

07. If an amount R is paid at the end of every year for ' n ' years, then the net present value of the annuity at an interest rate of i is

- (A) $R \left[\frac{(1+i)^n - 1}{i} \right]$
- (B) $R \left[\frac{(1+i)^n - 1}{i(1+i)^n} \right]$
- (C) $R(1+i)^n$
- (D) $R/(1+i)^n$

Answer: Option B

08. Pick out the wrong statement.

- (A) The annual depreciation rate for machinery and equipments in a chemical process plant is about 10% of the fixed capital investment
- (B) Annual depreciation rate of buildings in a chemical plant is about 3% of its initial cost
- (C) Insurance rates on annual basis in a chemical plant may be about 1% of the fixed capital investment
- (D) In a chemical industry, research and development cost amounts to about 15% of net sales realisation (NSR)

Answer: Option D

09. Which of the following does not come under the sales expenses for a product of a chemical plant?

- (A) Advertising
- (B) Warehousing
- (C) Legal fees
- (D) Customer service

Answer: Option C

10. Operating profit of a chemical plant is equal to

- (A) Profit before interest and tax i.e., net profit + interest + tax
- (B) Profit after tax plus depreciation
- (C) Net profit + tax
- (D) Profit after tax

Answer: Option A

11. Which of the following is not a current asset of a chemical company?

- (A) Inventories
- (B) Marketable securities
- (C) Chemical equipments
- (D) None of these

Answer: Option C

12. _____ taxes are based on gross earnings.

- (A) Property
- (B) Excise
- (C) Income
- (D) Capital gain

Answer: Option C

13. A balance sheet for an industrial concern shows

- (A) The financial condition at any given time
- (B) Only current assets
- (C) Only fixed assets
- (D) Only current and fixed assets

Answer: Option A

14. Pick out the wrong statement.

- (A) Gross revenue is that total amount of capital received as a result of the sale of goods or service
- (B) Net revenue is the total profit remaining after deducting all costs excluding taxes
- (C) The ratio of immediately available cash to the total current liabilities is known as the cash ratio
- (D) Consolidated income statement based on a given time period indicates surplus capital and shows the relationship among total income, costs & profit over the time interval

Answer: Option B

15. Pick out the correct statement.

- (A) Difference between income and expense is termed as gross revenue

- (B) Unamortised cost is the difference between the original cost of a property and all the depreciation charges made to date
- (C) Sum-of-the-years-digits methods of depreciation calculation accounts for the interest on the investment
- (D) Scrap value is the net amount of money obtainable from the sale of used property over and above any charges involved in its removal & sale

Answer: Option B

16. A series of equal payments (e.g., deposit or cost) made at equal intervals of time is known as

- (A) Perpetuity
- (B) Capital charge factor
- (C) Annuity
- (D) Future worth

Answer: Option C

17. A shareholder has _____ say in the affairs of company management compared to a debenture holder.

- (A) More
- (B) Less
- (C) Same
- (D) No

Answer: Option A

18. The ratio of working capital to total capital investment for most chemical plants (except for non-seasonal based products) is in the range of _____ percent.

- (A) 0.1 to 1
- (B) 1 to 2
- (C) 10 to 20
- (D) 50 to 60

Answer: Option C

19. Depreciation

- (A) Costs (on annual basis) are constant when the straight line method is used for its determination
- (B) Is the unavoidable loss in the value of the plant, equipment and materials with lapse in time
- (C) Does figure in the calculation of income tax liability on cash flows from an investment
- (D) All (A), (B) and (C)

Answer: Option D

20. In declining balance method of depreciation calculation, the

- (A) Value of the asset decreases linearly with time
- (B) Annual cost of depreciation is same every year
- (C) Annual depreciation is the fixed percentage of the property value at the beginning of the particular year
- (D) None of these

Answer: Option C

21. Fixed capital investment of a chemical plant is the total amount of money needed to supply the necessary plant and manufacturing facilities plus the working capital for operation of the facilities. Which of the following components of fixed capital investment requires minimum percentage of it?

- (A) Electrical installation cost
- (B) Equipment installation cost
- (C) Cost for piping
- (D) Equipment insulation cost

Answer: Option D

22. The inventory of raw materials included in the working capital is usually about _____ month's supply of raw materials valued at delivery prices.

- (A) One
- (B) Three
- (C) Six
- (D) Twelve

Answer: Option A

23. Which of the following ceramic packing materials is the costliest of all?

- (A) Berl saddles
- (B) Raschig rings
- (C) Pall rings
- (D) Intalox saddles

Answer: Option A

24. Payback period

- (A) And economic life of a project are the same
- (B) Is the length of time over which the earnings on a project equals the investment
- (C) Is affected by the variation in earnings after the recovery of the investment
- (D) All (A), (B) and (C)

Answer: Option B

25. Purchased cost of equipments for a chemical process plant ranges from _____ percent of the fixed capital investment.

- (A) 10 to 20
- (B) 20 to 40
- (C) 45 to 60
- (D) 65 to 75

Answer: Option B

26. Which of the following is not a component of depreciation cost?

- (A) Repairs and maintenance cost
- (B) Loss due to obsolescence of the equipment
- (C) Loss due to decrease in the demand of product
- (D) Loss due to accident/breakdown in the machinery

Answer: Option A

27. Cost of piping in a fluid processing unit (e.g., distillation) of a chemical process plant is about _____ percent of the fixed capital investment.

- (A) 4
- (B) 13
- (C) 22
- (D) 34

Answer: Option B

28. Direct costs component of the fixed capital consists of

- (A) Contingencies
- (B) Onsite and offsite costs
- (C) Labour costs
- (D) Raw material costs

Answer: Option B

29. A reactor having a salvage value of Rs. 10000 is estimated to have a service life of 10 years. The annual interest rate is 10%. The original cost of the reactor was Rs. 80000. The book value of the reactor after 5 years using sinking fund depreciation method will be Rs.

- (A) 40,096
- (B) 43,196
- (C) 53,196
- (D) 60,196

Answer: Option D

30. In which of the electric power generation system, the operating cost is minimum?

- (A) Thermal
- (B) Nuclear
- (C) Hydroelectric
- (D) Fast breeder reactor

Answer: Option C

31. According to six-tenths-factor rule, if the cost of a given unit at one capacity is known, then the cost of similar unit with " n " times the capacity of the first unit is approximately equal to _____ times the cost of the initial unit.

- (A) n
- (B) $n^{0.6}$

- (C) $n^{0.4}$
- (D) \sqrt{n}

Answer: Option B

32. Fixed charges for a chemical plant does not include the

- (A) Interest on borrowed money
- (B) Rent of land and buildings
- (C) Property tax, insurance and depreciation
- (D) Repair and maintenance charges

Answer: Option D

33. Which of the following is not a mathematical method for evaluation of profitability of a chemical process plant?

- (A) Cash reserve
- (B) Rate of return on investment
- (C) Payout period
- (D) Discounted cash flow based on full life performance

Answer: Option A

34. "Break-even point" is the point of intersection of

- (A) Fixed cost and total cost
- (B) Total cost and sales revenue
- (C) Fixed cost and sales revenue
- (D) None of these

Answer: Option B

35. An investment of Rs. 100 lakhs is to be made for construction of a plant, which will take two years to start production. The annual profit from the operation of the plant is Rs. 20 lakhs.

What will be the payback time?

- (A) 5 years
- (B) 7 years
- (C) 12 years
- (D) 10 years

Answer: Option B

36. A machine has an initial value of Rs. 5000, service life of 5 years and final salvage value of Rs. 1000. The annual depreciation cost by straight line method is Rs.

- (A) 300
- (B) 600
- (C) 800
- (D) 1000

Answer: Option C

37. Optimum number of effects in a multiple effect evaporator is decided by the

- (A) Cost benefit analysis
- (B) Floor area availability
- (C) Terminal parameters
- (D) Evaporation capacity required

Answer: Option A

38. Out of the following, the depreciation calculated by the _____ method is the maximum.

- (A) Diminishing balance
- (B) Straight line
- (C) Sum of the years digit
- (D) Sinking fund

Answer: Option A

39. Which of the following is not a component of the working capital for a chemical process plant?

- (A) Product inventory
- (B) In-process inventory
- (C) Minimum cash reserve
- (D) Storage facilities

Answer: Option D

40. Accumulated sum at the end of 5 years, if Rs. 10000 is invested now at 10% interest per annum on a compound basis is Rs.

- (A) 15000
- (B) 16105
- (C) 18105
- (D) 12500

Answer: Option B

41. Following the six-tenth factor rule, if a log-log plot of capacity of the equipment vs. cost of the equipment is made, then a straight line is obtained, whose slope is equal to

- (A) 0.1
- (B) 0.6
- (C) 0.2
- (D) 0.8

Answer: Option B

42. The economic life of a large chemical process plant as compared to a small chemical plant is

- (A) Only slightly more
- (B) Much more
- (C) Slightly less
- (D) Almost equal

Answer: Option B

43. Optimum economic pipe diameter for fluid is determined by the

- (A) Viscosity of the fluid
- (B) Density of the fluid
- (C) Total cost considerations (pumping cost plus fixed cost of the pipe)
- (D) None of these

Answer: Option C

44. 'P' is the investment made on an equipment, 'S' is its salvage value and 'n' is the life of the equipment in years. The depreciation for Rath year by the sum-of year's digit method will be

- (A) $(P - S)/n$
- (B) $1 - (P/S)^{1/m}$
- (C) $(m/n)(P - S)$
- (D) $[2(n - m + 1)/n(n + 1)].(P - S)$

Answer: Option D

45. 'Lang factor' is defined as the ratio of the capital investment to the delivered cost of major equipments. The value of 'Lang factor' for fixed capital investment, for a solid-fluid processing chemical plant ranges from

- (A) 1.2 to 1.4
- (B) 2.5 to 2.7
- (C) 4.2 to 4.4
- (D) 6.2 to 6.4

Answer: Option C

46. Construction expenses are roughly _____ percent of the total direct cost of the plant.

- (A) 2
- (B) 10
- (C) 30
- (D) 50

Answer: Option B

47. The amount of simple interest during 'n' interest period is (where, i = interest rate based on the length of one interest period, p = principal)

- (A) $p.i.n.$
- (B) $p(1 + i.n)$
- (C) $p(1 + i)n$
- (D) $p(1 - i.n)$

Answer: Option A

48. For a given fluid, as the pipe diameter increases, the pumping cost

- (A) Decreases
- (B) Increases

- (C) Remains the same
 - (D) May increase or decrease, depending upon whether the fluid is Newtonian or non-Newtonian
- Answer: Option A

49. An annuity is a series of equal payments occurring at equal time intervals, and this amount includes the sum of all payments plus interest, if allowed to accumulate at a definite rate of interest from the time of initial payment to the end of annuity term. Ordinary annuity is used in the calculation of the

- (A) Manufacturing cost
- (B) Depreciation by sinking fund method
- (C) Discrete compound interest
- (D) Cash ratio

Answer: Option B

50. 'Utilities' in a chemical process plant includes compressed air, steam, water, electrical power, oxygen, acetylene, fuel gases etc. Utility costs for ordinary chemical process plants ranges roughly from _____ percent of the total product cost.

- (A) 1 to 5
- (B) 10 to 20
- (C) 25 to 35
- (D) 35 to 45

Answer: Option B

51. With increase in the discounted cash flow rate of return, the ratio of the total present value to the initial investment of a given project

- (A) Decreases
- (B) Increases
- (C) Increases linearly
- (D) Remain constant

Answer: Option A

52. Pick out the wrong statement.

- (A) Debt-equity ratio of a chemical company describes the lenders contribution for each rupee of owner's contribution i.e., debt-equity ratio = total debt/net worth
- (B) Return on investment (ROI) is the ratio of profit before interest & tax and capital employed (i.e. net worth + total debt)
- (C) Working capital = current assets + current liability
- (D) Turn over = opening stock + production closing stock

Answer: Option C

53. Generally, income taxes are based on the

- (A) Total income
- (B) Gross earning
- (C) Total product cost
- (D) Fixed cost

Answer: Option B

54. Utilities cost in the operation of chemical process plant comes under the

- (A) Plant overhead cost
- (B) Fixed charges
- (C) Direct production cost
- (D) General expenses

Answer: Option C

55. The ratio of gross annual sales to the fixed capital investment is termed as the _____ ratio.

- (A) Cash reserve
- (B) Capital
- (C) Turnover
- (D) Investment

Answer: Option C

56. The depreciation during the year 'n', in diminishing balance method of depreciation calculation, is calculated by multiplying a fixed percentage 'N' to the

- (A) Initial cost

- (B) Book value at the end of $(n - 1)$ th year
 - (C) Depreciation during the $(n - 1)$ th year
 - (D) Difference between initial cost and salvage value
- Answer: Option B

57. Relative cost of chemical process plants in India is about _____ percent more than the similar plants in U.S.A.

- (A) 15
- (B) 35
- (C) 55
- (D) 75

Answer: Option B

58. If the interest rate of 10% per period is compounded half yearly, the actual annual return on the principal will be _____ percent.

- (A) 10
- (B) 20
- (C) > 20
- (D) < 20

Answer: Option C

59. Factory manufacturing cost is the sum of the direct production cost

- (A) Fixed charges and plant overhead cost
- (B) And plant overhead cost
- (C) Plant overhead cost and administrative expenses
- (D) None of these

Answer: Option A

60. Equipment installation cost in a chemical process plant ranges from _____ percent of the purchased equipment cost.

- (A) 10 to 20
- (B) 35 to 45
- (C) 55 to 65
- (D) 70 to 80

Answer: Option B

61. The _____ of a chemical company can be obtained directly from the balance sheet as the difference between current assets and current liabilities.

- (A) Cash ratio
- (B) Net working capital
- (C) Current ratio
- (D) Liquids assets

Answer: Option B

62. Which of the following elements is not included in the scope of market analysis?

- (A) Competition from other manufactures
- (B) Product distribution
- (C) Opportunities
- (D) Economics

Answer: Option D

63. In a chemical process plant, the total product cost comprises of manufacturing cost and the

- (A) General expenses
- (B) Overhead cost
- (C) R & D cost
- (D) None of these

Answer: Option A

64. Most chemical plants use an initial working capital amounting to 10-20% of the total capital investment. But this percentage may increase to _____ percent in case of seasonal products manufacturing plant.

- (A) 30
- (B) 50
- (C) 75
- (D) 95

Answer: Option B

65. Effective and nominal interest rates are equal, when the interest is compounded

- (A) Annually
- (B) Fortnightly
- (C) Monthly
- (D) Half-yearly

Answer: Option A

66. _____ method for profitability evaluation of a project does not account for investment cost due to land.

- (A) Net present worth
- (B) Pay out period
- (C) Discounted cash flow
- (D) Rate of return on investment

Answer: Option B

67. Which of the following methods of depreciation calculations results in book values greater than those obtained with straight line method?

- (A) Multiple straight line method
- (B) Sinking fund method
- (C) Declining balance method
- (D) Sum of the years digit method

Answer: Option B

68. Which of the following is the costliest material of construction used in pressure vessel construction?

- (A) Low alloy steel
- (B) Lead
- (C) Titanium
- (D) High alloy steel

Answer: Option C

69. A present sum of Rs. 100 at the end of one year, with half yearly rate of interest at 10%, will be Rs.

- (A) 121
- (B) 110
- (C) 97
- (D) 91

Answer: Option A

70. Annual depreciation costs are constant, when the _____ method of depreciation calculation is used.

- (A) Declining balance
- (B) Straight line
- (C) Sum of the years digit
- (D) None of these

Answer: Option B

71. The 'total capital investment' for a chemical process plant comprises of the fixed capital investment and the

- (A) Overhead cost
- (B) Working capital
- (C) Indirect production cost
- (D) Direct production cost

Answer: Option B

72. Annual depreciation cost are not constant when, the _____ method of depreciation calculation is used.

- (A) Straight line
- (B) Sinking fund
- (C) Present worth
- (D) Declining balance

Answer: Option D

73. An investment of Rs. 1000 is carrying an interest of 10% compounded quarterly. The value of the investment at the end of five years will be

- (A) $1000 (1 + 0.1/4)^{20}$
- (B) $1000 (1 + 0.1)^{20}$
- (C) $1000 (1 + 0.1/4)^5$
- (D) $1000 (1 + 0.1/2)^5$

Answer: Option A

74. The total investment in a project is Rs. 10 lakhs and the annual profit is 1.5 lakhs. If the project life is 10 years, then the simple rate of return on investment is

- (A) 15%
- (B) 10%
- (C) 1.5%
- (D) 150%

Answer: Option C

75. Pick out the wrong statement.

- (A) Gross margin = net income - net expenditure
- (B) Net sales realisation (NSR) = Gross sales - selling expenses
- (C) At breakeven point, NSR is more than the total production cost
- (D) Net profit = Gross margin - depreciation - interest

Answer: Option C

76. Pick out the wrong statement.

- (A) Net worth means paid up share capital and reserve & surplus (i.e. shareholders equity)
- (B) Return on equity = profit after tax/net worth
- (C) Working capital turnover ratio = sales/net working capital
- (D) Total cost of production is more than net sales realisation (NSR) at breakeven point

Answer: Option D

77. Which of the following is not a component of the fixed capital for a chemical plant facility?

- (A) Raw materials inventory
- (B) Utilities plants
- (C) Process equipment
- (D) Emergency facilities

Answer: Option A

78. Nominal and effective interest rates are equal, when the interest is compounded

- (A) Quarterly
- (B) Semi-annually
- (C) Annually
- (D) In no case, they are equal

Answer: Option C

79. If 'S' is the amount available after 'n' interest periods for an initial principal 'P' with the discrete compound interest rate 'i', the present worth is given by

- (A) $(1 + i)^n/S$
- (B) $S/(1 + i)^n$
- (C) $S/(1 + in)$
- (D) $S/(1 + n)^i$

Answer: Option B

80. The payback method for the measurement of return on investment

- (A) Gives a correct picture of profitability
- (B) Underemphasises liquidity
- (C) Does not measure the discounted rate of return
- (D) Takes into account the cash inflows after the recovery of investments

Answer: Option C

81. Total product cost of a chemical plant does not include the _____ cost.

- (A) Market survey
- (B) Operating labour, supervision and supplies
- (C) Overhead and utilities
- (D) Depreciation, property tax and insurance

Answer: Option A

82. _____ of depreciation calculation accounts for the interest on investment.

- (A) Straight line method
- (B) Declining balance
- (C) Both (A) and (B)
- (D) Neither (A) nor (B)

Answer: Option D

83. Manufacturing cost in a chemical company does not include the

- (A) Fixed charges
- (B) Plant overheads
- (C) Direct products cost
- (D) Administrative expenses

Answer: Option D

84. Personnel working in the market research group is responsible for the job of

- (A) Equipment selection
- (B) Product evaluation
- (C) Equipment design
- (D) Cost estimation

Answer: Option B

85. Functional depreciation of an equipment is the measure of decrease in its value due to its

- (A) Ageing
- (B) Wear and tear
- (C) Obsolescence
- (D) Breakdown or accident

Answer: Option C

86. Which of the following is not a component of working capital?

- (A) Raw materials is stock
- (B) Finished products in stock
- (C) Transportation facilities
- (D) Semi-finished products in the process

Answer: Option C

87. Effluent treatment cost in a chemical plant is categorised as the _____ cost.

- (A) Fixed
- (B) Overhead
- (C) Utilities
- (D) Capital

Answer: Option C

88. In an ordinary chemical plant, electrical installation cost may be about

- (A) 10-15% of purchased equipment cost
- (B) 3-10% of fixed capital investment
- (C) Either (A) or (B)
- (D) Neither (A) nor (B)

Answer: Option C

89. Depreciation is _____ in profit with time.

- (A) Decrease
- (B) Increase
- (C) No change
- (D) None of these

Answer: Option A

90. Gross earning is equal to the total income minus

- (A) Total product cost
- (B) Fixed cost
- (C) Income tax
- (D) None of these

Answer: Option A

91. _____ of depreciation calculation does not take into account the interest on investments.

- (A) Present worth method
- (B) Sinking fund method
- (C) Sum of the years-digits method
- (D) All (A), (B) and (C)

Answer: Option C

92. In a manufacturing industry, breakeven point occurs, when the

- (A) Total annual rate of production equals the assigned value
- (B) Total annual product cost equals the total annual sales
- (C) Annual profit equals the expected value
- (D) Annual sales equals the fixed cost

Answer: Option B

93. Chemical engineering plant cost index is used for finding the present cost of a particular chemical plant, if the cost of similar plant at some time in the past is known.

The present cost of the plant = original cost \times (index value at present/ index value at time original cost was obtained). The most major component of this cost index is

- (A) Fabricated equipment and machinery
- (B) Process instruments and control
- (C) Pumps and compressor
- (D) Electrical equipments and material

Answer: Option A

94. 'Six-tenth factor' rule is used for estimating the

- (A) Equipment installation cost
- (B) Equipment cost by scaling
- (C) Cost of piping
- (D) Utilities cost

Answer: Option B

95. In financial accounting of a chemical plant, which of the following relationship is invalid?

- (A) Assets = equities
- (B) Assets = liabilities + net worth
- (C) Total income = costs + profits
- (D) Assets = capital

Answer: Option D

96. Scheduling provides information about the

- (A) Proper utilisation of machines
- (B) Means to minimise idle time for machines
- (C) Time of completion of job
- (D) Time of starting of job and also about how much work should be completed during a particular period

Answer: Option D

97. The amount of compounded interest during ' n ' interest periods is

- (A) $p[(1+i)^n - 1]$
- (B) $p(1 + i)^n$
- (C) $p(1 - i)^n$
- (D) $p(1 + i^n)$

Answer: Option A

98. Cost of instrumentation in a modern chemical plant ranges from _____ percent of the total plant cost.

- (A) 5 to 10
- (B) 20 to 30
- (C) 40 to 50
- (D) 60 to 70

Answer: Option B

99. Gantt chart (or Bar chart) is helpful in

- (A) Efficient utilisation of manpower and machines
- (B) Preparing production schedule