This Question Booklet contains 12 printed pages

# PGFE

**Total Marks : 100**
**Time : 100 Minutes**

**Question Booklet Code :** **A**

**A**
Seal Sticker

**Candidate's Seat No. :**

**Candidate's Signature** _____ **Block Supervisor's Signature** _____

**DO NOT OPEN QUESTION BOOKLET UNTIL INSTRUCTED.**

INSTRUCTIONS FOR CANDIDATE:

1. Check Number printed on your OMR SHEET and Question Paper with your SEAT No. before answering the questions. Consult block supervisors in case the above mentioned numbers do not match with your seat number.
2. There are total 100 questions. For answer of each question A, B, C, D, E options are given in OMR SHEET. In OMR SHEET, there is "E" option. "E" option is for "Not Attempted". If candidate do not wish to answer the question he/she should select "E" option (Not Attempted). All questions are compulsory.

   For Example:

   Which state of India has the longest sea shore ?

   A ○ B ○ C ● D ○ E ○

   (A) Maharashtra (B) Tamilnadu

   (C) Gujarat (D) Andhra Pradesh

   In this example, the right answer is (C). Therefore, the Circle of (C) has been darkened (encoded). Candidate should not give the answer "Gujarat" in writing.

   **The options once darkened/answered by candidate cannot be changed.**
3. Candidates are not permitted to leave examination hall during examination.
4. Candidates must strictly enter SEAT NO. in the designated space provided in OMR SHEET as well as Question Paper neatly as soon as they receive the OMR SHEET & Question Paper.
5. Candidates must not write name or put any identification sign/symbol on OMR SHEET. In such case strict disciplinary action will be taken against candidate & will be considered disqualified/ineligible. Only Seat No. must be entered at designated space provided in OMR SHEET.
6. Both, Candidate's & Supervisor's signature must be done on Certificate of OMR SHEET. Unsigned OMR SHEET would not be considered for evaluation.
7. Candidates are not permitted to use or carry with them any kind of literature, guide, hand written notes, or printed books, mobile phone, pagers, smart watches, camera or any electronic gadgets to examination hall.
8. Use of only Non-scientific / Non-programmable calculator shall allow during examination.
9. Candidates are not permitted to talk/discuss in the Examination Hall. Any candidate found violating supervisor's instructions will be disqualified.
10. Candidates must fully darken circle A, B, C, D and E accordingly with Blue / Black ball pen. If answers are marked with any other coloured ball pen, pencil, white ink (whitner), any corrections are done by candidate by means of blade or rubber or whitner will not be considered for evaluation.
11. Candidates may carry QP with them after Examination.
12. **For correct answer 1 (One) marks will be given.**

    **If candidate gives more than one option as answer for one question in answer sheet (OMR SHEET), or gives wrong answer then the candidate will be allotted Zero (0) marks.**

    **If candidate does not want to answer a particular question and marks (E) or leave the option without encoding on OMR sheet, then no minus marks will be given.**

Submit the OMR SHEET to the block supervisor after completion of examination without fail before leaving examination hall, failure to do so will result in disqualification of the candidature for the examination and disciplinary action will be taken against such candidate.

1. Which of the following metal is present in the structure of Chlorophyll?

(A) Ca (B) Zn

(C) Mg (D) Mn

2. Which of the following enzyme is commonly used in classification of fruit beverages?

(A) Sucrase (B) Pectinase

(C) Bromilin (D) α-Amylase

3. Which of the following species of wheat in India is widely used for the preparation of different baked products?

(A) T. compactum (B) T. dicoccum

(C) T. durum (D) T. aestivum

4. Bixin is a _____ pigment derived from the seed coat of Bixa orellana.

(A) Yellow (B) Green

(C) Orange (D) Purple

5. Potassium metabisulfite should not be used for the preservation of coloured juices because

(A) Bleaching action (B) Characteristic flavour

(C) Characteristic aroma (D) Limiting of $CO_2$

6. The foods which contains moisture less than that normally present in natural fruit but more than dehydrated fruit are known as _____.

(A) Insoluble moisture foods. (B) High moisture foods

(C) Low moisture foods. (D) Intermediate moisture foods

7. Which type of heat exchange consists of a set of tubes in a container called shell?

(A) Spiral (B) Plate

(C) Shell and tube (D) None

8. Under equilibrium conditions water activity equals to _____.

(A) 10/RH (B) 100/RH

(C) RH/10 (D) RH/100

9. Which heat exchange flow type is the most efficient?

(A) Cross flow (B) Counter flow

(C) Parallel flow (D) None

10 In a multiple effect evaporator, the effect of boiling point elevation is to _____.

(A) Increase the capacity (B) Reduce the economy

(C) Reduce the capacity (D) Increase the economy

11. Which of the following is the correct way to improve the nutritive value of legume proteins.

(A) Eating raw (B) Soaking in water

(C) Blanching (D) Heat processing

12. Which of the following fruit content high fat?

(A) Kiwi (B) Orange

(C) Pineapple (D) Avocado

13. Which of the following vitamin will help in prevention of dermatitis?

(A) Vit. B7 (B) Vit. B9

(C) Vit. B12 (D) Vit. C

14. What is the source of white wheat flour?

(A) Germ (B) Endosperm

(C) Bram (D) None

15 Heat transfer in liquid and gases takes place by _____.

(A) Radiation (B) Conduction

(C) Conduction and radiation (D) Convection

16. The solution with high solute concentration is having _____ osmotic pressure.

(A) Low (B) High

(C) Zero (D) Same

17. Which of the following non-carbohydrate material acts as a stabilizer?

(A) Carrageenan (B) Gum arabic

(C) Gelatin (D) Cellulase

18. A two phase system in which a liquid is dispersed in a solid is called _____.

(A) Colloid (B) Gel

(C) Sol (D) Foam

19. Which of the following method is recognized as nonthermal method of food processing?

(A) High pressure processing (B) Microwave processing

(C) Autoclaving method (D) Retort processing

20. Which of the following part of spray drier collects the dried powder from the drying Chamber?

(A) Atomizer (B) Nozzle

(C) Cyclone Separator (D) Blower

21. Which of the following process is responsible for the requirement of less torque and mechanical energy for the extrusion process?

(A) Hydrolysis of starch (B) Retrogradation of starch

(C) Dextrinization of starch (D) Gelatinization of starch

22. What is the role of calcium propionate in bread?

(A) Emulsifier (B) Anti microbial agent

(C) Antioxidant (D) Dough Strengthener

23. What is the role of sequestrants in foods

(A) To impact colour (B) To enhance flavour

(C) To remove the traces of metal (D) To reduce the consistency

24. The rate of dehydration is affected by _____.

(A) Temperature difference (B) Humidity

(C) Air velocity (D) All above

25. Which of the following water is easier to remove and evaporate from the food?

(A) Bound water (B) Free water

(C) Multilayer water (D) None

26. In which of the following freezing method, food or Package comes in direct Contact with refrigerant?

(A) Bract freezing (B) Plate breezing

(C) IQF (D) Immersion freezing

27. An insulator should have _____.

(A) High thermal conductivity (B) Low thermal conductivity

(C) Porous structure (D) Less resistance to heat flow

28. Which amino acid is required for the synthesis of Niacin?

(A) Tryptophan (B) Glutamic acid

(C) Methionine (D) Histidine

29. Which of the following equipment is used for the grading of rice on the basis of size?

(A) Aspirator (B) Destoner

(C) Plansifter (D) Pneumatic separator

30. In a single effect evaporator, the economy is _____.

(A) > 1 (B) 1

(C) < 1 (D) None

31. Which of the following is a liquifying enzyme?

(A) β-Amylase (B) α-Amylase

(C) Invertase (D) None

32. Which of the following stimulant is present in the Cocoa?

(A) Caffeine (B) Flavonoid

(C) Catechins (D) Theobromine

33. Which of the following alcoholic beverage is prepared from rice?

(A) Whisky (B) Wine

(C) Beer (D) Arrack

34. Why fruits are stored in controlled atmospheric storage?

(A) To increase respiration (B) To avoid contamination

(C) To inhibit the overripening (D) None

35. In which of the following drier, heated air is blown up through the food particles with just enough force to suspend the particles in a gentle motion?

(A) Kiln drier (B) Fluidized bed drier

(C) Spray drier (D) Vacuum drier

36. Which of the following toxin is produced by mold?

(A) Botulin (B) Enterotoxin

(C) Neurotoxin (D) Mycotoxin

37. Heat sensitive foods are most commonly Concentrated in _____.

(A) Flash evaporator (B) Thin film evaporator

(C) Vacuum evaporator (D) Open kettles

38. Peroxide value of oil is a measure of _____.

(A) Degree of Oxidation (B) Amount of carbon present

(C) Degree of saturation (D) Degree of unsaturation

39. Which of the following vitamin is a rich source of yeast?

(A) Vit. A (B) Vit. B

(C) Vit. C (D) Vit. D

40. The damage in the texture of tomato during freezing storage is due to _____.

(A) Protein denaturation (B) Formation of small ice crystals

(C) Formation of large ice crystals (D) None

41. Which of the following microorganisms grows at freezing temperature?

(A) Psychrotrophs (B) Mesotrophs

(C) Thermotrophs (D) None

42. The principle behind the application of several treatments / methods to prevent bacterial growth is called _____.

(A) Antimicrobial principle (B) Inhibitory effect

(C) Inhibitory principle (D) Hurdle effect

43. Paperboard and Polystyrene have _____.

(A) Low thermal conductivity (B) High thermal conductivity

(C) No thermal conductivity (D) None

44. Cocoa fermentation is dominated by _____.

(A) Yeast (B) Fungi

(C) Bacteria (D) All

45. Oxygen permeability of package is an important function of packaging of _____.

(A) Dairy products (B) Fruits and vegetables

(C) Bakery products (D) Nuts and dry fruits

46. The characteristic odour of garlic is due to _____.

(A) Allicine (B) Eugenol

(C) Glycosides (D) Thymol

47. What is the nature of return paddy obtained from disc sheller?

(A) Lengthy (B) Dwarf

(C) Short (D) Thin

48. What is the adverse effect of excessive dietary intake of saturated fatty acid?

(A) Rickets (B) Increases blood cholesterol

(C) Pellagra (D) D M disease

49. What is the percentage of sugar in the sugar candy?

(A) 60-65 (B) 70-75

(C) 75-80 (D) 40-50

50. Which of the following stain is used to demonstrate fungus?

(A) Indian ink (B) Safranin

(C) Lacto phenol Cotton blue (D) Nigrosin

51. Traceability of the food Product is done with the help of _____.

(A) Batch code (B) MRP of the product

(C) Quantity of the product (D) Barcode system & batch code records

52. Heat sensitive material can be concentrated in an evaporator by employing _____.

(A) Vacuum (B) High pressure

(C) High residence time (D) None

53. Which of the following vitamin is also called Niacin?

(A) Vit. B2 (B) Vit. A

(C) Vit. C (D) Vit. B3

54. Which of the following contains highest proteins?

(A) Fruits (B) Vegetables

(C) Mushroom (D) Meat

55. What does INS, with respect to additives stand for in labeling regulations?

(A) Indian Numbering System (B) International Numbering System

(C) Inspection Numbering System (D) None

56. What is the objective of clinching in canning of fruits and vegetable?

(A) Permanent sealing of can (B) Addition of syrup or brine

(C) Intentional escape of air from loose lid (D) Sterilization of can

57. In air convection driers, the rate of drying depends upon _____.

(A) Air velocity (B) Pressure

(C) Vacuum (D) None

58. Pure concentrated oil soluble extract of a natural herb is known as _____.

(A) Essential oil (B) Oleoresin

(C) Extracted solute (D) None

59. The small ice crystals are formed due to _____.

(A) Slow freezing (B) Fast freezing

(C) Medium freezing (D) None

60 In which of the following storage method, the refrigerated storage area is maintained under reduced pressure and high humidity

(A) Modified atmosphere Storage (B) Hypobaric storage

(C) High humidity storage (D) None

61. Greaseproof paper is resistant to _____.

(A) Grease (B) Oil

(C) Oil and grease (D) None

62. Return paddy is collected from which side of the compartment separator

(A) Upper (B) Lower

(C) Middle (D) Adjacent

63. Which of the following taste is imparted by Naringin?

(A) Sweet (B) Soul

(C) Salty (D) Bitter

64. Which of the following food additive is known as leavening agent?

(A) Na - Benzoate (B) Na - Nitrate

(C) Na - Sulphate (D) Na - Bicarbonate

65. The optimum temperature at which most enzyme act rapidly is about

(A) 20°C (B) 25°C

(C) 37°C (D) 45°C

66. What is the purpose of adding Ca salts in the Canning of Okra?

(A) To maintain the Colour
(B) To maintain the tenderness
(C) To maintain the quality
(D) To maintain the taste

67. In which of the following freezing method, the food comes in contact of air?

(A) Immersion freezer
(B) Plate freezer
(C) Blast freezer
(D) None

68. In which of the following body organ carotene changes into Vit. A?

(A) Brain
(B) Stomach
(C) Liver
(D) Intestine

69. What is the extraction rate of straight run flour?

(A) 68%
(B) 82%
(C) 78%
(D) 72%

70. Clarifying agent gelatin should be added along with _____ while clarification process of fruit juices.

(A) Tannin
(B) Pectinol
(C) Casein
(D) None

71. In which of the following food conduction is used as a mode of heat transfer?

(A) Canned food
(B) Meat
(C) Fruit juices
(D) Baked products

72. Which of the following is not the rice milling equipment?

(A) Sheller
(B) Cone polisher
(C) Disc separator
(D) Compartment type separator

73. In which of the following phenomena, the surface of the food becomes dried due to the loss of moisture from the surface of food due to high temperature?

(A) Tenderization
(B) Shrinkage
(C) Case hardening
(D) None

74. Which of the following food additive is responsible for causing symptoms of Chinese Restaurant Syndrome?

(A) Firming Agent
(B) Ca - Propionate
(C) Na - Silicate
(D) Sodium salt of Glutamic Acid

75. What is the role of aspirator?

(A) To remove the bran
(B) To remove the hulk
(C) To remove the endosperm
(D) To remove the germ

76. _____ is used to remove the precures of limonin from fruits to prevent bitterness of fruit juices.

(A) Carbon dioxide
(B) Ethylene
(C) Propylene
(D) None

77. Which of the following step is not included in the pulse milling?

(A) Dehulling
(B) Splitting
(C) Parboiling
(D) Loosening of hulk

78. A fluid with flow behaviour index less than one is called _____.

(A) Pseudoplastic (B) Bingham plastic

(C) Dilatant (D) Newtonian

79 Identify the example of a classical diffusional mass transfer process without involving heat among the following.

(A) Alcohol distillation (B) Carbonation of the beverages

(C) Fruit juice concentration (D) Drying of food gains

80. Which of the following is the effect of homogenization on the appearance of milk?

(A) Yellowish appearance (B) Black appearance

(C) Whitish appearance (D) Dusty appearance

81. If $u = e^x + y$ and $v = e^x + 7y$, then the Jacobian $\frac{\partial(x,y)}{\partial(u,v)}$ equals _____.

(A) $7e^x$ (B) $6e^x$

(C) $7e^{-x}$ (D) $\frac{e^{-x}}{6}$

82. Let $f:[0,1]\to\mathbb{R}$ be continuous function which is differentiable on (0, 1) and such that $f(0) = 1$ and $f(1) = 0$. Then which of the following statements is true in general ?

(A) There exists $c \in (0, 1)$ such that $f(c) = cf'(c)$

(B) There exists $c \in (0, 1)$ such that $f(c) = -cf'(c)$

(C) There exists $c \in (0, 1)$ such that $f'(c) = cf(c)$

(D) There exists $c \in (0, 1)$ such that $f'(c) = -cf(c)$

83. If $f(x, y) = x^2y - xy^2 + 4xy - 4x^2 - 4y^2$ then (0, 0) is

(A) A point of minima (B) A point of maxima

(C) A saddle point (D) None of these

84. The improper integral $\int_0^{\pi/2} \frac{\sin x}{\sqrt{1-\cos x}}dx$ is

(A) divergent (B) convergent and its value is 0

(C) convergent and its value is 1 (D) convergent and its value is 2

85. Let C denote the closed curve in the first quadrant formed by the parabolas $y^2 = 4x$ and $x^2 = 4y$. If the area bounded by C is $\frac{16}{3}$, then the value of the line integral $\oint_C (xdy - ydx)$ is

(A) $\frac{8}{3}$ (B) $\frac{16}{3}$

(C) $\frac{32}{3}$ (D) $\frac{4}{3}$

86. The general solution of the equation $y'' + 2y' - y = 0$ is

(A) $y = e^{-x}(c_1 e^{\sqrt{2}x} + c_2 e^{-\sqrt{2}x})$ (B) $y = e^{\sqrt{2}x}(c_1 e^{x} + c_2 e^{-x})$

(C) $y = e^{x}(c_1 e^{\sqrt{2}x} + c_2 e^{-\sqrt{2}x})$ (D) $y = e^{-\sqrt{2}x}(c_1 e^{x} + c_2 e^{-x})$

87. If the general solulion of the equationdy $\frac{dy}{dx}+y\sin x=e^{\cos x}$ is $(f(x)+c)e^{\cos x}$, then $f(x)$ equals _____

(A) sin $x$ (B) cos $x$

(C) $x$ (D) 0

88. The inverse Laplace transform of the function F(s) = $\frac{1}{S^2(S^2+1)}$ is

(A) t cost (B) t sint

(C) t – cost (D) t – sint

89. If the Laplace transform of the function f(t) = $\frac{\cos 2t \sin t}{e^t}$ is denoted by F(s), then the value of F(0) is

(A) $\frac{-1}{5}$ (B) $\frac{1}{5}$

(C) $\frac{-1}{10}$ (D) $\frac{1}{10}$

90. Which of the following is a solution of Laplace equation in two dimensions ?

(A) $e^{-y}\cos x$ (B) $x^2+y^2$

(C) $e^{-y}+\cos x$ (D) $x^3+3x^2-3y^2+1$

91. If the eigen values of the matrix $\begin{bmatrix} a & 1 \\ 1 & 2b \end{bmatrix}$, (where a, b > 0), are 2 and 3 then the point (a, b) lies on which of the following straight lines ?

(A) $x+y=5$ (B) $x+2y=6$

(C) $x+y=1$ (D) $x+2y=5$

92. Let A be a square matrix of order 3 and suppose det $A \neq 0$. Then the non-homogeneous system of linear equations Ax = b has

(A) no solulion (B) unique solution

(C) three solutions (D) infinite solutions

93. Let C = { Z : $|z| = \frac{3}{2}$ }. Then the value of the contour integral $\int_C \frac{\cos(2\pi z)}{z^2-3z+2}dz$ is

(A) $-2\pi i$ (B) $2\pi i$

(C) 1 (D) –1

94. The coefficient of $Z^2$ in the Taylor series expension of $f(z) = \sin^2 z$ about z = 0 is

(A) 0 (B) 1

(C) 2 (D) $\frac{1}{2}$

95. Consider functions f(z) = $\overline{z}$ and g(z) = $e^{\overline{z}}$ defined over complex numbers, Then

(A) f and g both are analytic in C

(B) f is analytic but g is not analytic in C

(C) g is analytic but f is not analytic in C

(D) Neither f nor g is analytic in C

96. Bag A contains 2 white and 3 red balls and Bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be white. What is the probability that the white ball is drawn from Bag B ?

(A) $\frac{9}{19}$

(B) $\frac{18}{19}$

(C) $\frac{5}{19}$

(D) $\frac{10}{19}$

97. The probability of obtaining at least two 'Five' in rolling a fair die 3 times is

(A) $\frac{2}{9}$

(B) $\frac{1}{9}$

(C) $\frac{2}{27}$

(D) $\frac{1}{27}$

98. If the mean of the 15 observations is $x_1, x_2, ....., x_{14}, x_{15}$ is 15 then the mean of the 15 observations $y_1, y_2, ....., y_{14}, y_{15}$ (where $y_i = x_i + i$ for $i = 1, 2, .....15$) is

(A) 23

(B) 22

(C) 11

(D) 9

99. Which of the following iteration formula is suitable for computing the cube-root of the number 11?

(A) $x_{n+1} = \frac{x^3_n + 11}{2x^2_n}$

(B) $x_{n+1} = \frac{3x^3_n + 11}{2x^2_n}$

(C) $x_{n+1} = \frac{2x^3_n + 11}{3x^2_n}$

(D) $x_{n+1} = \frac{x^3_n + 11}{3x^2_n}$

100. Which of the following is a single step method for numeric solution of ordinary differential equations?

(A) Gauss - Jordan method

(B) Secant method

(C) Runge - Kutta method

(D) Bisection method

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