

Roll No.

Question Booklet Number

O. M. R. Serial No.

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Question Booklet Number

M. Sc. (Industrial Chemistry) (Second Semester)
EXAMINATION, 2022-23

CHEMISTRY OF MATERIALS, PETROCHEMICALS
AND FERTILIZERS

Paper Code						
M	S	I	C	2	0	2

Questions Booklet Series
A

Time : 1:30 Hours]

[Maximum Marks : 75

Instructions to the Examinee :

परीक्षार्थियों के लिए निर्देश :

- Do not open the booklet unless you are asked to do so.
 - The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
 - Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.
- प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
 - प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
 - प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page)

(शेष निर्देश अन्तिम पृष्ठ पर)

(Only for Rough Work)

1. Fertilizer is :
 - (A) Organic materials
 - (B) Inorganic materials
 - (C) Nanomaterials
 - (D) Both (A) and (B)
2. Which are not macronutrients in fertilizers ?
 - (A) Nitrogen
 - (B) Phosphorus
 - (C) Magnesium
 - (D) Iron
3. The dimension of nanomaterials is less than
 - (A) 1 nm
 - (B) 10 nm
 - (C) 100 nm
 - (D) 1000 nm
4. The colour of Nanogold particle is :
 - (A) Orange
 - (B) Yellow
 - (C) Red
 - (D) Above all
5. Pozzolana reacts with lime producing :
 - (A) Tri-calcium silicate
 - (B) Di-calcium silicate
 - (C) Calcium silicate
 - (D) Calcium aluminate
6. is responsible for controlling the strength and soundness of portland cement.
 - (A) SiO_2
 - (B) Al_2O_3
 - (C) Fe_2O_3
 - (D) CaO
7. Example of an antiferromagnetic substance is :
 - (A) MnO
 - (B) FeO
 - (C) CO_3O_4
 - (D) All of the above
8. In which of the following the magnetic moments align themselves parallel to each other ?
 - (A) Diamagnetic materials
 - (B) Paramagnetic materials
 - (C) Ferromagnetic materials
 - (D) Ferrimagnetic materials

9. What gas is in LPG ?
- (A) Butane
 - (B) Propane
 - (C) Iso-butane
 - (D) All of the above
10. Petroleum means :
- (A) oil from rock
 - (B) oil from well
 - (C) oil from deep earth
 - (D) All of the above
11. The example(s) of micronutrients is/are :
- (A) Copper
 - (B) Zinc
 - (C) Chlorine
 - (D) All of the above
12. The three number of the fertilizer label are :
- (A) N P K
 - (B) K M P
 - (C) D A P
 - (D) None of the above
13. One nanometer is equal to :
- (A) 10^{-6} m
 - (B) 10^{-9} m
 - (C) 10^{-12} m
 - (D) 10^{-15} m
14. Nanomaterials synthesised by sol-gel technique results in a foam like structure called :
- (A) Gel
 - (B) Arojel
 - (C) Aerosol
 - (D) Foam
15. oil is employed for lubricating texture machinery.
- (A) Vegetable oil
 - (B) Kerosene oil
 - (C) Olive oil
 - (D) Lard oil
16. oil is used for producing lubricants for internal combustion engines.
- (A) Grease oil
 - (B) Olive oil
 - (C) Lard oil
 - (D) Rapeseed oil
17. Paramagnetic materials have relative permeability :
- (A) < 1
 - (B) > 1
 - (C) equal to 1
 - (D) equal to ferromagnetic materials

18. Hysteresis loop in case of magnetically hard materials is more in shape as compared to magnetically soft materials.
- (A) Rectangular
 - (B) Circular
 - (C) Triangular
 - (D) All of the above
19. The fertilizer potash is composed of :
- (A) 52% K and 48% Cl
 - (B) 70% K and 30% Cl
 - (C) 30% K and 70% Cl
 - (D) 100% K
20. The impurities present in phosphate fertilizers are :
- (A) Fluorides
 - (B) Cadmium
 - (C) Uranium
 - (D) All of the above
21. Natural gas is mostly :
- (A) H_2
 - (B) N_2
 - (C) O_2
 - (D) CH_4
22. The main elements present in petroleum are :
- (A) carbon and nitrogen
 - (B) carbon and oxygen
 - (C) nitrogen and oxygen
 - (D) carbon and hydrogen
23. is used in solar cell.
- (A) Carbon nanotubes
 - (B) Nanorods
 - (C) Nanobots
 - (D) All of the above
24. Example of an organic nanomaterials or nanoparticles :
- (A) Zinc oxide
 - (B) Silica
 - (C) Carbon nanotubes
 - (D) Gold
25. Viscosity index is measure for the change of viscosity with change in :
- (A) pressure
 - (B) temperature
 - (C) volume
 - (D) All of the above

26. Type of lubrication system used in aircraft engines :

- (A) wet sump system
- (B) dry sump system
- (C) splash system
- (D) mist lubrication

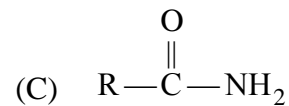
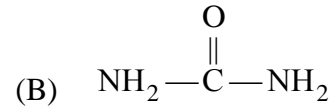
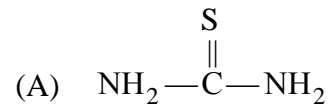
27. Which of the following is non-ferromagnetic ?

- (A) Nickel
- (B) Iron
- (C) Cobalt
- (D) Manganese

28. Magnetism of the centre of Bar magnet is :

- (A) Zero
- (B) Negative
- (C) Maximum
- (D) Minimum

29. The chemical formula of urea is :



(D) All of the above

30. Urea contains % of Nitrogen.

- (A) 26
- (B) 36
- (C) 46
- (D) 66

31. Pressure fed oiling is not used with :

- (A) cylinder walls
- (B) hydraulic lifter
- (C) camshaft bearings
- (D) crankshaft bearings

32. In most automobiles, which lubrication system is commonly used ?

- (A) Petrol system
- (B) Splash system
- (C) Pressure system
- (D) Gravity system

33. According to their dimensions the nano-structure are categorized into types.
- (A) one
 (B) two
 (C) three
 (D) four
34. Which one is used in cancer therapeutics ?
- (A) Nanobots
 (B) Carbon nanotubes
 (C) Carbon nanorods
 (D) None of the above
35. When of the following is/are biofuels ?
- (A) Methane
 (B) Methanol
 (C) Gasoline
 (D) All of the above
36. What does CNG stand for ?
- (A) Combined Natural Gas
 (B) Clean Natural Gas
 (C) Carbon-Nitrogen Gas
 (D) Compressed Natural Gas
37. The magnetic dipoles in a ferrimagnetic material is represented as :
- (A) ↑↑↑↑
 (B) ↑↓↑↓
 (C) ↑↓↑↑
 (D) ↙↘↗↖
38. When does a ferromagnetic material become paramagnetic materials ?
- (A) Never
 (B) At Curie temperature
 (C) Below Curie temperature
 (D) Above Curie temperature
39. fertilizer supplies only one major plant nutrient.
- (A) Double
 (B) Straight
 (C) Complete
 (D) Complex

40. is not a nitrogenous fertilizer.
- (A) Superphosphate of lime
 - (B) Urea
 - (C) Calcium cyanamide
 - (D) Ammonium sulphate
41. Why are the detergents used as air additives ?
- (A) To increase fire point
 - (B) To prevent foaming
 - (C) To reduce viscosity
 - (D) To prevent sludge formation
42. Which of the following oils has the highest viscosity ?
- (A) SAE-10
 - (B) SAE-20
 - (C) SAE-30
 - (D) SAE-40
43. Sodalime glass is also known as :
- (A) hard glass
 - (B) soft glass
 - (C) fine glass
 - (D) lime glass
44. An example of traditional ceramic is :
- (A) carbides
 - (B) nitrides
 - (C) boron nitrides
 - (D) silicate glass
45. Cetane number is the measure of :
- (A) viscosity of fuel
 - (B) ignition quality
 - (C) calorific value
 - (D) number of carbon molecules
46. The anti-knock value of a gasoline engine is defined in terms of :
- (A) knock number
 - (B) anti-knock number
 - (C) cetane number
 - (D) octane number
47. The chemical fertilizer is essential for better rhizobial nitrogen fixation, is :
- (A) sulphur
 - (B) sodium
 - (C) phosphorus
 - (D) potassium

48. Most commonly used nitrogen containing fertilizer in India is :
- (A) sodium nitrate
 - (B) ammonia
 - (C) urea
 - (D) calcium nitrate
49. Which of the following is not a classification of glass ?
- (A) soda-bromine glass
 - (B) soda-lime glass
 - (C) potash-lead glass
 - (D) potash-lime glass
50. Which of the following is the property of glass ?
- (A) Absorb and refract light
 - (B) Beautiful colours
 - (C) High polish
 - (D) All of the above
51. The relation between cetane number and octane number in fuels in IC engines :
- (A) No relation
 - (B) Both are equal
 - (C) Directly proportional
 - (D) Inversely proportional
52. Octane number of *n*-heptane is :
- (A) 0
 - (B) 10
 - (C) 20
 - (D) 50
53. Toxicity of nanomaterials is not primarily dependent on :
- (A) surface area
 - (B) surface charge
 - (C) particle size
 - (D) thermal conductivity
54. SEM is :
- (A) Scanning Electron Microscope
 - (B) Scanning Electrode Microscope
 - (C) Surface Electrode Materials
 - (D) Surface Electron Microscope
55. The fire point of an oil is about higher than the flash point.
- (A) 5–10°C
 - (B) 5–20°C
 - (C) 5–30°C
 - (D) 5–40°C

56. Which statement is correct ?
- (A) Lower the flash point easier to ignite
 - (B) Higher the flash point easier to ignite
 - (C) Lower the flash point tougher to ignite
 - (D) None of the above
57. How is triple superphosphate made ?
- (A) Phosphate rock + CaSiO_3
 - (B) Phosphate rock + H_2SO_4
 - (C) Phosphate rock + H_3PO_2
 - (D) Phosphate rock + H_3PO_4
58. A balanced fertilizer for plant is :
- (A) ammonium sulphate
 - (B) urea
 - (C) compost
 - (D) calcium phosphate
59. Flash point of gasoline is :
- (A) -450°F
 - (B) 45°F
 - (C) -10°F
 - (D) 10°F
60. What is the fire point of diesel ?
- (A) 140°F
 - (B) -140°F
 - (C) 200°F
 - (D) -200°F
61. Example of hand glass :
- (A) Potash-lime glass
 - (B) Soda-lime glass
 - (C) Potash-lead glass
 - (D) Common glass
62. Glass becomes on heating :
- (A) hard
 - (B) soft
 - (C) gas
 - (D) None of the above
63. For effective cutting of steel with hand hacksaw, which of the following coolants is suitable ?
- (A) Grease
 - (B) Cutting oil
 - (C) Kerosene oil
 - (D) Petrol

64. Which of the following is the temperature at which lubricant will start to flow when poured ?
- (A) Viscosity
 - (B) Triple point
 - (C) Melting temperature
 - (D) Pour point
65. For blue colour silver nano-materials the size and shape of silver is around :
- (A) 10 mm
 - (B) 40 nm
 - (C) 50 mm
 - (D) 40 pm
66. Example of inorganic nanotube materials :
- (A) WS_2
 - (B) TiO_2
 - (C) ZnO
 - (D) Above all
67. Maximum permissible limit of magnesia content in ordinary portland cement is :
- (A) 4%
 - (B) 6%
 - (C) 8%
 - (D) 10%
68. The development of strength of cement and its fitness are :
- (A) not related
 - (B) directly proportional
 - (C) inversely proportional
 - (D) randomly related
69. The essential constituent of portland cement is :
- (A) Lime
 - (B) Silica
 - (C) Alumina
 - (D) All of the above
70. Excess alkalies in cement cause :
- (A) staining
 - (B) efflorescence
 - (C) alkali aggregate cement
 - (D) All of the above
71. Octane number is :
- (A) Rating of IC engine power
 - (B) No. of carbon molecules
 - (C) Measurement of the quality of diesel fuel
 - (D) Measurement of the quality of gasoline

72. The octane number of isooctane is :
- (A) 25
 - (B) 75
 - (C) 50
 - (D) 100
73. Which type of lubricant are calcium and sodium ?
- (A) Solid
 - (B) Semi-solid
 - (C) Liquid
 - (D) Permanent
74. The flash point of lubricant should be
- (A) $> 650^{\circ}\text{F}$
 - (B) $< 100^{\circ}\text{F}$
 - (C) $300-400^{\circ}\text{F}$
 - (D) $400-500^{\circ}\text{F}$
75. Vicat apparatus is used for :
- (A) Fineness test
 - (B) Soundness test
 - (C) Consistency test
 - (D) All of the above
76. The % of SiO_2 present in ordinary port-land cement :
- (A) 5-10%
 - (B) 10-17%
 - (C) 17-25%
 - (D) 25-50%
77. is popularly called glass bricks.
- (A) Wired glass
 - (B) Safety glass
 - (C) Shielding glass
 - (D) Structural glass
78. Which of the following is used to prepare soluble glass ?
- (A) Quartz sand
 - (B) PbO_2
 - (C) NaOH
 - (D) $\text{Mg(OH)}_2 + \text{SiO}_2$
79. Which of the following lubricants is obtained by fractional distillation of petroleum ?
- (A) Coolant
 - (B) Synthetic oils
 - (C) Fatty oils
 - (D) Mineral oil

80. The lubricants for transformers must have quality of good :
- (A) low load capacity
 - (B) less oiliness
 - (C) dielectric strength
 - (D) no resistance to oxygen
81. In textile industries are added to the lubricants.
- (A) Oxygen gas
 - (B) Carbon
 - (C) Inhibitors
 - (D) Black-P
82. What are the lubricants used for railway tracks ?
- (A) Heavy oil
 - (B) Grease
 - (C) Vegetable oil
 - (D) Graphite
83. Oil emulsions are the most effective lubricants in :
- (A) engines
 - (B) gears
 - (C) light cutting
 - (D) heavy cutting
84. Graphite is a :
- (A) solid lubricant
 - (B) semi-liquid lubricant
 - (C) liquid lubricant
 - (D) None of the above
85. The most important property of nano-materials is :
- (A) friction
 - (B) force
 - (C) temperature
 - (D) elastic
86. The first talk about nanotechnology was given by :
- (A) Bohr
 - (B) Newton
 - (C) Einstein
 - (D) Richard Feynman

87. The specific gravity of particles of ordinary portland cement is :
- (A) 1
 - (B) 2.15
 - (C) 4.25
 - (D) 3.15
88. contains maximum % of dicalcium silicate.
- (A) Portland cement
 - (B) Sulphate resisting cement
 - (C) Rapid hardening cement
 - (D) Low heat cement
89. Viscosity numbering system is used to rate the of engine, oil.
- (A) oil temperature
 - (B) oil weight
 - (C) oil gravity
 - (D) thickness
90. The most important quality of any lubricant is :
- (A) viscosity
 - (B) surface tension
 - (C) specific gravity
 - (D) specific heat
91. Initial setting time of ordinary portland cement is :
- (A) 30 minutes
 - (B) 1 hour
 - (C) 5 hours
 - (D) 12 hours
92. Final setting time of ordinary portland cement should not be greater than :
- (A) 6 hours
 - (B) 10 hours
 - (C) 24 hours
 - (D) 72 hours

93. substance is used to decrease knocking in diesel fuel.
- (A) Tetra ethyl lead
 - (B) Di-ethyl lead
 - (C) Hydrogen peroxide
 - (D) Acetone peroxide
94. Which of the following exhaust gas produces least harmless components after its combustion ?
- (A) NO_2
 - (B) N_2
 - (C) CO_2
 - (D) CO
95. Early attainment of strength in rapid hardening cement is mainly due to :
- (A) Tri-calcium Aluminate
 - (B) Tri-calcium Silicate
 - (C) Fine grinding
 - (D) Gypsum
96. The purpose of adding pozzolana in cement is :
- (A) to decrease shrinkage
 - (B) to decrease heat of hydration
 - (C) to increase durability
 - (D) to increase strength
97. oil is used for making lubricants for railway engines.
- (A) Lard oil
 - (B) Rapessed oil
 - (C) Vegetable oil
 - (D) Petroleum oil
98. Which of the following are the types of synthetic lubricants ?
- (A) Silicate esters
 - (B) Dibasic acid esters
 - (C) Organo-phosphate esters
 - (D) All of the above
99. Slow setting cement have higher percentage of :
- (A) Gypsum
 - (B) Tri-calcium silicate
 - (C) Tri-calcium aluminate
 - (D) Di-calcium phosphate
100. Strength of cement is mainly due to :
- (A) CS_2
 - (B) C_2S
 - (C) C_3S
 - (D) C_4AF

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ● (C) (D)

Q. 2 (A) (B) ● (D)

Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर—A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।