Uka Tarsadia University(Diwaliba Polytechnic)
Diploma in Chemical Engineering
Objective Type Questions (Petroleum Refining & Petrochemical Technology)

Unit 1: Basics of Petroleum and Refinery

1) The characterisation factor of a crude oil is calculated as 12.5. It means that; it is

A. Paraffinic

B. Naphthenic

C. Intermediate

D. None of these

2) Which of the following is desirable in petrol (gasoline) but undesirable in kerosene?

A. Paraffins

B. Aromatics

C. Mercaptans

D. Naphthenic acid

3) Main constituent of natural gas is

A. CH4

B. C2H2

C. C2H4

D. C2H6

4) Molecular weight of crude petroleum may be around

A. 50

B. 250

C. 1500

D. 5000

5) The characterisation factor of crude petroleum oil is around

A. 3

B. 11

C. 22

D. 28

6) With increase in the number of carbon and hydrogen atoms in hydrocarbon molecules, the density of petroleum products

A. Decreases

B. Increases

C. Remains same

D. Unpredictable from the data

7) Petroleum deposits are detected by the.

A. Oil seepage at the surface of the earth

B. Measurement of density, elasticity and magnetic & electric properties of the rock in the crust of the earth

C. Age & nature of rocks inside the crust of the earth

D. All of the above

8) The reservoir rock containing petroleum has

A. Low porosity

B. High permeability

C. High porosity

D. Both B and C

9) Molecular weight of petrol may be about

A. 40-60

B. 100-130

C. 250-300

D. 350-400

10) Asphalts are

A. Low molecular weight & low boiling point compounds present in petroleum

B. Desirable in catalytic cracking feedstock, because they produce coke

C. Readily oxidisable and form carbonaceous sludge

D. All of the above

11) Water content in the crude oil as it comes out of oil well may be upto _____ percent.

A. 2

B. 5

C. 10

D. 25

12) Both asphalt and wax are produced by _____ base crude oils.

A. Naphthenic

B. Asphalt

C. Paraffin

D. Mixed

13) Paraffins are desirable in lubricating oil, as it has got high

A. Viscosity

B. Viscosity index

C. Smoke point

D. Pour point

14) Extractor temperature is maintained at -20°C in Edeleanu process to reduce the _____ of kerosene.

A. Smoke point

B. Paraffins

C. Aromatics

D. Naphthenes

15) Butadiene is a/an

A. Di-olefin

B. Naphthene

C. Aromatic

D. Olefin

16) Which one is used to determine the colour of petroleum products?

A. Colour comparator

B. Saybolt chromometer

C. Cleveland apparatus

D. None of these

17) Aromatics are desired constituents of

A. Lubricating oil

B. Diesel

C. Kerosene

D. Petrol

18) Pick out the wrong statement.

A. Higher specific gravity of petroleum products means higher C/H ratio

B. Aromatics have lower specific gravity than corresponding paraffins

C. Hydrocarbons of low specific gravity (e.g, paraffins) possess the maximum thermal energy per unit volume

D. Hydrocarbons of high specific gravity (eg, aromatics) possess the maximum thermal energy per unit weight

19) Crude oil is transported inland from oil field to refineries, mainly by the

A. Road tankers

B. Rail tankers

C. Underground pipelines

D. None of these

20) Which of the following has the maximum °API gravity of all?

A. Diesel

B. Kerosene

C. Petrol

D. Furnace oil

21) Which of the following has the minimum °API gravity of all?

A. Diesel

B. Kerosene

C. Petrol

D. Furnace oil

22) The first crude oil refinery of India is located at

A. Naharkatiya

B. Digboi

C. Kochin

D. Madras

23) Pick out the additive property of a lube oil out of following.

A. °API gravity

B. Specific gravity

C. Viscosity

D. Flashpoint

24) Molecular weight of crude oil is in the range of

A. 100-120

B. 230-250

C. 450-550

D. 600-850

25) Increase in the specific gravity of petroleum products indicates

A. Decrease in paraffin content

B. Increase in thermal energy per unit weight
C. Increase in aromatic content
D. Higher H/C ratio
26) Highest quality bitumen is produced from the _____ crude oil.
A. Paraffinic
B. Naphthenic
C. Intermediate
D. Mixed
27) Which of the following fractions of a crude oil will have the maximum gravity API (i.e. °API) ?
A. Diesel
B. Gasoline
C. Atmospheric gas oil
D. Vacuum gas oil
28) With increase in density, the viscosity of petroleum products
A. Increases
B. Decreases
C. Remains same
D. Either A or B
29) Crude petroleum oil is a _____ fuel.
A. Primary
B. Fossil
C. Both A & B
D. Secondary
30) The conductivity of crude oil-water mixture depends on the
A. pH value
B. Water percentage
C. Temperature
D. All of the above
31) Crude oil produced by Indian oil fields are predominantly _____ in nature.
A. Paraffinic
B. Naphthenic
C. Asphaltic
D. Mixed base
32) Carbon percentage (by weight) in crude petroleum may be about
A. 65
B. 75
C. 85
D. 95
33) Hydrogen percentage (by weight) in crude petroleum may be about
A. 5
B. 15
C. 25
D. 35
34) Petroleum is believed to have originated from _____ sources.
A. Vegetable

B. Animal
C. Both A & B
D. Neither A nor B
35) The general formula of naphthenes is
A. C_nH_{2n+2}
B. C_nH_{2n-6} (where, $n \geq 6$)
C. C_nH_{n-4}
D. Same as that for olefins i.e. C_nH_{2n}
36) Older crude petroleum
A. Is light and better
B. Gives more distillates
C. Gives less tar
D. All of the above
37) Olefins are
A. Saturated hydrocarbons
B. Unsaturated cyclic compounds (hydrocarbons)
C. Present in substantially good quantity in crude petroleum
D. None of these
38) Which of the following is not a sulphur compound present in petroleum ?
A. Thiophenes
B. Mercaptans
C. Sulphones
D. Pyroles
39) Which is almost absent in crude petroleum?
A. Olefins
B. Mercaptans
C. Naphthenes
D. Cycloparaffins
40) Which of the following is the easiest to crack?
A. Paraffins
B. Olefins
C. Naphthenes
D. Aromatics
41) Petroleum
A. Is optically active
B. Constitutes mainly of olefins
C. Does not contain asphalt
D. Does not contain aromatics
42) Pick out the wrong statement.
A. Multigrade lubricating oils have high viscosity index
B. Paraffinic oil has very high viscosity index
C. Naphthenic oil has very low viscosity index
D. High viscosity index means a large change in viscosity with change in temperature
43) Pick out the wrong statement about the smoking tendency of various hydrocarbon constituents of kerosene.

A. Smoking tendency of hydrocarbons increases in the order : paraffins → isoparaffins → naphthenes → aromatics
B. Smoking tendency of paraffins increases with decrease in its molecular weight
C. Smoking tendency of naphthenes decreases with its increasing molecular weight & also on addition of double bond
D. Smoking tendency of aromatics decreases with increase in its molecular weight
44) Which of the following factors does not govern the mechanism of petroleum formation from organic sources?
A. pH of the soil
B. Bacterial action
C. Heat
D. Pressure
45) _____ base crude oil is also called asphaltic crude.
A. Paraffinic
B. Naphthenic
C. Mixed
D. Aromatic
46) A petroleum well is called 'dry', if it contains
A. Very little oil
B. No natural gas
C. Only natural gas
D. All of the above
47) Crude oil is pumped by a _____ pump.
A. Gear
B. Centrifugal
C. Screw
D. Reciprocating
48) Which of the following is a naphthene?
A. Butene
B. Butadiene
C. Cyclohexane
D. Acetylene
49) H/C ratio (by weight) for the same number of carbon atoms is the highest in case of
A. Aromatics
B. Paraffins
C. Olefins
D. Naphthenes
50) CnH2n is the general formula for
A. Olefins
B. Naphthenes
C. Both A & B
D. Neither A nor B
51) Which of the following theories of origin of petroleum does not explain the presence of nitrogen & sulphur compounds in crude oil?
A. Modern theory

B. Carbide theory
C. Engler theory
D. All of the above

Unit 2: Fractionation of Petroleum

1. What is the primary component of crude oil?
a) Sulfur
b) Carbon
c) Hydrogen
d) Nitrogen
2. How is crude oil separated?
a) Crystallization
b) Fractional distillation
c) Decantation
d) Sublimation
3. What type of gas is LPG?
a) Gasoline
b) Kerosene
c) Uncondensed
d) Heavy oil
4. What is the boiling temperature of petrol?
a) 40-120^{o}C
b) 120-180^{o}C
c) 180-250^{o}C
d) 250-320^{o}C
5. Which fuel/oil is used for obtaining gasoline?
a) Kerosene
b) Diesel
c) Heavy
d) Naphtha
6. Which of the following is not used as a lubricant?
a) Lubricating oil
b) Grease
c) Asphalt
d) Petroleum jelly
7. What is the function of petroleum coke?
a) Lubrication
b) In candles
c) As fuel
d) As solvent
8. Carbon black and hydrogen can be manufactured using _____
a) Natural gas

b) Coal gas
c) Oil gas
d) Water gas

9. Oil gas is obtaining by the cracking of _____
a) Kerosene oil
b) Diesel oil
c) Heavy oil
d) Gasoline

10. Which of these gases is used for heating open-hearth furnaces?
a) Oil gas
b) Producer gas
c) Biogas
d) Water gas

11.During the desalting of crude oil which of the statement is not true?
a) Desalter pressure is maintained above vaporisatrion pressure of crude oil
b) Desalter pressure is maintained below vaporisatrion pressure of crude oil
c) Low voltage is preferable for better desalting
d) Lower temperature is preferable

12.If the crude is paraffinic then its characterization factor will be?
(a) 5
(b) 8
(c) 11
(d) above 12

13. Smoke Volatility index is expressed as?
(a) Smoke point =0.42×(percentage distilled at 204◦C)
(b) Smoke point =1.42×(percentage distilled at 204°C)
(c) Smoke point =2.42×(percentage distilled at 204°C)
(d) Smoke point =3 42×(percentage distilled at 204°C)

14.If diesel has cetane number of 50 then the diesel index will be?
(a) 36
(b) 46
(c) 56
(d) 66

15.Aviation Fuel Contains?
(a) Light Naphtha
(b) Medium Naphtha
(c) Kerosene
(d) Diesel

16.Which of the following will have higher API gravity?
(a) Gas Oil,
(b) Gasoline
(c) Crude Oil
(d) Kerosene

17.Aniline point is related to?
(a) Octane number

(b) Diesel number
(c) Smoke
(d) Point pour point

18.If a fuel has high aniline point then which of the statement is true?
(a) Fuel ha low paraffin
(b) Fuel has high aromatics
(c) Fuel has low diesel index
(d) Fuel has high diesel index

19.Petroleum feed stock used for linear alkyl benzene is?
(a) Crude oil
(b) Kerosene
(c) Diesel
(d) Light cycle oil

20.If a crude has specific gravity of 0.8576 and chracterisation factor of 11.66 then its average boiling point in ^{o}C will be?
(a) 238.8
(b) 298.8
(c) 398.8
(d) 498.8

21.For LAB which fraction of the kerosene is used
(a) Paraffins
(b) Olefins
(c) Benzene
(d) Xylene

22. The lowest temperature at which the oils gives enough vapour.
a) Pour point
b) Cloud point
c) Flash point
d) Fire point

23. The lubricating oil is volatilizes then the formed vapour _____
a) Must be less
b) Must be high
c) Non- inflammable
d) Flammable

24. The fire point is the lowest temperature at which the vapour of oil burns continuously for at least _____ when a small flame is brought near to it.
a) 1 Second
b) 2 Seconds
c) 4 Seconds
d) 5 Seconds

25. The fire point of an oil is about _____ higher than the flash point.
a) 5-10^{o}C
b) 5-20^{o}C
c) 5-30^{o}C
d) 5-40^{o}C

26. Pensky -Marten's apparatus is used to find out the _____
a) Cloud point
b) Pour point
c) Flash point
d) Fire point
27. Oil cup in Pensky-marten's apparatus is made with _____
a) Brass
b) Iron
c) Copper
d) Steel
28. For refrigerator system, the oils with the low viscosity, high cloud point and low pour point are used.
a) True
b) False
29. Lubrication is necessary to protect wear and tear caused due to _____
a) Electrostatic force
b) Gravitational force
c) Frictional force
d) Magnetic force
30. Lubricant act as a coolant to carry away heat.
a) True
b) False
31. Select the incorrect statement from the following option.
a) Lubricant keeps out dirt
b) Lubricant act as a seal
c) Lubricant transmit fluid power
d) Lubricant enhance corrosion
32. On increasing the lubrication, the efficiency of the machine _____
a) Increases
b) Decreases
c) Remain same
d) Does not get affected
33. At normal ambient temperature and atmospheric pressure, in which form LPG is obtained?
a) Solid
b) Gaseous
c) Liquid
d) Solid-liquid
34. Under which compound name does the liquid petroleum gas (LPG) are sold?
a) Urea
b) Ethylene
c) Benzoyl peroxide
d) Butane
35. Which type of LPG is mostly produced in Indian refineries?
a) Grade A
b) Grade B

c) Grade C
d) Grade D

36. In which type of industries LPG is used as a fuel?
a) Steel industries
b) Plastic Industries
c) In the production of olefins
d) In the production of coal gas

37. What is the odour of Liquid Petroleum Gas (LPG)?
a) It is odourless
b) Fruity smell
c) Undesirable odour
d) Alcoholic smell

38. By which process only saturated hydrocarbons are obtained in LPG?
a) Straight distillation
b) Thermal Cracking
c) Hydrocracking
d) Reforming

39. Liquid petroleum gas (LPG) is corrosive to steel.
a) True
b) False

40. What happens when LPG is inhaled in large concentrations?
a) It kills a person
b) It increases a person's eye sight
c) It does not have any effect on person's health
d) It causes a little anaesthesia

41. In which processes does the low boiling fractions of petroleum are used?
a) Petrol engines
b) Diesel engines
c) Oil fired furnaces
d) Kerosene engines

42. Most commonly crude heater before the fractionation tower in the freinery is the_____

Electric immersion

B. Pipestill

C. Steam coil

D. None of these

43. Carbon percentage (by weight) in crude petroleum may be about

(A) 65

(B) 75

(C) 85

(D) 95

44. With increase in the number of carbon and hydrogen atoms in hydrocarbon molecules, the density of petroleum products

(A) Decreases

(B) Increases

(C) Remain same

(D) Unpredictable from the data

45. Octane of natural gas is

a) 60-80

b) 80-100

c) >100

d) <60

46. Which of the following is a non-petroleum source?

a) CaC2

b) H2S

c) Paraffin

d) Olefin

47. Which of the following process is used to convert the mixture of saturated hydrocarbons obtained from petroleum into a more reactive material?

a) Hydrogenation

b) Acidification

c) Alkylation

d) Chlorination

48. Grease is a semisolid lubricant

True

False

49. CNG is used in traditional gasoline/internal combustion engine

True

False

50. Full form of CNG is Compressed natural gas

True

False

51.Vacuum distillation is used in

a) under high pressures

b) under low pressures

c) gentle heating

d) quick heating

Unit 3: Refinery Processes

1) Gasoline yield in catalytic reforming of naphtha may be about _____ percent by weight.

A. 85

B. 65

C. 50

D. 98

2) The main aim of cracking is to produce

A. Gasoline

B. Lube oil

C. Petrolatum

D. Coke

3) Which of the following is a non-regenerative fixed bed catalytic reforming process?

A. Hydroforming
B. Thermofer catalytic reforming
C. Platforming
D. Hyperforming
4) The main purpose of recycling the byproduct hydrogen gas in the reformer reactor is to
A. Obviate catalyst poisoning
B. Maintain the reaction temperature
C. Sustain the reactor pressure
D. Hydrogenate the feed stock
5) Pyrolysis of kerosene or natural gasoline is done to produce mainly the
A. Olefins and aromatics
B. Lighter paraffins
C. Stabilised gasoline
D. Diesel
6) Which of the following processes consumes hydrogen?
A. Fluid catalytic cracking
B. Visbreaking
C. Propane deasphalting
D. None of these
7) Octane number (unleaded) of reformed gasoline may be upto
A. 60
B. 70
C. 80
D. 90
8) Which is the most effective catalyst used in catalytic cracking of petroleum products?
A. Iron oxide
B. Nickel
C. Vanadium pentoxide
D. Zeolite
9) Which of the following reactions is undesirable in the production of catalytically reformed gasoline?
A. Dehydrogenation of naphthene
B. Dehydrogenation of lower paraffins
C. Dehydrocyclisation of higher paraffins
D. Isomerisation of paraffins
10) Which is the most ideal feed stock for 'coking' process used for the manufacture of petroleum coke?
A. Naphtha
B. Vacuum residue
C. Light gas oil
D. Diesel
11) Petroleum coke is commercially produced by the _____ process.
A. Hydrocracking
B. Visbreaking
C. Fluid catalytic cracking
D. Delayed coking
12) Road grade bitumen is produced from vacuum residue by its

A. Aeration
B. Pyrolysis
C. Hydrogenation
D. Steam reforming

13) Visbreaking process is used mainly for making
A. High cetane diesel
B. High octane gasoline
C. Fuel oil
D. Smoke free kerosene

14) Choose the correct statement.
A. Coking tendency increases with increasing molecular weight
B. Coking tendency decreases with increasing molecular weight
C. Higher pressure enhances coke formation
D. Coking is an exothermic reaction

15) Cracking is
A. An exothermic reaction
B. An endothermic reaction
C. Favoured at very low temperature
D. None of these

16) Catalytic cracking compared to thermal cracking of residue of vacuum distillation of crude oil
A. Gives higher yield of petrol
B. Lower octane number of petrol
C. Higher sulphur content in the product
D. Higher gum forming material in petrol

17) Catalyst used in the catalytic cracking is
A. Silica-alumina
B. Silica gel
C. Vanadium pentoxide
D. Nickel

18) Fuel oil is subjected to visbreaking to reduce its
A. Pour point
B. Viscosity
C. Pressure drop on pumping
D. All of the above

19) Which of the following is used as a catalyst in fluidised bed catalytic cracking?
A. Silica-magnesia
B. Silica-alumina
C. Bentonite clays
D. All of the above

20) Pick out the wrong statement.
A. Higher temperature is employed in visbreaking than in thermal cracking
B. Pyrolysis is a mild thermal cracking process
C. Lead suceptibility of petrol produced by catalytic process is more than that produced by thermal cracking

D. Operating pressure and temperature in thermal cracking process is more than that in catalytic cracking process

21) Feed for reforming is generally

A. Naphtha or straight run gasoline

B. Reduced crude

C. Vacuum gas oil

D. Atmospheric gas oil

22) Higher boiling fractions like atmospheric residue is distilled under vacuum at low temperature because at high temperature, there is a tendency of the predominance of

A. Thermal cracking

B. Gum formation

C. Coking

D. Discoloration

23) In petroleum refining, the process used for conversion of hydrocarbons to aromatics is

A. Catalytic cracking

B. Catalytic reforming

C. Hydrotreating

D. Alkylation

24) Hydrocracking employs

A. High pressure & temperature

B. Low pressure & temperature

C. High pressure and low temperature

D. High temperature and low pressure

25) Pressure & temperature maintained in catalytic cracking is about

A. 2atm & 500°C

B. 10atm & 500°C

C. 30atm & 200°C

D. 50atm. & 750°C

26) In catalytic cracking, the

A. Gasoline obtained has a very low octane number

B. Pressure & temperature is very high

C. Gasoline obtained has very high aromatic content

D. Gasoline obtained has very high amount of gum forming compounds

27) The most commonly used feed stock for the reforming reactor is Heavy fuel oil.

True

False

28) Operating temperature and pressure in catalytic reforming is about

A. 1-5 Kgf/cm2 & 200°C

B. 15-45 Kgf/cm2 & 450 - 550°C

C. 50 - 75 kgf/cm2 & 600 - 800°C

D. 5-10 kgf/cm2 & 150 - 250°C

29) In catalytic cracking process, olefins crack _____ times faster than in thermal cracking process.

A. 100

B. 200-300

C. 1000-10000

D. 10

30) The main reaction in reforming is the

A. Dehydrogenation of naphthenes

B. Hydrogenation of naphthenes

C. Hydrocracking of paraffins

D. Saturation of olefins

31) Which of the following is the most widely used cracking process in oil refineries?

A. Dubbs process

B. T.C.C. moving bed process

C. Fluidised bed catalytic cracking process

D. Houdry's fixed bed process

32) Choose the correct statement regarding thermal cracking.

A. Moderate changes in operating temperature does not change the depth of cracking

B. Increased residence time results in the decreased severity of cracking

C. At low pressure, the yield of lighter hydrocarbons are more

D. Greater depth of cracking gives lower octane number gasoline

33) The order of preference for feedstock to a catalytic reformer is

A. Catalytic naphtha - coking naphtha - virgin naphtha

B. Coking naphtha - virgin naphtha - catalytic naphtha

C. Virgin naphtha - catalytic naphtha - coking naphtha

D. Virgin naphtha - coking naphtha - catalytic naphtha

34) Straight run naphtha is converted into high octane number petrol (gasoline) by catalytic

A. Cracking

B. Polymerisation

C. Reforming

D. Isomerisation

35) Which of the following processes is used for the production of petroleum coke?

A. Stabilisation

B. Visbreaking

C. Cracking

D. Reforming

36) Name the endothermic reaction out of the following:

A. Catalytic cracking

B. Hydrocracking

C. Dehydrogeneration of naphthene to produce aromatic

D. Catalytic polymerisation

37) Reforming

A. Uses naphtha as feedstock

B. Does not much affect the molecular weight of the feed

C. Improves the quality & yield of gasoline

D. All of the above

38) Reforming converts

A. Olefins into paraffins

B. Naphthenes into aromatics

C. Naphthenes into olefins

D. Naphthenes into paraffin

39) Platforming is a _____ process.

A. Moving bed

B. Fluidised bed

C. Non-regenerative & fixed bed

D. Regenerative

40) Higher pressure in the reforming reactor

A. Increases coke formation

B. Increases the rate of reaction

C. Produces high octane number gasoline

D. None of these

41) Which of the following is the most suitable feed for platforming process (reforming)?

A. Olefinic hydrocarbon

B. Naphtha

C. Fuel oil

D. Atmospheric residue

42) The coking process normally mostly used in Indian oil refineries is the _____ coking process.

A. Delayed

B. Flexi

C. Fluid

D. Contact

43) The catalytic cracking of heavier petroleum fraction is done to produce mainly

A. Gasoline

B. Asphalt

C. Diesel oil

D. Tar

44) .

Petroleum coke is used mainly in the

A. Discoloration of yellow glycerine

B. Sugar refining

C. Manufacture of carbon electrode

D. Blast furnace for reduction of iron ore

45) Maximum use of petroleum coke is in

A. Adsorption refining operation

B. Fuel gas manufacture

C. Carbon electrode manufacture

D. Iron ore reduction

46) Catalyst used in catalytic reforming is

A. Platinum on alumina

B. Nickel

C. Iron

D. Aluminium chloride

47) Visbreaking

A. Uses natural gas as feed

B. Is carried out at atmospheric pressure

C. Produces fuel oil of lower viscosity
D. Produces gasoline only
48) Which of the following processes in oil refinery does not employ 'cracking'?
A. Coking
B. Visbreaking
C. Pyrolysis
D. None of these
49) Pick out the wrong statement.
A. Iso-paraffin crack faster than n-paraf-fin
B. Catalytic cracking is endothermic, but the regeneration of catalyst is exothermic
C. Rate of decomposition of olefins in catalytic cracking is slightly slower than the thermal cracking
D. None of these
50) The temperature of visbreker furnace is to be kept around_____oC to reduce viscosity of residue.
a) 125 – 160
b) 225 – 260
c) 325 – 360
d) 425 – 460

Unit 4: Treatment Techniques

1) Performance number of a liquid fuel is related to its

A. Wax content

B. Spontaneous ignition temperature

C. Knocking tendency

D. Sulphur content

2) Waxes present in petroleum products

A. Can be separated out by distillation

B. Are not soluble in them

C. Crystallise out at low temperature

D. Decrease their viscosity

3) Gasoline extracted from natural gas (by compression and cooling) is called the _____ gasoline.

A. Polymer

B. Unleaded

C. Casing head

D. Straight run

4) Clay treatment is used to remove

A. Salt from the crude oil

B. Colour & dissolved gases from cracked gasoline

C. Wax from lube oil

D. None of these

5) Deoiling of wax is done by its

A. Heating

B. Cooling

C. Solvent extraction

D. Both B & C

6) Furfural solvent extraction is used for upgrading (by dissolving aromatics)

A. Naphtha

B. Lubricating oils

C. Wax

D. Cracking feedstock

7) Pick out the undesirable property for a solvent meant for dewaxing of lube oil.

A. Complete miscibility with oil

B. High solubility of wax in the solvent

C. Both A & B

D. Neither A nor B

8) Doctor's solution used for sweetening of petroleum products is

A. Sodium plumbite

B. Sodium sulphite

C. Sodium thiosulphate

D. Lead sulphate

9) Phenols are added in gasoline to

A. Improve the octane number

B. Act as an antioxidant

C. Reduce its viscosity

D. Increase its pour point

10) Which of the following fractions of petroleum contains maximum sulphur?

A. Diesel

B. Gasoline

C. Naphtha

D. Atmospheric residue

11) An upper limit of oil content is limited to about _____ percent for achieving efficient and satisfactory level of wax sweating.

A. 5

B. 15

C. 40

D. 60

12) Waxy crudes are treated with chemical additives mainly to

A. Depress its pour point

B. Dissolve wax

C. Precipitate wax

D. Remove wax

13) Which parameter is used for the grading of paraffin waxes?

A. Specific gravity

B. Melting point

C. Viscosity

D. Penetration number

14) _____ is not an important refinery process for upgrading the quality of lubricating oil.

A. Deoiling

B. Solvent refinning

C. Clay treatment

D. Hydrotreatment

15) Solvent used in duo-sol extraction for lube oil upgradation is a mixture of

A. Propane & phenol-cresol mixture

B. Methyl ethyl ketone & glycol

C. Phenol & furfural

D. Propane & liquid sulphur dioxide

16) The solvent used in Barisol dewaxing process is

A. Hexane

B. Furfural

C. Benzol and ethylene dichloride

D. Methyl ethyl ketone (MEK)

17) Solvent used in the deasphalting process is

A. Furfurol

B. Phenol

C. Propane

D. Hexane

18) Which of the following contains maximum sulphur?

A. Diesel

B. Petrol

C. Kerosene

D. Fuel oil

19) Sweetening of petroleum product means the removal of

A. Sulphur & its compounds

B. Water

C. Organic impurities

D. Wax

20) In sweetening process, solutizer agent used with caustic alkali is

A. Potassium isobutyrate

B. Sodium plumbite

C. Methanol

D. Phenol

21) The doctor's solution comprises of sodium plumbite in

A. Alcohal

B. Water

C. Aqueous caustic soda

D. Soda ash

22) Deoiling is the process of removal of oil from wax. It is done by the _____ process.

A. Solvent extraction

B. Sweating

C. Resettling

D. All of the above

23) Sulphuric acid treatment of petroleum products removes the _____ materials.

A. Gum forming

B. Color forming

C. Asphaltic

D. All of the above

24) Pour point of a petrofuel is

A. Multiple of 3°F

B. Multiple of 5°F

C. 5°C below the temperature at which oil ceases to flow

D. None of these

25) Solution used in Doctor's treatment for the removal of mercaptans is

A. Sodium hydroxide

B. Sodium plumbite

C. Cupric chloride

D. Potassium isobutyrate

26) Clay treatment of petroleum products

A. Decolorises & stabilises cracked gasoline

B. Desulphurise straight run gasoline & kerosene

C. Adsorb arsenic from feedstock to catalytic reforming

D. All of the above

27) Presence of sulphur in gasoline

A. Leads to corrosion

B. Increases lead susceptibility

C. Decreases gum formation

D. Helps during stabilisation

28) Which of the following constituents present in petroleum is responsible for ash formation?

A. Nitrogen compounds

B. Organometallic compounds

C. Sulphur compounds

D. Oxygen compounds

29) _____ treatment is done for appreciable improvement in viscosity index of lubricating oil.

A. Acid

B. Solvent extraction

C. Alkali

D. Clay

30) In solutizer sweetening process, solutizer solution used is

A. Methanol in Unisol process

B. Naphthenic acid in Mercapsol process

C. Both A & B

D. Neither A nor B

31) Hydrofining is the most recent and effective method for the

A. Removal of sulphur

B. Improvement of smoke point

C. Reduction of breathing loss

D. Improvement of viscosity index

32) Which of the following petroleum products contain minimum sulphur?

A. Naphtha

B. Kerosene

C. LSHS

D. Furnace oil

33) Complete removal of _____ from gasoline is done by Unisol process using caustic soda and methyl alcohol.

A. Waxes

B. Mercaptans

C. Asphalt

D. Diolefins

34) Solvent deoiling process is used for separating oil and soft wax from hard wax. Methyl iso-butyl ketone and methyl ethyl ketone (MEK) are two commonly used deoiling solvents. Use of former as the deoiling solvent has the advantages of the

A. Elimination of solvent drying facility

B. Higher nitration temperature

C. Lower solvent dilution ratio

D. All of the above

35) Solvent used for dewaxing of petroleum products are

A. Furfural

B. Methyl ethyl ketone (MEK)

C. Propane

D. Both B & C

36) Most widely used solvent for dewaxing is

A. Methyl-ethyl-ketone (MEK)

B. Naphtha

C. Petroleum ether

D. Sodium plumbite

37) Pick out wrong statement
a) There is very low temperature in phenol extraction process
b) Furfural extraction process is unstable
c) The selectivity of phenol is very high in phenol extraction process
d) Large quantity of solvent required in phenol extraction process

38) Duo-sol process means
a) There is one solvent used in this process
b) There is two solvent used in this process
c) There is three solvent used in this process
d) None of the above
39) In Lead doctoring of Gasoline Process, the ratio of Doctoring solution to Gasoline is
a) 1:2
b) 1:3
c) 1:4
d) 1:5
40) In Lead doctoring of Gasoline Process, the contact time between Doctoring solution and Gasoline is
a) 0.5 to 1 Minute
b) 2 to 2.5 Minutes
c) 3 to 3.5 Minutes
d) 4 to 4.5 Minutes
41) Crystal is produce by _____in Lube oil
a) Methyl Ethyl Ketone
b) Cyclohexane
c) Methane
d) None of the above
42) Chilling and pressing process is used for
a) Dewaxing of Lubricating oil
b) Sweetening of Gasoline
c) Desalting of crude oil
d) None of the above
43) Purpose of dewaxing is/are
a) To separate wax from charge stock
b) To produce low viscous compound
c) Both a) and b)
d) None of above
44) The reaction between charge stock and sulfuric acid is
a) Exothermic
b) Endothemic

c) Both a) and b)
d) None of above

45) The process to remove sulfur from petroleum compound is known as
a) Distillation
b) Sweetening
c) Evaporation
d) Coking

46) ADU is also known as_____in Petroleum refining unit
a) Atmospheric Distillation Unit
b) All Distillation Unit
c) Average Distillation Unit
d) None of the above

47) VDU is also known as_____in Petroleum refining unit
a) Vacuum Distillation Unit
b) Vast Distillation Unit
c) Visual Distillation Unit
d) None of the above

48) Following solvent is used in Barisol process
a) Ethylene Dichloride and Benzol
b) Propylene Dichloride and Benzol
c) Butylene Dichloride and Benzol
d) Dichloro Pentane and Benzol

49) The process in which the wax is separated from lube oil is known as Dewaxing
a) True
b) False

50) Screw type agitator is used in Chilling and Pressing process to separate wax.
a) True
b) False

51) Molecular weight of sulfur dioxide is _____ gm/mole.
a) 44
b) 64
c) 88
d) 120

52) Molecular weight of sulfur Trioxide is _____ gm/mole.
a) 70
b) 80
c) 90
d) 100

53) Molecular weight of hydrogen sulfide is _____ gm/mole.
a) 28
b) 34
c) 42
d) 62

Unit- 5 : Basics of Petrochemicals

1) The synthesis of methanol from carbon monoxide and hydrogen is what type of reaction?

a) Irreversible

b) Reversible

c) Both of the mentioned

d) None of the mentioned

2) What happens to equilibrium constant in methanol synthesis as temperature decreases?

a) Increases

b) Remains same

c) Decreases

d) None of the mentioned

3) Methanol decomposes to form hydrogen and which is the other product?

a) Carbon monoxide

b) Carbon dioxide

c) Carbon

d) None of the mentioned

4) Which type of reaction is oxidation of methanol?

a) Exothermic

b) Endothermic

c) Neutral

d) None of the mentioned

5) The Indian petrochemical industry constitutes around 40 per cent of chemical sector output

a) True

b) False

6) crucial factors govern the choice of feedstock in petrochemical plants are

a) availability

b) cost

c) power consumption

d) all of these

7) The Indian chemical industry ranks twelfth by volume in the world for production of petro chemicals

a) True

b) False

8) C1 group petrochemicals are

a) Methane,

b) $CO - H_2$ synthesis,

c) synthesis gas derivatives

d) all of the above

9) C2 group petrochemicals are

a) Ethane,

b) ethylene, ethylene derivatives,

c) acetylene

d) all of the above

10) which of the following is not end product of petrochemical industry

a) Polymer

b) Synthetic fibr

c) synthetic rubber,

d) natural rubber

11) Basic feedstock used in petrochemical industry for manufacture of olefins and aromatics are derived from

a) natural gas

b) petroleum fractions

c) both

d) none

12) Some of the alternative feed stock choice for petrochemical industry are:

a) Naphtha from methane from natural gas to liquid process

b) Naphtha from coal via direct liquification or indirect liquification by FT process

c) Plastic waste to naphtha and other hydrocarbons through liquefaction, pyrolysis and separation processes

d) All of the above

13) The feed stock for petrochemical via methane route is

a) Synthesis gas from methane, coal and biomass; conversion of synthesis gas to methanol and production of olefin by methnol to olefin technology.

b) Conversion of methanol to dimethyl ether

c) Oxidative coupling of methane

d) None of these

14) The feed stock for petrochemical is Carbon dioxide to liquid fuel by engineered bacteria

a) True

b) False

15) The feed stock for petrochemical is Gasification of petrocoke to hydrogen

16) petrochemical feedstock are

a) methane

b) synyhesis gas

c) both

d) none

17) 'Synthesis gas' is commonly used to describe basic gas mixtures –

a) synthesis gas containing CO, hydrogen
b) synthesis gas containing hydrogen and nitrogen for the production of ammonia
c) Both
d) None

18) Petrochemical derivatives based on synthesis gas and carbon monoxide have experienced steady growth due to

a) large scale utilization of methanol
b) development of a carbonylation process for acetic acid
c) Oxo synthesis process for detergents, plasticizers, and alcohols.
d) All of the above

19) Methanol is the largest consumer of synthesis gas

a) True
b) False

20) raw materials for synthesis gas production are

a) natural gas
b) refinery gases,
c) naphtha, fuel oil/residual heavy hydrocarbons and coal
d) all of the above

21) Methanol was first obtained by Robert Boylein in the year 1661

a) True
b) False

22) Methanol was first obtained through rectification of crude wood vinegar over milk of lime

a) True
b) False

23) Methanol consumption can be separated end use categories – chemical feedstock, methyl fuels, and miscellaneous uses.

a) True
b) False

24) Methanol is not used on production of

a) formaldehyde,
b) Benzene
c) acetic acid
d) methyl methacrylate,

25) Present capacity of methanol in India is 4.65 thousand tones

a) True
b) False

26) Process steps involved in the production of methanol are:

a) Production of synthesis gas using steam reforming or partial oxidation Synthesis of methanol

b) High-pressure process

c) Medium pressure

d) Low-pressure process

27) The correct sequence is

a) 1,2,3,4

b) 2,3,1,4

c) 4,3,2,1

d) 4,1,2,3

28) High-pressure process in production of methanol have pressure range between

a) 5 – 10 MPa

b) 25 – 30 MPa

c) 50– 70 MPa

d) None of these

29) Medium-pressure process in production of methanol have pressure range between

a) 5 – 10 MPa

b) 10– 25 MPa

c) 5 0– 70 MPa

d) None of these

30) The major reactions take place during methanol synthesis converter can be described by following equilibrium reactions:

a) $CH_3OH \rightarrow CO + 2\ H_2$

b) $CH_3OH + H2O \rightarrow CO_2 + 3\ H_2$

c) $CO+H_2O \rightarrow CO_2 + H_2$

d) All of the above

31) The reaction $CH_3OH \rightarrow CO + 2\ H_2$ is exothermic

a) True

b) False

32) In order to achieve a maximum yield of methanol and a maximum conversion of synthesis gas, the process must be effected at

a) High temperature and high pressure

b) High temperature and low pressure

c) low temperature and high pressure.

d) Low temperature and low pressure

33) synthesis loop in methanol production which comprises of following items –

a) circulator, converters

b) heat exchanger, heat recovery exchanger

c) cooler, separator.

d) All of the above

34) The catalyst used in methanol synthesis must be very selective towards the methanol reaction

a) True

b) False

35) Which of the following can be used as catalyst in production of methanol

a) zinc-chromic oxide

b) vanadiumpenta oxide

c) raney nickel

d) none of these

36) Desulfurization is process unit in production of methanol

a) True

b) False

37) Formaldehyde is commercially available as aqueous solution with concentration ranging from 30-56 wt.% HCHO

a) True

b) False

38) Formaldehyde in solid form as paraformaldehyde

a) True

b) False

39) Which one form of Solid formaldehyde

a) Paraformaldehyde

b) trioxane.

c) Both

d) None

40) The catalyst which cannot be used in production of formaldehyde is

a) zinc-chromic oxide catalyst

b) Silver catalyst

c) Iron-molybdenum catalyst

d) None of these

41) Formaldehyde is use to make Polyaceta resin

a) True

b) False

42) Which one of the following is not the step of formaldehyde production

a) Oxidation: $CH_3OH + 0.5\ O_2 \rightarrow HCHO + H_2O$

b) Pyrolysis: $CH_3OH \rightarrow HCHO + H_2$

c) Undesired reaction: $CH_3OH + 1.5\ O_2 \rightarrow 2H_2O + CO_2$

d) None of these

43) $CH_3OH + 0.5\ O_2 \rightarrow HCHO + H_2O$ is indothermic reaction

a) True

b) False

44) Which one following is not applied in production of formaldehyde

a) Catalytic reactor

b) Light end stripper

c) Alcohol stripper

d) Desulphurizer

45) The feed ratio in production of methanol is about 30 – 50 % for $CH_3OH: O_2$

a) True

b) False

46) Why water + HCHO + methanol stream is sent to a specific section of the absorber but not the top section of the absorber

a) This is to maximize the removal efficiency of both water and formaldehyde rich solution

b) formaldehyde rich solution will be dilute and not effective in extracting more HCHO + methanol from the gas phase stream.

c) This is to minimize the removal efficiency of both water and formaldehyde rich solution

d) formaldehyde rich solution will be dilute and not effective in extracting more HCHO + methanol from the gas phase stream.

e) Both A) and B)

47) Formaldehyde is produced from methanol

a) True

b) False

48) The inlet temperature if ractor in production of formaldehyde from methane is

a) 54°C

b) 90°C

c) 20°C

d) 160°C

49) Formaldehyde is used in manufacturing of Bakelite

a) True

b) False

Unit 6: Important C2 , C3 & Other Petrochemical compound

1) At what temperature does acetylene reacts with dry hydrogen chloride in a multi tubular reactor packed with mercuric chloride catalyst, supported over activated carbon, to produce vinyl chloride?

a) 50-60 ^oC

b) 90-100 ^{o}C
c) 150-175 ^{o}C
d) 180 ^{o}C

2) What approx. percentage of chlorine is present in the homopolymer of vinyl chloride?
a) 57%
b) 50%
c) 48%
d) 40%

3) Vinyl chloride is produced by thermal pyrolsis of ethylene dichloride at pressure and temperature of

a) 4 kgf/cm² & 500°C
b) 10 kgf/cm² & 1000°C
c) 40 kg/cm² & 200°C
d) 100 kgi/cm² & 500°C

4) Ethylene dichloride is produced from from Ethylene

a) True
b) False

5) During the production of vinyl chloride from ethylene

a) Ethylene reacts with Chlorine to produce Ethylene dchloride
b) Ethylene reacts with Chlorine to produce Ethylene dichloride
c) Ethylene reacts with Chlorine to produce Ethylene tridichloride
d) Ethylene reacts with Chlorine to produce tetra chloro Ethylene

6) During the production of vinyl chloride from ethylene

a) The purified Ethylene dichloride undergoes selective cracking to form vinyl chloride
b) The purified Ethylene dichloride undergoes selective cracking to form ethane
c) The purified Ethylene dichloride undergoes selective cracking to form polyethane
d) None of these

7) During the production of Ethylene dichloride from ethylene which is the desired reaction

a) $C_2H_4 + Cl_2 \longrightarrow C_2H_4Cl_2$
b) $C_2H_4 + Cl_2 \longrightarrow C_2H_6Cl_2$
c) $C_2H_4 + Cl_2 \longrightarrow C_2H_4Cl$

8) Undesired product during the production of Ethylene dichloride from ethylene is

a) Propylene dichloride
b) Polychloroethanes
c) Unreacted chlorine
d) All of these

9) The catalyst used during the production of Ethylene dichloride from ethylene is

a) Platinium
b) Mercury

c) Zinc oxide

d) Freeic chloride

10) The catalyst used during the production of Ethylene dichloride from ethylene is

a) Platinium

b) Ethylene dibromide

c) Zinc oxide

d) Mercury

11) During the production of Ethylene dichloride from ethylene reactor operating conditions are

a) 10 °C and 1.5 – 5 atms

b) 100^{o}C and 5 – 20 atms

c) 50 ^{o}C and 1.5 – 2 atms

d) None of these

12) $C_2H_4 + Cl_2$ ---->$C_2H_4\ Cl_2$ is exothermic reaction

a) True

b) False

13) During the production of Ethylene dichloride from ethylene,t he liquid product is partially recycled back to the reactor to maintain the liquid medium concentration.ue)

a) True

b) False

14) Which one of the following is the favorable reaction from production of vinyl chloride

a) $C_2H_4 + Cl_2$ --→ $CH_2CHCl + HCl$

b) $C_2H_4Cl_2$--→ $CH_2CHCl_2 + HCl$

c) $C_2H_6 + Cl_2$ --→ $CH_2CHCl + HCl$

d) $C_2H_4Cl_2$--→ $CH_2CHCl + HCl$

15) During the production vinyl chloride from Ethylene dichloride the catalyst used is

a) Platinium

b) charcoal

c) Zinc oxide

d) Freeic chloride

16) Production vinyl chloride from Ethylene dichloride follows a reversible gas phase reaction

a) True

b) False

17) In the production vinyl chloride from Ethylene dichloride Pyrolysis furnace operated at

a) 4 atm and 500 C.

b) 10 atm and 1000 C

c) 2 atm and 20 C

d) None of these

18) In the production vinyl chloride from Ethylene dichloride .The gases from the quench tower then enter a partial condenser which produces

a) HCl as a gas

b) the liquid stream consisting of vinyl chloride, unreacted ethylene dichloride and polychlorides

c) Both A) and B)

d) None of these

19) In the production vinyl chloride from Ethylene dichloride The bottom product from the vinyl still is fed to a distillation column which separates the ethylene dichloride from the polychlorides

a) True

b) False

20) The unit operation used in vinyl chloride production is

a) Dryer

b) Vinyl stilled

c) EDC stil

d) All of the above

21) The correct reaction in production of ethylene oxide is

a) C_2H_4 + O2---> $CH_2O.CH_2O$

b) C_2H_6 + CO ---> $CH_2O.CH_2O$

c) C_2H_4 + HCHO ---> $CH_2O.CH_2O$

d) None of these

22) Ethylene to air ratio in productionof ethylene oxide is

a) 30 – 40 %

b) 5 – 10%

c) 3 – 10 %

d) None of these

23) Which is used as catalyst in production of ethylene oxide from ethane

a) Charcoal

b) Silver oxide on alumina

c) Ferric chloride

d) molybendum

24) C_2H_4 + 0.5O2---> $CH_2O.CH_2O$ is a exothermic reaction

a) True

b) False

25) Dowtherm is an organic liquid that can attain to temperatures upto 300 °C

a) True

b) False

26) Benzene is produced by

a) Reacting Toluene with hydrogen

b) Reacting Toluene and phenol

c) D ehydrating toluene aniline

27) During the production of benzene by hydroalkylation route the main reaction is

a) Toluene + H_2 -→ Benzene + phenol

b) Toluene + H_2 -→ Benzene + Ethane

c) Toluene + H_2 -→ Benzene + Methane

28) During the production of benzene by hydroalkylation route reactor operating conditions:

a) 600 – 650 ^oC and 35 – 40 atms

b) 200– 450 ^oC and 325 – 45 atms

c) 100– 250 ^oC and 35 – 40 atms

d) None of these

29) During the production of benzene by hydroalkylation route

a) Chromia on porous carrier

b) Silver on alumina

c) Charcoal

d) Molybendum

30) The reaction During the production of benzene by hydroalkylation route

a) Toluene---→ diphenyl + hydrogen

b) Toluene + hydrogen ---→ alkanes

c) Toluene + Benzene -→ Methyl diphenyl

d) All of these

31) Phenol can be produced from

a) Cumene

b) Toluene

c) Benzene

d) All of these

32) By which of the following process phenolcan be manufactured frombenzene

a) Benzene hydrochlorination to form Benzyl chloride followed by hydrolysis of benzyl chloride to form phenol

b) Benzene chlorination to form benzyl chloride which is transformed to sodium benzoate and eventually to phenol using NaOH and HCl

c) Benzene sulfonate process

d) All of these

33) Why is diphenyl oxide added to the causticization reactor?

a) To suppress the formation of more diphenyl oxide at the causticization reactor

b) Toactivatethe formation of more diphenyl oxide at the causticization reactor

c) It act as catalyst

d) None of these

34) During chlorination benzene and chlorine form

A. Dichloro benzene

B. Monochloro benzene

C. Either A) or B)

D. Both A) and B)

35) In Causticization NaOH in aqueous medium is used

a) True

b) False

36) Propylene often referred as the crown prince of petrochemicals

a) True

b) False

37) Propylene is a

a) By product of steam crackers

b) compound having four carbon atom

c) is a saturated hydrocarbon

d) none of these

38) Propylene may be recovered from

a) FCC light ends

b) Propane dehydrogenation

c) Metathesis

d) All of these

39) Propylene can be produced by Propane dehydrogenation

a) True

b) False

39) Propylene from methanol is produced by

A. Converting methanol to dimethyl ether in adiabatic reactor catalyst

B. Converting ethanol to dimethyl ether in adiabatic reactor catalyst

C. Either A) or B)

D. Both A) and B)

40) processes for the manufacture of propylene oxide is

A. Propylene chlorohydrin process
B. propylene oxidation process using peroxides.
C. Both A) and B)
D. None of these

41) propylene oxide is used for the manufacture of
a) propylene glycol andpolyols
b) polyurethane
c) polyester resins
d) all of these

42) In Propylene hypochlorination process Propylene is reacted with aqueous chlorine resulting in the formation of propylene chlorohydrins
a) True
b) False

43) The step in the production of propylene oxide is
a) Propylene hypochlorination
b) Neutralisation
c) Dehydrochlorination
d) all of these

44) Polyols major use is in the manufacture of polyurethane(True)
a) True
b) False

45) What are the temperature and pressure conditions for the polymerization reaction of propylene?
a) 50-80 ^{o}C and 5-25 atm
b) 50-80 ^{o}C and 25-50 atm
c) 100-150 ^{o}C and 5-25 atm
d) 100-150 ^{o}C and 25-50 atm

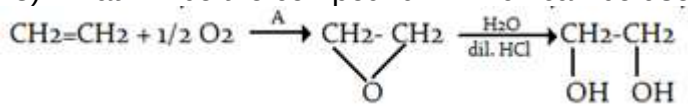
46) Which of the following is used as a catalyst in the polymerization of propylene?
a) MoO_2
b) CrO_3+Al_2O_3
c) Ni+Pt
d) $TiCl_4$+$Al(C_2H_5)_3$

47) Where among the following fields polypropylene cannot be used?
a) insulating cables and wires
b) home appliances

c) automobile appliances

d) furniture

48) What will be the compound A which can be used to carry out this synthesis of glycol?



a) RCOR’

b) RCO_2OH

c) RCHO

d) RCOOH