content, etc), inorganic non-combustible components like glass and metals have also been assigned a heat content. Why ?

Select one:

- ☐ Glasses and metals releases heat at high temperatures due to the breakage of the chemical bonds.
- ☒ Glasses and metals of raw MSW have labels and stickers on them which are burnable.
- ☐ Glasses and metals do contain some amount of Carbon and hydrogen at the elemental level and hence have a small heat content.
- ☐ This is wrong. Glasses and metals cannot have any heat content.

The correct answer is: Glasses and metals of raw MSW have labels and stickers on them which are burnable.

Question 22

Complete

Mark 1.00 out of
1.00

Many people using indoor/in-house pipe composting facility complain about bad odour from their composting unit. This is because -----

Select one:

- ☐ When the food wastes decay, bad odour is natural. It is not going to affect the biodegradation process in anyway.
- ☐ pipe composting systems are originally designed as outdoor units and should not be used indoors/in-house.
- ☒ pipe composting facility may turn anaerobic if there is no sufficient amount of air getting into the system
- ☐ pipe composting is originally designed as an anaerobic system where these issues are normal.

The correct answer is: pipe composting facility may turn anaerobic if there is no sufficient amount of air getting into the system

Question 23

Complete

Mark 1.00 out of
1.00

Which of the following can be considered to be a property of the waste ?

Select one:

- ☐ Actual air required for burning the waste per unit time
- ☐ actual air required for burning a unit mass of waste
- ☐ air required at stoichiometry for burning the waste per unit time
- ☒ Air required at stoichiometry for burning a unit mass of waste

The correct answer is: Air required at stoichiometry for burning a unit mass of waste

Question 24

Complete

Mark 1.00 out of
1.00

All composting processes are batch processes. Why ?

Select one:

- ☐ Whether it is raw MSW or kitchen waste, municipality collects it and delivers to the compost plant only once in a day.
- ☐ Solid waste cannot be supplied to the processing facility on a continuous basis (like wastewater that can be pumped).
- ☐ We need to get the final product, ripe compost, in batches so that it is easy to classify based on their characteristics.
- ☒ Unlike ASP (activated sludge process), composting process extends to the endogenous decay phase.

The correct answer is: Unlike ASP (activated sludge process), composting process extends to the endogenous decay phase.

Question 25

Complete

Mark 1.00 out of
1.00

Unit of Eddy diffusivity is

Select one:

- ☐ kg/s
- ☒ m^2/s
- ☐ m/s
- ☐ kg/m

The correct answer is:
 m^2/s

Question 26

Complete

Mark 1.00 out of 1.00

Size of ultra-fine particles is

Select one:

- ☐ < 0.1 micrometer
- ☐ ≥ 0.1 micrometer
- ☐ > 0.1 micrometer
- ☒ ≤ 0.1 micrometer

The correct answer is: ≤ 0.1 micrometer**Question 27**

Complete

Mark 1.00 out of 1.00

In case of super adiabatic condition

Select one:

- ☐ $\Gamma_d > \text{ELR}$ or $T_{\text{parcel}} < T_{\text{env}}$
- ☐ $\Gamma_d < \text{ELR}$ or $T_{\text{parcel}} < T_{\text{env}}$
- ☒ $\Gamma_d < \text{ELR}$ or $T_{\text{parcel}} > T_{\text{env}}$
- ☐ $\Gamma_d > \text{ELR}$ or $T_{\text{parcel}} > T_{\text{env}}$

The correct answer is: $\Gamma_d < \text{ELR}$ or $T_{\text{parcel}} > T_{\text{env}}$ **Question 28**

Complete

Mark 1.00 out of 1.00

Local topography is responsible for

Select one:

- ☐ large scale motion
- ☐ planetary motion
- ☒ meso scale motion
- ☐ small scale motion

The correct answer is: meso scale motion

Question 29

Complete

Mark 1.00 out of
1.00

Identify the wrong statement

Select one:

- ☒ Spectral models are Lagrangian models
- ☐ Gaussian puff model is time dependent
- ☐ Gaussian Plume and puff models are deterministic models
- ☐ All empirical models are statistical models

The correct answer is: Spectral models are Lagrangian models

Question 30

Complete

Mark 1.00 out of
1.00

If mathematical results are translated back into the real world context, then it is referred to

Select one:

- ☐ model validation
- ☐ simulation
- ☐ model formulation
- ☒ interpretation

The correct answer is: interpretation

Question 31

Complete

Mark 1.00 out of
1.00

Mahender and Ravindra are waiting at the station to catch a train. Mahendra regularly travels in this train in all the seasons whereas Ravindra has not travelled in that train. Mahendra has predicted that the train will arrive in 20 minutes based on his experience. On the other hand, Ravindra has predicted that the train will arrive in 5 minutes. Based on the information provided, identify the correct statement

Select one:

- ☐ Ravindra's model is more robust and Mahendra's model does not need any calibration
- ☐ Ravindra's model does not need any calibration and Mahendra's model is hypothetical
- ☐ Both Ravindra's and Mahendra's models are simulated
- ☒ Ravindra's model has simulated the result and Mahendra's model is more robust

The correct answer is: Ravindra's model has simulated the result and Mahendra's model is more robust

Question 32

Complete

Mark 0.00 out of
1.00

Identify the correct statement

Select one:

- ☐ Effective stack height is always less than or equal to the height of the stack
- ☒ Effective stack height is always greater than the height of the stack
- ☐ Effective stack height is always greater than or equal to the height of the stack
- ☐ Effective stack height is always greater than the height of the stack

The correct answer is:
Effective stack height is always greater than or equal to the height of the stack

Question 33

Complete

Mark 1.00 out of 1.00

Which of the following is an Air Shed model

Select one:

- ☐ Ausplume
- ☐ Degadis
- ☒ Calgrid
- ☐ Calpuff

The correct answer is: Calgrid

Question 34

Complete

Mark 1.00 out of 1.00

Out of the raw MSW samples (% by weight) given below, which one is most likely to be from a developed nation ?

Select one:

- ☐ Food waste – 30%, Plastics – 12%, inerts – 5% and textiles – 2%, etc
- ☐ Food waste – 10%, Plastics – 2%, inerts – 30% and textiles – 10%, etc
- ☒ Food waste – 2%, Plastics – 12%, inerts – 5% and textiles – 0%, etc
- ☐ Food waste – 2 %, Plastics – 2%, inerts – 30% and textiles – 0%, etc

The correct answer is: Food waste – 2%, Plastics – 12%, inerts – 5% and textiles – 0%, etc

Question 35

Complete

Mark 0.00 out of 1.00

A plume is released from a stack. If X is the downwind distance, Y is the crosswind distance from its center line and Z is the height of the receptor and all the conditions are same, the concentration will be maximum at

Select one:

- ☐ X,-Y,Z
- ☐ X,Y,Z
- ☒ X,0,0
- ☐ X,0,Z

The correct answer is: X,0,Z

Question 36

Complete

Mark 1.00 out of 1.00

Which of the following oxidants participate in smog formation?

Select one:

- ☐ PAN only
- ☐ Acrolein only
- ☐ Aldehyde only
- ☒ PAN,Aldehyde,Acrolein

The correct answer is: PAN,Aldehyde,Acrolein

Question 37

Complete

Mark 1.00 out of 1.00

Identify the true statement

Select one:

- ☐ none of the options mentioned
- ☐ Street canyons with heavy traffic needs a dense avenue of trees
- ☒ A hedge is needed on an open road if we have to protect people immediately at roadside
- ☐ Street canyons with moderate traffic needs a green wall

The correct answer is: A hedge is needed on an open road if we have to protect people immediately at roadside

Question 38

Complete

Mark 1.00 out of 1.00

Which of the following plays a role in reducing particulates

Select one:

- ☒ bark, stomata, leaves
- ☐ leaves but not stomata
- ☐ barks but not stomata
- ☐ stomata but not barks

The correct answer is: bark, stomata, leaves

Question 39

Complete

Mark 1.00 out of 1.00

Photocopiers do not emit

Select one:

- ☒ perchloroethylene
- ☐ ozone
- ☐ particulates
- ☐ VOC

The correct answer is: perchloroethylene

Question 40

Complete

Mark 1.00 out of 1.00

Sick Building syndrome can be confirmed if

Select one:

- ☒ CO₂ concentration is greater than 1000 ppm
- ☐ CO₂ concentration is greater than 1000 ppm and CO concentration is lesser than 800 ppm
- ☐ CO concentration is greater than 1000 ppm
- ☐ Both CO₂ and CO concentrations are greater than 1000ppm

The correct answer is: CO₂ concentration is greater than 1000 ppm

Question 41

Complete

Mark 1.00 out of 1.00

Stack effect occurs when

Select one:

- ☒ Temperature inside is higher than outside
- ☐ Temperature outside is higher than inside
- ☐ Height of the building is less than 100m
- ☐ Height of the building is more than 100m

The correct answer is:

Temperature inside is higher than outside

Question 42

Complete

Mark 1.00 out of 1.00

Which of the following is NOT an asphyxiant gas

Select one:

- ☐ NO
- ☒ O₃
- ☐ CO
- ☐ CH₄

The correct answer is: O₃

Question 43

Complete

Mark 1.00 out of 1.00

Which of the following is not part of ABL

Select one:

- ☐ Viscous layer
- ☒ Free atmosphere
- ☐ Residual layer
- ☐ Logarithmic layer

The correct answer is: Free atmosphere

Question 44

Complete

Mark 1.00 out of 1.00

Tuning refers to

Select one:

- ☐ validation
- ☐ verification
- ☐ simulation
- ☒ calibration

The correct answer is: calibration

Question 45

Complete

Mark 0.00 out of
1.00

During aerobic composting of MSW, temperature of the waste increases initially. This is because

Select one:

- ☒ Glucose present in MSW releases about 490-680 kCal of energy per gm.mole that is trapped inside the windrow.
- ☐ Much heat is released due to the exothermic reactions and the MSW which is of low heat conductivity retains the heat inside the windrow.
- ☐ Glucose present in MSW releases about 26 kCal of energy per gm.mole that is trapped inside the windrow.
- ☐ Much heat is released due to the endothermic reactions and the MSW which is of low specific heat retains the heat inside the windrow.

The correct answer is:

Much heat is released due to the exothermic reactions and the MSW which is of low heat conductivity retains the heat inside the windrow.

Question 46

Complete

Mark 1.00 out of
1.00

SPM stands for

Select one:

- ☒ Suspended Particulate Matter
- ☐ Scouring Particulate matter
- ☐ Settleable Particulate matter
- ☐ Small Particulate matter

The correct answer is: Suspended Particulate Matter

Question 47

Complete

Mark 1.00 out of 1.00

The effect of acid rain on the marble panel joints is called

Select one:

- ☐ Pitting
- ☐ Corrosion
- ☒ Etching
- ☐ Abscission

The correct answer is: Etching

Question 48

Complete

Mark 1.00 out of 1.00

Downward curling of leaf is called as

Select one:

- ☐ Necrosis
- ☒ epinasty
- ☐ chlorosis
- ☐ Mitosis

The correct answer is: epinasty

Question 49

Complete

Mark 1.00 out of 1.00

Tarnishing of Copper occurs due to

Select one:

- ☒ Hydrogen sulphide
- ☐ Mercury
- ☐ Vinyl Chloride
- ☐ Lead

The correct answer is: Hydrogen sulphide

Question 50

Complete

Mark 1.00 out of 1.00

Quiescent condition refers to

Select one:

- ☐ Unsteady state
- ☐ Constant state
- ☐ Dynamic state
- ☒ Steady state

The correct answer is: Steady state

Question 51

Complete

Mark 1.00 out of 1.00

Contrail from a Jet plane is considered as

Select one:

- ☐ none of the options mentioned
- ☐ turbulent motion
- ☐ random motion and turbulent motion
- ☒ random motion

The correct answer is: random motion

Question 52

Complete

Mark 1.00 out of 1.00

A source is emitting SO_2 at a rate of 25 Kg/s. If the vertical and horizontal dispersion coefficients are 100 and 140 respectively and the wind velocity is 2m/s, the concentration in round figure in $\mu\text{g}/\text{m}^3$ at ground level is

Select one:

- ☐ 584 $\mu\text{g}/\text{m}^3$
- ☐ 684 $\mu\text{g}/\text{m}^3$
- ☒ 284 $\mu\text{g}/\text{m}^3$
- ☐ 384 $\mu\text{g}/\text{m}^3$

The correct answer is: 284 $\mu\text{g}/\text{m}^3$

Question 53

Complete

Mark 1.00 out of 1.00

Pasquill- Gifford Stability Class “D” represents:

Select one:

- ☐ very unstable
- ☐ stable
- ☒ neutral
- ☐ unstable

The correct answer is: neutral

Question 54

Complete

Mark 1.00 out of 1.00

Sulphurous smog is caused by combustion of

Select one:

- ☒ coal fuel
- ☐ diesel fuel
- ☐ biomass fuel
- ☐ hydrogen fuel

The correct answer is: coal fuel

Question 55

Complete

Mark 1.00 out of 1.00

The motion of the particle smaller than $0.1\text{ }\mu\text{m}$ undergo

Select one:

- ☐ turbulent motion
- ☐ laminar motion
- ☐ stratified motion
- ☒ brownian motion

The correct answer is: brownian motion

Question 56

Complete

Mark 0.00 out of
1.00

While separating different components from MSW, a magnetic separator is usually used before the eddy current separator. Why ?

Select one:

- ☐ Ferrous metals can get heated up while passing through eddy current separator
- ☒ As eddy current separator also uses magnet, efficiency goes down significantly
- ☐ Density of ferrous metals and non-ferrous metals do not match and eddy current separator works at low efficiency
- ☐ Eddy current separator may get congested/clogged with all metals coming in.

The correct answer is:

Ferrous metals can get heated up while passing through eddy current separator

Question 57

Complete

Mark 1.00 out of
1.00

Gaussian Distribution is

Select one:

- ☐ Random Probability Distribution
- ☒ Continuous Probability Distribution
- ☐ none of the options mentioned
- ☐ Discrete Probability Distribution

The correct answer is: Continuous Probability Distribution

Question 58

Complete

Mark 0.00 out of
1.00

Perhaps, the most difficult component to be separated from the mixed raw MSW is the food waste. Why ?

Select one:

- ☐ it has varying size and density
- ☐ it has high water content
- ☐ it picks up significant amount of dust
- ☒ it decays fast and becomes sticky easily

The correct answer is: it has varying size and density

Question 59

Complete

Mark 1.00 out of
1.00

The mostly used furnace for MSW incineration is -----

Select one:

- ☒ grates/rocker type
- ☐ fluidized bed type
- ☐ rotary kiln type
- ☐ multiple hearth type

The correct answer is: grates/rocker type

Question 60

Complete

Mark 1.00 out of
1.00

The temperature in the furnace of an incineration facility is not allowed to go above 1100 °C. Why ?

Select one:

- ☒ At higher temperatures, there is a possibility of NOx formation
- ☐ It needs large amount of auxiliary fuel to maintain higher temperatures
- ☐ At higher temperatures refractory bricks may be damaged
- ☐ At higher temperatures, flue gas cannot be treated by bag filters

The correct answer is: At higher temperatures, there is a possibility of NOx formation