National Testing Agency

Question Paper Name:	5286 Energy Systems Engineering 30th June 2019 Shift 1
Subject Name:	Energy Systems Engineering
Creation Date:	2019-06-30 13:01:39
Duration:	180
Total Marks:	100
Display Marks:	Yes

Energy Systems Engineering

Group Number :	1
Group Id :	489994236
Group Maximum Duration :	0
Group Minimum Duration :	120
Revisit allowed for view? :	No
Revisit allowed for edit? :	No
Break time:	0
Group Marks:	100

Energy Systems Engineering

Section Id :	489994292
Section Number :	1
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	100
Number of Questions to be attempted:	100
Section Marks:	100
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	489994320
Question Shuffling Allowed :	Yes

Question Number : 1 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The major share of India's primary energy mix in 2017 was from _____.

A. Oil
B. Coal
C. Solar
D. Natural gas

Options :

1. 1
2. 2
3. 3

4. 4

Question Number : 2 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the Paris agreement, India has agreed to _____.

A. Reduce the emissions intensity of GDP by more than one third of its 2005 value in 2030.
B. Reduce the emissions by more than one third of its 2005 value in 2030.
C. Reduce the emissions per population by more than one third of its 2005 value in 2030.
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 3 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is true for India in 2018?

A. Share of nuclear in electricity generation is more than the share of renewables
B. Share of nuclear by installed capacity is more than the share of renewables
C. Both a. and b.
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 4 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What are strategies for enhancing the energy security of a nation?

A. Increase strategic energy storage
B. Diversify energy supply sources
C. Increase the use of biofuels
D. All of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 5 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

India's renewable energy policy has been with a focus on major thrust and growth of _____.

A. de-centralized solar Microgrids less than 100 kW each
B. roof-top solar PV in urban areas
C. grid-connected biomass-based power generation in rural areas
D. large grid-connected solar PV and wind plants

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 6 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Specific Energy Consumption for a paper mill is

A. Energy used on a monthly basis
B. Energy used per unit of money spent
C. Energy used per unit of paper produced
D. Electricity used in the plant

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 7 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A Sankey diagram for a process plant represents _____.

A. the carbon flows in a plant
B. the energy flows in a plant
C. the water flows in a plant
D. the exergy flows in a plant

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 8 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The energy payback time for a system with an annual production of 3,000 kWh energy while consuming 8,000 kWh energy through its life cycle is about:

A. 2.67 years
B. 0.38 years
C. 1.67 years
D. 0.63 years

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 9 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A lower limit for the discount rate would typically be:

A. Interest rate by bank
B. Insurance percentage of capital investment
C. Ratio of payback period to life of project
D. Ratio of O&M cost to capital investment cost

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 10 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. For a discount rate of 12 % and a project life of 10 years, the capital recovery factor will approximately be:

A. 5.65
B. 0.12
C. 0.18
D. 1.47

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 11 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements is not true about the renewable energy technologies?

A. They do not have any environmental externalities
B. They have significantly lower net carbon emissions as compared to the fossil fuel based technologies
C. The energy output is typically intermittent and variable
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 12 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a sustainability indicator for an energy system?

A. EPBT
B. NIMBY
C. EROI
D. Carbon footprint

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 13 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Concentrating collectors mainly utilize:

A. Diffuse radiation
B. Direct radiation
C. Both
D. None

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 14 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A _____ is used to measure direct normal radiation:

A. Pyranometer
B. Pyrheliometer
C. Pyranometer with shading ring
D. Pyrheliometer with shading ring

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 15 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Zenith angle and the angle of incidence on a surface are equal when:

A. The surface is facing due South
B. The surface is facing due North
C. The surface is horizontal
D. The surface is vertical

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 16 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a compound parabolic concentrator, the concentration ratio is around:

A. 2-6
B. 20-60
C. 200-600
D. 2000-6000

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 17 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A flat plate collector is suitable for an operating temperature around:

A. 60 °C
B. 180 °C
C. 390 °C
D. 600 °C

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 18 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Thermal energy storage concept where the receiver heat transfer fluid is the same as the storage medium is:

A. Passive direct
B. Passive indirect
C. Active direct
D. Active indirect

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 19 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Thermal energy storage concept where the circulating storage medium is different from the receiver heat transfer fluid:

A. Passive direct
B. Passive indirect
C. Active direct
D. Active indirect

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 20 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Latent heat storage works using:

A. Two-tank molten salt
B. Phase change material
C. Concrete
D. Thermal oil

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 21 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In optimization, parameters are

A. changed to minimize a desired outcome
B. changed to maximize a desired outcome
C. always varied
D. always fixed

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 22 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

To determine the maximum energy production from a photovoltaic cell on a particular day by changing its tilt angle is

A. a modeling activity
B. a simulation activity
C. a design activity
D. an optimization activity

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 23 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

One advantage of simulation is

A. It's helpful where mathematical models are not applicable
B. It can be used to find the best solution
C. Simulation models are cheap to build
D. It can be used to find the maximum profit

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 24 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Optimization methods can be defined as

A. Constrained and unconstrained
B. Function and unconstrained
C. Function and constrained
D. Function and variables

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 25 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Constraints in an optimization are

A. desired mathematical relationships of parameters
B. desired mathematical relationships of variables
C. must always be equality relationships
D. must always be linear relationships

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 26 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Cold streams are those which

A. have low enthalpy
B. have low temperature
C. need to be cooled
D. need to be heated

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 27 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following should not be placed below the pinch?

A. Steam heaters
B. Water coolers
C. Air coolers
D. Steam generators

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 28 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

According to the second law of thermodynamics, the minimum approach temperature (ΔT_{min}) should be

A. negative
B. zero
C. positive
D. greater than 15

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 29 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the minimum approach temperature (ΔT_{min}) is reduced

A. Cold utility requirement is increased but hot utility requirement is decreased
B. Hot utility requirement is increased but cold utility requirement is decreased
C. Both hot and cold utility requirements are decreased
D. Both hot and cold utility requirements are increased

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 30 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

According to Pinch Analysis, a heat pump should be placed

A. above the pinch
B. below the pinch
C. across the pinch
D. either above or below the pinch

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 31 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If E^0 = 1.006 V at 700°C, what is the open circuit voltage (Nernst potential) for an SOFC operating at 700°C (1 bar pressure) on 30% H_2 (balance H_2O) and air?

A. 1.161 V
B. 1.230 V
C. 0.973 V
D. 0.938 V

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 32 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A 60 cell SOFC stack produces 45 A. The average cell potential is 0.85 V. What is the approximate power output of this stack?

A. 2.3 kW
B. 3.1 kW
C. 2.0 kW
D. 2.7 kW

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 33 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Now consider that the above stack is fed with gaseous CH_4 at a flow rate of 5 g/min and three times the stoichiometric air required. What is the overall efficiency if the efficiency is defined as ε = electrical output/(-Δh of oxidation of fuel in inlet)? Use the data in the table below.

i	h_i in J/mole	s_i in J/(mole.K)
CH_4	3.8e4	246
H_2	2.0e4	165
O_2	2.2e4	243
H_2O	-2.2e5	232
CO_2	-3.6e5	268
CO	-9.0e4	234

Table: Thermodynamic data at 700 °C

A. 49%
B. 52%
C. 55%
D. 60%

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 34 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the properties below is desirable for the material used in PEMFC bipolar plates?

A. High ionic conductivity
B. Low electronic conductivity
C. Should allow easy distribution of fuel and air to the electrodes
D. Should allow gas transport across the bipolar plate

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 35 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the properties below is desirable for a PEMFC electrolyte?

A. High ionic conductivity
B. Low electronic resistivity
C. Should be impermeable to liquids
D. Should allow gas transport across the electrolyte

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 36 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Pressurized heavy water reactor does not require enriched uranium as fuel because _____.

A. heavy water absorbs neutron
B. heavy water is an excellent moderator
C. heavy water enriches uranium
D. due to high pressure, enrichment is not required

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 37 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. During normal operation, a nuclear reactor is _____.

A. Subcritical
B. Supercritical
C. Critical
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 38 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a critical reactor, as the number of neutrons is doubled, it _____.

A. remains critical and power remains same
B. becomes supercritical and power remains same
C. becomes supercritical and power is doubled
D. remains critical and power is doubled

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 39 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The loss of coolant in a boiling water reactor will make it _____.

A. Subcritical because of increase in temperature
B. Supercritical because percentage of fissile material in reactor increases
C. Supercritical because fission rate increases with temperature
D. Subcritical because water which is a coolant also acts as a moderator in these reactors

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 40 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Why is graphite required in the gas cooled reactor – choose the correct statement.

A. as a moderator because gas which act as coolant is not a moderator
B. to enhance melting point of fuel
C. because graphite enriches uranium
D. to shield from radiation

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 41 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. Which of these are non-invasive flow meters?

A. Ultrasonic flow meter
B. Hot wire anemometer
C. Orifice flow meter
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 42 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A tachometer is used to measure _____.

A. conductivity of water samples
B. electrical current
C. power factor
D. RPM

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 43 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A cement plant has a stream of hot air from the cooler at 430°C. The air flow rate is 1.4 kg/kg of clinker. The specific heat capacity of air is 1 kJ/kgK (Take the reference temperature as 30°C). What is the energy content of the air stream?

A. 430 kJ/kg clinker
B. 560 kJ/kg clinker
C. 572 kJ/ kg clinker
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 44 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is the meaning of synthetic crude oil?

A. crude oil synthesized in the lab by chemical methods
B. crude oil synthesized in the lab by physical methods
C. addition of hydrogen to saturate unsaturated C-C bonds
D. none of the above.

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 45 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. What are main compounds responsible for sulphur in the crude oil?

A. paraffins
B. naphthenes
C. asphaltenes
D. resins

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 46 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The trend of world population versus time for the last two thousand years would show:

A. Significant crests and troughs corresponding to periods of global stability and recession
B. Monotonic linear growth
C. Monotonic exponential growth
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 47 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the Kaya identity, what are the units for the carbon intensity of the energy sector?

A. tonnes of CO_2/capita
B. tonnes of CO_2/$ of GDP
C. tonnes of CO_2
D. tonnes of CO_2/MJ

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 48 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of these problems are local pollution issues?

A. Ultra violet energy alternative
B. Radiation Balance Alternative
C. Photochemical Smog
D. All of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 49 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the Human Development Index. What are the units?

A. No units
B. Years
C. $ / capita
D. CO_2 / capita

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 50 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A unit of useful energy saved (MJ) will result in

A. only one unit of primary energy saving
B. only one unit of delivered energy saving
C. only one unit of final energy saving
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 51 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Spacing between two rotational energy levels is

A. B
B. 2B
C. 3B
D. 4B

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 52 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A molecule must be _____ to give response in Raman spectrum.

A. Polarizable
B. Non polarizable
C. Anisotropically polarizable
D. None of the above.

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 53 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Mo has Binding Energy (BE) of 228 eV. If wavelength of incident radiation is 1.54Å, the KE of ejected electron is

A. 6000 eV
B. 7000 eV
C. 8000 eV
D. 9000 eV

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 54 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

XPS is not used for determination of

A. Crystal structure
B. Oxidation state
C. Identification of elements
D. Electronic structure

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 55 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For p^1 state, one of the possible J value is

A. 1
B. 3/2
C. 2
D. 5/2

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 56 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Viscosity of glycerol is approximately 1000 times of that of water. If the viscosity of water is 1 cP, the value of viscosity of glycerol in SI is:

A. 1 N-m
B. 1 Pa-s
C. 0.001 Kg $m^{-1}s^{-1}$
D. 0.001 N-sm^{-2}

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 57 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Nusselt number is defined as

A. ratio of viscous to inertia force
B. ratio of mass diffusivity to thermal diffusivity
C. ratio of momentum diffusivity to thermal diffusivity
D. dimensionless heat transfer coefficient

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 58 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the definition of Biot number and Nusselt number, the thermal conductivity is

A. fluid property in Bi, Solid property in Nu
B. solid property in Bi, Fluid property in Nu
C. fluid property in both Nu and Bi
D. Solid property in both Bi and Nu

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 59 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the internal diameter of a circular pipe is 25 mm, density of water is 1000 kg/m^3 and viscosity is 1cP, what would be the minimum velocity of water such that the flow is turbulent?

A. 1.6 m/s
B. 3.2 m/s
C. 0.16 m/s
D. 0.8 m/s

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 60 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Prandtl number of air at normal pressure and temperature is

A. 0.7
B. 7.0
C. 10
D. 0.07

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 61 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. A piston cylinder contains air at 600 kPa, 290 K and a volume of 0.01 m^3. A constant pressure process gives 54 kJ of work out. Find the final volume of the air.

A. 0.05 m^3
B. 0.01 m^3
C. 0.10 m^3
D. 0.15 m^3

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 62 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In an open system, for maximum work, the process must be entirely:

A. irreversible
B. reversible
C. adiabatic
D. none of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 63 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Heat conducted through unit area and unit thickness per unit time when temperature gradient between opposite faces is unity is called

A. Thermal conductance
B. Thermal conductivity
C. Thermal gradient
D. Temperature gradient

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 64 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Commutator in DC generator is used for

A. collection of current
B. convert DC armature current to AC
C. collection of voltage
D. convert AC armature current to DC

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 65 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The probability for the change of state of a quantum particle

A. Can be a complex number
B. Cannot in general be added if there is more than one alternative
C. Is the product of probability to go from start to intermediate and then from intermediate to finish
D. Is always less than 1

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 66 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. Which of the following is true regarding electrode polarization in a solution?

A. The capacitance of the electrical double layer is found to be independent of the electrode potential in experimental practices
B. The counter charge ions in the solution arrange themselves in a very close plane near the electrode to perfectly balance the excess charge on the electrode
C. There exists a concentration gradient of counter charge ions near the electrode in the solution
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 67 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which equation will be true, if the medium is considered to be air?

A. Curl(H) = 0
B. Div(H) = 0
C. Grad(H) = 0
D. Div(H) = 1

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 68 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The current flowing through an insulating medium is called

A. Conduction
B. Convection
C. Radiation
D. Susceptibility

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 69 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following technology captures CO_2 before combustion?

A. Post-combustion capture
B. Pre-combustion capture
C. Pyrolysis
D. Torrefaction

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 70 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

IGCC uses _____.

A. Steam turbine cycle only
B. Gas turbine cycle only
C. Both gas turbine and steam turbine cycles
D. None of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 71 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Act which has been enacted the open access to generate electricity is?

A. Indian Electricity Act 2003
B. Energy Conservation Act 2001
C. Indian Electricity Act 2010
D. Energy Conservation Act 2007

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 72 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When was power development in India commenced?

A. 1897
B. 1902
C. 1954
D. 1975

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 73 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When was Rural Electrification Corporation established in India?

A. 1969
B. 1869
C. 1996
D. 2003

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 74 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What among the following is/are the primary objective of *Saubhagya* scheme?

A. Electrifying all the households in India
B. Substitution of kerosene in urban Indian households
C. Promote electricity consumption in Indian households
D. Promoting electricity and LPG consumption in Indian rural households

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 75 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which is the major coal producing organization in India?

A. NTPC
B. CIL
C. SCCL
D. None

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 76 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Fermentation is a _____ process.

A. biochemical
B. thermochemical
C. thermal
D. chemical

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 77 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Lipids are converted into fatty acids in the _____ step during biomethanation.

A. Acidogenesis
B. Acetogenesis
C. Hydrolysis
D. Methanogenesis

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 78 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Tyre pyrolysis occurs in the _____.

A. presence of air, as per stoichiometric need
B. absence of air
C. presence of air, but below the stoichiometric need
D. presence of excess air

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 79 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The process with the highest operating temperature is _____.

A. Biomethanation
B. Incineration
C. Gasification
D. Pyrolysis

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 80 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Automotive waste oils, paints, and electronic items are examples of _____.

A. organic waste
B. inorganic waste
C. hazardous waste
D. inert materials in waste

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 81 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Electrical generator that can be used in Type 4 WTG include _____.

A. Permanent magnet synchronous generator
B. Induction generator
C. All of the above
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 82 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A 5 MW Type 3 DFIG-based WTG is connected to grid. Cut in, nominal and cut out wind speeds are 4 m/s, 11 m/s and 23 m/s respectively. If the wind speed is 12 m/s, calculate the reactive power compensation capacity required for this WTG to neutralize its reactive power consumption:

A. 2.42 MVAr
B. 3.75 MVAr
C. 2.5 MVAr
D. External reactive power compensation is not required

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 83 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Flow augmented turbines are used for harnessing _____.

A. Tidal stream energy
B. Tidal barrage power
C. Both of them
D. None of them

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 84 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Sea and swell are generated directly due to

A. internal waves in the ocean
B. surface wind speed
C. temperature gradient in the atmosphere
D. pressure gradient in the upper atmosphere

Options :

1. 1
2. 2
3. 3

4. 4

Question Number : 85 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Biodiesel production involves conversion of _____ into a mixture of _____.

A. Fatty acids or trigyclerides, methyl esters of fatty acids
B. Pentose sugars, fatty esters
C. Alcohol based species, methanol
D. Lignin, glycerine

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 86 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

1st Generation ethanol production needs _____ as the feed stock.

A. Sugar or carbohydrates
B. Cellulose or Hemicellulose
C. Lignin
D. All of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 87 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of these control type would be used for a PV inverter operating with droop control in an islanded network?

A. Grid feeding
B. Grid supporting
C. Grid forming
D. Grid Loading

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 88 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Frequency restoration and voltage correction functions are part of which control layer?

A. Primary control
B. Secondary control
C. Tertiary control
D. PWM control

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 89 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Parameters of which of these control layers mainly affect the dominant modes of small signal stability?

A. Power control
B. Voltage control
C. Current control
D. PWM control

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 90 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. Who is not a stake-holder in a demand response program?

A. Utility
B. Customer
C. Load Aggregator
D. DR assessment agency

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 91 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A typical demand response program would not be implemented for which of these functions?

A. Peak clipping
B. Load shifting
C. Power quality improvement
D. Valley filling

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 92 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following can be employed to prevent agglomeration?

A. Annealing
B. Exposing to air
C. Particle confinement
D. All of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 93 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

. For hydrogen storage system the number of operational life cycles (charge-discharge) should not be less than _____.

A. 500 cycles
B. 1000 cycles
C. 1500 cycles
D. 2000 cycles

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 94 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Steam Methane Reforming process for hydrogen production is an

A. Exothermic process
B. Endothermic process
C. Thermo neutral process
D. None of the above

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 95 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The cost of hydrogen production is highest for which of the following method.

A. Steam Methane Reforming
B. Coal Gasification
C. Electrolysis of water
D. Partial oxidation of hydrocarbons

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 96 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not an electronic controller circuit?

A. Charge controller
B. Battery
C. DC to AC converter
D. MPPT tracker

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 97 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a high efficiency solar cell, which of the following phenomenon would be most important?

A. Charge carrier collection
B. Charge carrier generation
C. Light absorption in the active material
D. All of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 98 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a PV module component?

A. Battery
B. Glass
C. Back sheet
D. EVA

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 99 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

What is the target set for solar PV as per National Solar Mission?

A. 200 GW
B. 100 GW
C. 175 GW
D. None of these

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 100 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Radiance and eQuest are simulation tools that are primarily used for which of the following purposes?

A. Thermal comfort requirements
B. Analysis of climate
C. Lighting and thermal performance of buildings
D. None of these

Options :

1. 1
2. 2
3. 3
4. 4