

Question Booklet No. :

PADT/2021

Register  
Number

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2021

**BASICS OF ENGINEERING  
(Degree Standard)**

Duration : Three Hours]

[Total Marks : 300

Read the following instructions carefully before you begin to answer the questions.

**IMPORTANT INSTRUCTIONS**

1. You will be supplied with this question booklet 15 minutes prior to the commencement of the examination.
2. This question booklet contains **200** questions. Before answering the questions, you shall check whether all the questions are printed serially and ensure that there are no blank pages in the question booklet. **If any defect is noticed in the question booklet, it shall be reported to the invigilator within the first 10 minutes and get it replaced with a complete question booklet. If the defect is reported after the commencement of the examination, it will not be replaced.**
3. Answer **all** the questions. All the questions carry equal marks.
4. You must write your register number in the space provided on the top right side of this page. Do not write anything else on the question booklet.
5. An answer sheet will be supplied to you separately by the room invigilator to shade the answers. Instructions regarding filling of answers etc., which are to be followed mandatorily, are provided in the answer sheet and in the memorandum of admission (Hall Ticket).
6. You shall write and shade your question booklet number in the space provided on page one of the answer sheet with **BLACK INK BALL POINT PEN**. If you do not shade correctly or fail to shade the question booklet number, your answer sheet will be invalidated.
7. Each question comprises of five responses (answers) : i.e. (A), (B), (C), (D) and (E). You have to select **ONLY ONE** correct answer from (A) or (B) or (C) or (D) and shade the same in your answer sheet. If you feel that there are more than one correct answer, shade the one which you consider the best. **If you do not know the answer, you have to mandatorily shade (E).** In any case, choose **ONLY ONE** answer for each question. If you shade more than one answer for a question, it will be treated as a wrong answer even if one of the given answers happens to be correct.
8. You should not remove or tear off any sheet from this question booklet. You are not allowed to take this question booklet and the answer sheet out of the examination room during the time of the examination. After the examination, you must hand over your answer sheet to the invigilator. You are allowed to take the question booklet with you only after the examination is over.
9. **You should not make any marking in the question booklet except in the sheets before the last page of the question booklet, which can be used for rough work. This should be strictly adhered to.**
10. Failure to comply with any of the above instructions will render you liable for such action as the Commission may decide at their discretion.



**SPACE FOR ROUGH WORK**





1. The value of the integral  $\int_C \frac{z^2+1}{z^2-1} dz$  where  $C$  is a unit circle and the centre at  $z = i$  is.
- (A)  $2\pi$  (B)   $0$   
 (C)  $-2\pi$  (D)  $4\pi$   
 (E) Answer not known
2. At  $z = +i$ , the complex function  $f(z) = 1 + z^2$  has
- (A)  Zero of order one (B) Zero of order two  
 (C) Simple pole (D) Pole of order two  
 (E) Answer not known
3. The curve  $u(x, y) = c_1$  and  $v(x, y) = c_2$  are orthogonal if
- (A)  $u$  and  $v$  are complex function (B)   $u + iv$  is an analytic function  
 (C)  $u - v$  is an analytic function (D)  $u + v$  is an analytic function  
 (E) Answer not known
4. The Cauchy-Riemann equations in polar form for a complex function  $f(z) = P + iQ$  to be analytic are;
- (A)  $\frac{\partial P}{\partial \theta} = \frac{1}{r} \frac{\partial Q}{\partial r}$  and  $\frac{\partial Q}{\partial \theta} = -\frac{1}{r} \frac{\partial P}{\partial r}$  (B)   $\frac{\partial P}{\partial r} = \frac{1}{r} \frac{\partial Q}{\partial \theta}$  and  $\frac{\partial Q}{\partial r} = -\frac{1}{r} \frac{\partial P}{\partial \theta}$   
 (C)  $\frac{\partial P}{\partial r} = -\frac{1}{r} \frac{\partial Q}{\partial \theta}$  and  $\frac{\partial Q}{\partial r} = \frac{1}{r} \frac{\partial P}{\partial \theta}$  (D)  $\frac{\partial P}{\partial r} = \frac{1}{r} \frac{\partial Q}{\partial \theta}$  and  $\frac{\partial Q}{\partial r} = \frac{1}{\theta} \frac{\partial P}{\partial \theta}$   
 (E) Answer not known
5. The image of a line  $2x + y = 2$  under the transformation  $w = \frac{1}{z}$  is
- (A)  $2u - v = 0$  (B)  $2u + v = 2$   
 (C)   $2u^2 + 2v^2 - 2u + v = 0$  (D)  $2u^2 + v^2 - 2u + v = 2$   
 (E) Answer not known
6. The flux of the vector field  $\vec{F} = x\vec{i} + y\vec{j} + z\vec{k}$  over the sphere  $x^2 + y^2 + z^2 = a^2$  is
- (A)  $-4\pi a^2$  (B)   $4\pi a^3$   
 (C)  $4\pi a^2$  (D)  $-4\pi a^3$   
 (E) Answer not known

7. The Taylor's expansion of  $e^{x+y}$  about the point  $(0, 0)$  upto second degree is

(A)   $1 + x + y + \frac{(x+y)^2}{2} + \dots$

(B)  $1 - x - y + \frac{(x-y)^2}{2} + \dots$

(C)  $1 + x + y + \frac{x^2 + xy + y^2}{2!} + \dots$

(D)  $1 + x + y + x^2 + y^2 + 2xy + \dots$

(E) Answer not known

8. An ordinary differential equation of the form  $y'' + p(x)y' + q(x)y = r(x)$  is

(A) linear and homogeneous ODE

(B) non-linear homogeneous ODE

(C)  linear and non-homogeneous ODE

(D) non-linear and non homogeneous ODE

(E) Answer not known

9. Let  $y_1$  and  $y_2$  be solutions to a homogeneous linear ODE  $y'' + p(x)y' + q(x)y = 0$

Assertion (A) :  $y = c_1y_1 + c_2y_2$  is a solution to  $y'' + p(x)y' + q(x)y = 0$

Reason (R) : For a homogeneous linear ODE  $y'' + p(x)y' + q(x)y = 0$  any linear combination of two solutions is again a solution to it

(A)  Assertion (A) is correct and (R) is the correct reason

(B) Assertion (A) is only correct

(C) Assertion (A) is correct but (R) is not the correct reason

(D) Assertion (A) is wrong but (R) is correct

(E) Answer not known

10. If  $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{pmatrix}$  and  $B = A^8 - 11A^7 - 4A^6 + A^5 + A^4 - 11A^3 - 3A^2 + 2A + I$  then

$B$  matrix can be expressed as

(A)  $A^2 + I$

(B)  $A^2 + A$

(C)   $A^2 + A + I$

(D)  $A^3 + A^2 + I$

(E) Answer not known



11. Atomic packing fraction of BCC structure is  
(A) 0.24 (B) 0.52  
(C)  0.68 (D) 0.74  
(E) Answer not known
12. The half-life period of a certain radioactive element with disintegration constant 0.0693 per day is  
(A)  10 days (B) 14 days  
(C) 140 days (D) 1.4 days  
(E) Answer not known
13. Nuclear reactions which convert fertile materials into Fissile materials, are called  
(A) Fission reactions (B)  Breeding reactions  
(C) Thermal reactions (D) Fusion reactions  
(E) Answer not known
14. The phenomenon of ejection of electrons from the surface of metals, when light of a suitable wavelength fall on it, is known as  
(A) Compton effect (B)  Photoelectric effect  
(C) Ionisation (D) Radioactivity  
(E) Answer not known
15. The refractive indices of core ( $\mu_1$ ) and Cladding ( $\mu_2$ ) of an optical fibre satisfy the relation  
(A)  $\mu_1 < \mu_2$  (B)  $\mu_1 = \mu_2$   
(C)   $\mu_1 > \mu_2$  (D) Both (A) and (B)  
(E) Answer not known
16. The life time of atom in the meta stable state is  
(A)  $10^{-8}$  second (B)   $10^{-3}$  second  
(C)  $10^8$  second (D)  $10^3$  second  
(E) Answer not known

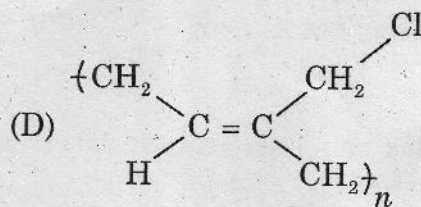
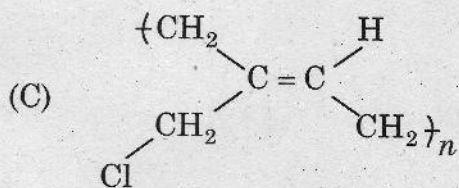
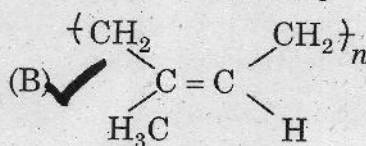
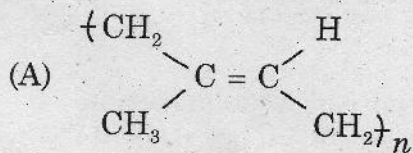
17. The second law of thermodynamics implies that
- (A) A refrigerator can reduce the temperature to absolute zero
  - (B) Whole heat can be converted into mechanical energy
  - (C) Conservation of energy
  - (D)  No heat engine can have 100% efficiency
  - (E) Answer not known
18. In which of the following mode, heat is carried by the moving particle
- (A)  Convection
  - (B) Conduction
  - (C) Radiation
  - (D) Wave motion
  - (E) Answer not known
19. The co-efficient of superficial expansion of a substance is approximately equal to how many time its co-efficient of linear expansion
- (A)  2
  - (B) 3
  - (C) 1
  - (D) 4
  - (E) Answer not known
20. An ultrasonic generator consists of Quartz plate of thickness 0.6 mm, (density =  $2800 \text{ kg/m}^3$  and the Young's modulus =  $8.8 \times 10^{10} \text{ N/m}^2$ . If the thickness is increased to 1.2 mm then the frequency is
- (A) Doubled
  - (B) Same as the original value
  - (C)  Half of the original value
  - (D) Increased to three times of the original value
  - (E) Answer not known
21. In SONAR, we use
- (A)  Ultrasonic waves
  - (B) Infrasonic waves
  - (C) Radio waves
  - (D) Audible sound waves
  - (E) Answer not known



22. In Newtonian mechanics second law relates
- (A) Velocity and acceleration (B) Velocity and force  
(C)  Acceleration and force (D) Displacement and velocity  
(E) Answer not known
23. The process where in, there is a variation of electrode potential, owing to the inadequate diffusion of species from the bulk of the electrolytic solution to the vicinity of the electrode is called
- (A) Activation polarisation (B)  Concentration polarisation  
(C) Decomposition potential (D) Resistance polarisation  
(E) Answer not known
24. To increase the Corrosion-resistance, a little quantity of \_\_\_\_\_ is added to stainless steel.
- (A) Cobalt (B)  Molybdenum  
(C) Tin (D) Copper  
(E) Answer not known
25. Cyclomethylene trinitroamine is commonly known as
- (A) TNT (B) Dynamite  
(C) Amatol (D)  RDX  
(E) Answer not known
26. Oxygen balance of TNT is
- (A)  -24.7 (B) -11.3  
(C) -24.5 (D) 15.2  
(E) Answer not known
27. Lime containing more than 90% of Calcium oxide, is called \_\_\_\_\_ lime.
- (A) Poor (B) Hydraulic  
(C)  Fat (D) Dolomitic  
(E) Answer not known

28. Phenol is a
- (A) Mono functional monomer                      (B) Di-functional monomer  
 (C)  Tri-functional monomer                      (D) Tetra-functional monomer  
 (E) Answer not known

29. Identify the repeating unit of natural rubber from the following:



- (E) Answer not known

30. The processes that can be employed for converting sea water into drinking water are

- (i) Electrodialysis  
 (ii) Solar stills  
 (iii) Reverse osmosis  
 (iv) Ultra centrifugation

- (A) (i) and (iv) only                      (B) (i), (ii) and (iv) only  
 (C)  (i), (ii) and (iii) only                      (D) (iii) and (iv) only  
 (E) Answer not known

31. The phosphoric acid when used as electrolyte in hydrogen-oxygen fuel cells at about 200°C polymerises to

- (A)  Pyro phosphoric acid                      (B) Ortho phosphoric acid  
 (C) Meta phosphoric acid                      (D) Tri polyphosphoric acid  
 (E) Answer not known



32. Explain the sentence with in quotes: "Work expands so as to fill the time available for its completion". An elderly lady at leisure can spend the entire day writing a postcard to her niece.
- (A) The more work there is to be done, this more the time needed
  - (B) ✓ Whatever time is available for a given amount of work, all of it will be used
  - (C) If you have more time, you can do more work
  - (D) If you have some important work to do, you should always have some additional time
  - (E) Answer not known

33. Our nation aims at providing every citizen with the basic necessities and complete freedom to lead a life of his own choice. We aim to create a democratic society, strong and free, in which every citizen will occupy an equal and honoured place, and be given full and equal opportunities for growth and service.

Choose the correct option given below:

According to the author, our national objective is to

- (A) Create equal opportunities for all
- (B) End economic exploitation in the country
- (C) Promote individual freedom and prosperity
- (D) ✓ Promote democracy, socialism and secularism
- (E) Answer not known

34. Choose the correct one word for the following phrase

A person who leaves his country to settle in some other country

- (A) Immigrant
- (B) ✓ Emigrant
- (C) Foreigner
- (D) Citizen
- (E) Answer not known

35. Choose the correct word from the options given below.

Instant access to the things

- (A) Friction loss
- (B) Power source
- (C) ✓ Control center
- (D) Calculation speed
- (E) Answer not known

36. Form a wh question for the underlined expression

The Manager was transferred at short notice

- (A) How was the Manager transferred?
- (B) ✓ Who was transferred at short notice?
- (C) When was the Manager transferred?
- (D) Where was the Manager transferred?
- (E) Answer not known

37. Sending e-mail is similar to

- (A) Picturing an event
- (B) Narrating a story
- (C) ✓ Writing a letter
- (D) Creating a drawing
- (E) Answer not known

38. What is the cause? Industries use alloy for making utensils and hard devices.

1. Because Alloys are very cheap
2. Because Easy to make hard devices
3. Because having more resistant properties
4. Because it is a combination of a metal and a non metal

- (A) 1
- (B) 2
- (C) ✓ 3
- (D) 4
- (E) Answer not known

39. Although there are more than 100 known element, they rarely occur \_\_\_\_\_ the pure state.

- (A) at
- (B) ✓ in
- (C) between
- (D) among
- (E) Answer not known

40. The preacher said that truth always

- (A) ✓ wins
- (B) won
- (C) has won
- (D) had won
- (E) Answer not known



41. The type of website that engages consumers in interactions that will move them closer to a direct purchase is known as a \_\_\_\_\_ website?
- (A) customer service (B)  interactive  
(C) corporate (D) marketing  
(E) Answer not known
42. What is the overall term for creating, editing, formatting, storing, retrieving and printing a text document?
- (A)  word processing (B) spreadsheet design  
(C) web design (D) database design  
(E) Answer not known
43. A \_\_\_\_\_ is a collection of information saved as a unit.
- (A) folder (B)  file  
(C) path (D) Directory  
(E) Answer not known
44. Network layer is responsible for
- (A) Delivery of individual packet from source to Destination  
(B) Routing  
(C) Logical Addressing  
(D)  All of the above  
(E) Answer not known
45. Which of the following denotes 100 base-FX
- (A) Base band (B) Fast ethernet  
(C) Twisted pair (D)  Pair of optical fibre  
(E) Answer not known
46. Internet works on
- (A)  Packet switching (B) Circuit switching  
(C) Message switching (D) Serial switching  
(E) Answer not known

47. What is the motive of Cache memory?
- (A) to increase the speed of processor  
 (B) ✓ to increase the speed of main memory  
 (C) to increase the speed of buffer memory  
 (D) to increase the speed of external memory  
 (E) Answer not known
48. Physical memory is directly accessed by
- (A) ✓ CPU (B) Buffer memory  
 (C) External memory (D) Internal memory  
 (E) Answer not known
49. A man walks from one town to another at a constant speed of 15 kmph and then returns back at a constant speed of 10 kmph, his average speed of journey is
- (A) 12.5 kmph (B) ✓ 12 kmph  
 (C) 2.5 kmph (D) 25 kmph  
 (E) Answer not known
50. If a body is moving with a uniform acceleration ( $a$ ), then the distance travelled by the body during the  $n^{\text{th}}$  second of its motion is given by
- (A)  $\frac{u+a}{2}(1-2n)$  (B)  $\frac{u+a}{2}(n-2)$   
 (C) ✓  $u + \frac{a}{2}(2n-1)$  (D)  $u - \frac{a}{2}(2n-1)$   
 (E) Answer not known
51. A particle starts from rest and moves in a straight line whose equation of motion is  $x = 2t^3 - t^2 - 1$ . The acceleration after 2 second in
- (A)  $10 \text{ m/s}^2$  (B)  $12 \text{ m/s}^2$   
 (C) ✓  $22 \text{ m/s}^2$  (D)  $18 \text{ m/s}^2$   
 (E) Answer not known



52. The moment of inertia of a triangle of base ' $b$ ' and height ' $h$ ' about an axis passing through its vertex and parallel to the base is \_\_\_\_\_ as that passing through its C.G. and parallel to the base.

- (A) four times (B) six times  
(C)  nine times (D) twelve times  
(E) Answer not known

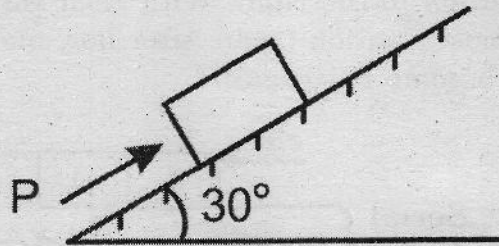
53. Which of the following statements are true?

- (i) Kinetic friction is the friction between two bodies when motion is impending  
(ii) Kinetic friction is the friction between two bodies after motion begins  
(iii) Kinetic friction is lesser than static friction  
(iv) Kinetic friction is more than static friction.
- (A) (i) and (iii) (B)  (ii) and (iii)  
(C) (ii) and (iv) (D) (i) and (iv)  
(E) Answer not known

54. The angle to which an inclined plane may be raised before an object resting on it starts moving under the action of its own weight and reaction of the plane is

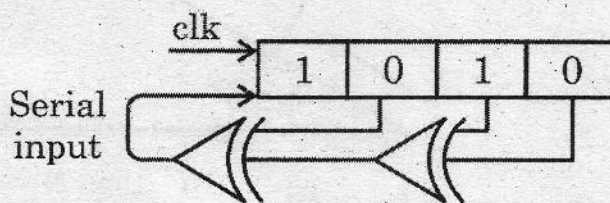
- (A) Angle of friction (B)  Angle of repose  
(C) Lead angle (D) Angle of sliding  
(E) Answer not known

55. A block of weight 1600 N is in contact with a plane inclined at  $30^\circ$  to the horizontal as shown in figure. Find the value of  $P$  to just cause the motion to impend up the plane. The coefficient of friction between the surfaces in contact is 0.20.



- (A)  1077 N (B) 1546 N  
(C) 2877 N (D) 7728 N  
(E) Answer not known

56. The dimension of pressure in MLT system is  
 (A)  $ML^{-1}T^{-1}$  (B)  $ML^{-1}T^2$   
 (C)  $ML^{-1}T^{-2}$  (D)  $ML^2T^2$   
 (E) Answer not known
57. Decibel is a logarithmic unit expression of  
 (A) noise levels (B) power ratio  
 (C) current (D) voltage  
 (E) Answer not known
58. The distance of a synchronous satellite from the earth's surface is  
 (A) 10,000 km (B) 35,900 km  
 (C) 25,400 km (D) 350 km  
 (E) Answer not known
59. A device used for coupling microwave energy is known as  
 (A) Transmitter (B) Resonator  
 (C) Wave guide (D) Loop  
 (E) Answer not known
60. Among the following the slowest ADC is  
 (A) Flash type (B) Successive approximation type  
 (C) Integrating type (D) Counting type  
 (E) Answer not known
61. The shift register shown in figure is initially loaded with the bit pattern 1010. Subsequently the shift register is clocked, with each clock pulse the pattern gets shifted by 1 bit position to the right. With each shift, the bit at the serial input is pushed to the left most position (msb) After how many clock pulses will the content of the shift register become 1010 again



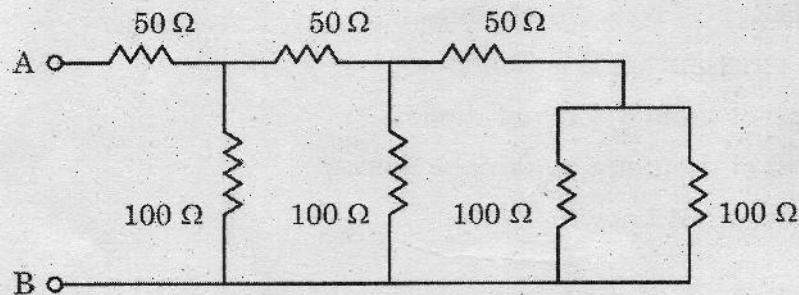
- (A) 3 (B) 7  
 (C) 11 (D) 15  
 (E) Answer not known



62. Which of the following statement is best suited for a zener diode?
- (A) It is a rectifier diode
  - (B) It works in the forward bias region
  - (C)  It is a constant voltage device
  - (D) It is mostly used in clipping circuit
  - (E) Answer not known
63. There are two semiconductor diodes A and B. One of them is Zener whereas other is avalanche. Their ratings are 5.6 V (A) and 24 V (B) respectively then
- (A)  A is Zener, B is avalanche
  - (B) A is avalanche, B is Zener
  - (C) Both of them are Zener diodes
  - (D) Both of them are avalanche diodes
  - (E) Answer not known
64. Estimate the reduction in speed of a dc generator working with constant excitation in 400 V bus bars to decrease its load from 400 kw to 200 kw. The resistance between terminals is 0.02  $\Omega$  neglect the armature reaction
- (A) 97.61%
  - (B)  -2.38%
  - (C) 50%
  - (D) -1.08%
  - (E) Answer not known
65. The starting torque of a 3 phase induction motor is \_\_\_\_\_ supply voltage.
- (A) Independent of
  - (B) Directly proportional to
  - (C)  Directly proportional to square of
  - (D) Indirectly proportional to
  - (E) Answer not known
66. Which one of the following remains practically constant for all loads in a transformer?
- (A) Primary current
  - (B)  Iron loss
  - (C) Copper loss
  - (D) Secondary current
  - (E) Answer not known

67. According to Kirchoff's voltage law, the algebraic sum of all IR drops and e.m.f.s in any closed loop of a network is always
- (A) ✓ zero
  - (B) positive
  - (C) negative
  - (D) determined by battery e.m.f.s
  - (E) Answer not known

68. Find the total resistance of the network given between terminals A and B



- (A) 50 Ω
  - (B) ✓ 100 Ω
  - (C) 116.67 Ω
  - (D) 150 Ω
  - (E) Answer not known
69. Control activities generally relate to
- (A) Improvement of profit
  - (B) ✓ Measurement of achievement
  - (C) Quality improvement
  - (D) Leadership
  - (E) Answer not known
70. Translation of symbols encoded by the sender into the message for understanding is called
- (A) ✓ Decoding
  - (B) Encoding
  - (C) Transmission
  - (D) Action
  - (E) Answer not known



71. Manpower planning is determined through

1. Job Analysis
2. Job Specification
3. Job Evaluation
4. Job Description

- (A) 1, 2, 3 are true, 4 is false                      (B) 1, 2 are true, 3, 4 are false  
(C)  1, 2, 4 are true, 3 is false                      (D) 1, 3, 4 are true, 2 is false  
(E) Answer not known

72. Staffing function of management comprises the activities of

- (A) Selecting suitable persons for positions
- (B) Defining the requirements with regard to people for the job to be done
- (C) Training and developing staff to accomplish their task more effectively

- (D)  (A), (B) and (C)  
(E) Answer not known

73. Which training technique is used to analyse and understand interpersonal behaviour?

- (A) Lecture method
- (B)  Transaction analysis
- (C) Conference
- (D) Rotation position
- (E) Answer not known

74. The training method which involves the creation of a separate training centre within the plant itself for the purpose of providing training to the new employees

- (A)  Vestibule training
- (B) Apprenticeship training
- (C) Internship training
- (D) Sensitivity training
- (E) Answer not known

75. When management pays attention to more important areas and when day to day routine problems are looked after by lower level of management this is known as
- (A) MBO  
(B) Management by exception  
(C) Unity of command  
(D) Critical path method  
(E) Answer not known
76. The word "MBO" stands for
- (A) Management by organisations  
(B) Management by objectives  
(C) Management by obstacles  
(D) Management by observations  
(E) Answer not known
77. The assumptions and anticipated environment in which plans are expected to operate is known as
- (A) Objectives  
(B) Policies  
(C) Premises  
(D) Strategies  
(E) Answer not known
78. "Planning is the process by which Manager looks to the future and discovers alternative course of action open to him".
- The above statement is defined by
- (A) George Terry  
(B) Koontz and O. Donnel  
(C) Joseph Massie  
(D) Ernest Dale  
(E) Answer not known
79. \_\_\_\_\_ means the hierarchy of authority from the highest executive to the lowest one for the purpose of communication.
- (A) Unity of Command  
(B) Unity of Direction  
(C) Scalar chain  
(D) Division of work  
(E) Answer not known



80. Which ISO standard is used in international automobile companies to set automotive quality system standards?
- (A) ISO 9000 (B) ISO 14000  
(C)  ISO 16949 (D) ISO 4000  
(E) Answer not known
81. \_\_\_\_\_ is one in which an organisation can achieve radical change in performance as measured by cost, cycle time, service and quality by the application of variety of tools and techniques that focus on business.
- (A) Discrete improvement (B)  Business process re-engineering  
(C) Bench marking (D) Quality circle  
(E) Answer not known
82. When do unplanned down time occurs?
- (A) Maintenance (B)  Sudden breakdown  
(C) Machine setup time (D) Authorised breaks  
(E) Answer not known
83. Which Quality Management Program is related to the maintenance of plants and equipments?
- (A) Environmental Management Systems  
(B) Fault tree analysis  
(C) Failure mode effect analysis  
(D)  Total productive maintenance  
(E) Answer not known
84. FMEA is a document designed to
- (A) Control Quality  
(B)  Accept change  
(C) Business Process Re-engineering  
(D) Train Employees on Quality  
(E) Answer not known

85. In the algorithmic cusum for monitoring the process mean, 'K' refers to
- (A) Upper limit
  - (B)  Reference value
  - (C) Lower limit
  - (D) One sided upper and lower cusums
  - (E) Answer not known
86. The primary planning tool that translates the voice of the customer into design requirements that meet specific value is
- (A) Kaizen
  - (B) Kanban
  - (C)  House of quality
  - (D) Poka Yoke
  - (E) Answer not known
87. The employee problem solving group to improve product quality is known as
- (A) Quality group
  - (B) Quantity circle
  - (C)  Quality circle
  - (D) Group circle
  - (E) Answer not known
88. Which does not consist in the rules for the construction of Fishbone Diagram?
- (A)  Everyone should participate in sequence of opportunity
  - (B)  Criticize persons or ideas
  - (C) Everyone has to get equal opportunity
  - (D) Make sure each cause is understood by all the concerned persons
  - (E) Answer not known
89. 'Seiso' in 5 'S' practice means
- (A)  Structurise
  - (B) Systematise
  - (C)  Sanitise
  - (D) Standardise
  - (E) Answer not known



90. Match the following :

Award	Year of establishment
(a) Rajiv Gandhi National Quality Award	1. 1987
(b) Malcolm Baldrige National Quality Award	2. 1988
(c) Deming prize	3. 1951
(d) European Quality Award	4. 1991

- |   | (a)              | (b) | (c) | (d) |
|---|------------------|-----|-----|-----|
| (A) <input checked="" type="checkbox"/> | 4                | 1   | 3   | 2   |
| (B)                                     | 4                | 2   | 1   | 3   |
| (C)                                     | 2                | 3   | 1   | 4   |
| (D)                                     | 3                | 2   | 1   | 4   |
| (E)                                     | Answer not known |     |     |     |

91. \_\_\_\_\_ department is having primary responsibility for qualification testing of prototype to assess its functional efficiency, reliability and maintainability.

- (A) Research and development      (B) Production  
(C)  Quality control      (D) Service marketing  
(E) Answer not known

92. \_\_\_\_\_ is a diagrammatic view of the various steps in sequential order that form an overall process of an quality control organisation.

- (A) Check list      (B) '5S'  
(C)  Flow chart      (D) Process  
(E) Answer not known

93. Which is concerned with the assurance of maintenance of the specified quality of design?

- (A) Quality of performance      (B) Quality of design  
(C)  Quality of conformance      (D) Quality of control  
(E) Answer not known

94. The most common impacts of radio active pollutants, which appear late in life are
- (A) Shortened life span and increased probability of developing cancers and cataracts
  - (B) Damage of genes
  - (C)  Both (A) and (B)
  - (D) Damage of teeth
  - (E) Answer not known
95. Radiation sickness may be produced by radiation dose of about
- (A)  100 rem
  - (B) 50 rem
  - (C) 20 rem
  - (D) 5 rem
  - (E) Answer not known
96. The combined discharge of waste water from residential and industrial zones are called as
- (A) Domestic sewage
  - (B) Combined sewage
  - (C)  Sanitary sewage
  - (D) Industrial sewage
  - (E) Answer not known
97. Septic tank is
- (A) an aerobic attached growth treatment system
  - (B) an aerobic suspended growth biological treatment system
  - (C) an anaerobic attached growth biological treatment system
  - (D)  an anaerobic suspended growth treatment system
  - (E) Answer not known
98. Which one of the following tests, the organic matter in the wastewater is used as food by micro-organisms?
- (A)  BOD
  - (B) Most probable number
  - (C) COD
  - (D) Chlorine demand
  - (E) Answer not known



99. The particles in cigarette smoke are usually smaller than
- (A)  1 micron
  - (B) 10 micron
  - (C) 25 micron
  - (D) 100 micron
  - (E) Answer not known
100. The device, which can be used to control gaseous as well as particulate pollutants in the industrial emission, is known as
- (A) Cyclone
  - (B)  Spray tower
  - (C) Dynamic precipitator
  - (D) Fabric filter
  - (E) Answer not known
101. The secondary pollutant among the following is
- (A) Sulphur dioxides
  - (B) Methane
  - (C) Carbon dioxide
  - (D)  Peroxyl acetyl nitrate
  - (E) Answer not known
102. Inversions occur, when atmosphere is
- (A) Slightly stable
  - (B)  Most stable
  - (C) Unstable
  - (D) Neutral
  - (E) Answer not known
103. The international protocol to protect the Ozone layer is
- (A)  The Montreal protocol
  - (B) The Venna protocol
  - (C) Kyoto protocol
  - (D) Cartagena protocol
  - (E) Answer not known

104. Match the following Laplace Transforms with its function

	Laplace Transform $F(s)$	Function $f(t)$
(a)	$e^{-as}$	1. $e^{-at}$
(b)	$\frac{e^{-as}}{s}$	2. $e^{at}$
(c)	$\frac{1}{s-a}$	3. $u(t-a)$
(d)	$\frac{1}{s+a}$	4. $\delta(t-a)$

- |       | (a)              | (b) | (c) | (d) |
|-------|------------------|-----|-----|-----|
| (A)   | 4                | 3   | 1   | 2   |
| (B)   | 3                | 4   | 2   | 1   |
| (C) ✓ | 4                | 3   | 2   | 1   |
| (D)   | 3                | 4   | 1   | 2   |
| (E)   | Answer not known |     |     |     |

105. The value of the integral  $\int_0^{\infty} te^{-2t} \cos t dt$  is using Laplace transform method.

- |                      |          |
|----------------------|----------|
| (A) 1/25             | (B) 4/25 |
| (C) ✓ 3/25           | (D) 2/25 |
| (E) Answer not known |          |

106. Which one of the following statement is correct?

(\*denotes convolution and  
· denotes usual multiplication)

- |  |  |
|--|--|
| (A) ✓ $L(f(t) * g(t)) = L(f(t)) \cdot L(g(t))$ | (B) $L(f(t) * g(t)) = L(f(t)) * L(g(t))$         |
| (C) $L(f(t) \cdot g(t)) = L(f(t)) * L(g(t))$   | (D) $L(f(t) \cdot g(t)) = L(f(t)) \cdot L(g(t))$ |
| (E) Answer not known                           |  |

107.  $\oint_C \frac{e^z}{z-2} dz$  for any contour enclosing  $z_0 = 2$  is

- |                      |                     |
|----------------------|---------------------|
| (A) $2\pi e^2$       | (B) ✓ $2\pi i e^2$  |
| (C) $2\pi e^{-2}$    | (D) $2\pi i e^{-2}$ |
| (E) Answer not known |                     |



108. The work done when a force  $\vec{F} = (x^2 - y^2 + x)\vec{i} - (2xy + y)\vec{j}$  moves a particle in the  $xy$ -plane from  $(0,0)$  to  $(1,1)$  along the curve  $y^2 = x$  is
- (A)  $-\frac{5}{6}$  (B)  $\frac{1}{6}$   
 (C)   $-\frac{2}{3}$  (D)  $-\frac{8}{3}$   
 (E) Answer not known
109. If  $\nabla\phi = 2xyz^3\vec{i} + x^2z^3\vec{j} + 3x^2yz^2\vec{k}$ , then find  $\phi$
- (A)  $x^2yz^3 + yx^2z^3 + x^2yz^3 + C$  (B)  $xyz^3 + xz^3 + 6x^2yz + C$   
 (C)   $x^2yz^3 + C$  (D)  $xy^2z^3 + C$   
 (E) Answer not known
110. The value of  $\int_0^{\frac{\pi}{8}} \cos^2 4x \, dx$  is
- (A)   $\frac{1}{6}$  (B)  $\frac{1}{8}$   
 (C)  $\frac{1}{4}$  (D)  $\frac{1}{2}$   
 (E) Answer not known
111. Given  $f_{xx} = 2, f_{xy} = 0, f_{yy} = 2$ , then at the point  $(-3,0)$ ,  $f(x,y)$  attains
- (A) maximum (B)  minimum  
 (C) the value  $-3$  (D) neither maximum nor minimum  
 (E) Answer not known
112. If  $xy^3 - yx^3 = 6$  is the equation of a curve, then the slope of the curve at the point  $(1, 2)$  is
- (A)   $-\frac{2}{11}$  (B)  $\frac{2}{11}$   
 (C)  $\frac{1}{11}$  (D)  $-\frac{3}{11}$   
 (E) Answer not known

113. The quadratic form corresponding to the symmetric matrix  $\begin{pmatrix} 0 & -1 & 2 \\ -1 & 1 & 4 \\ 2 & 4 & 3 \end{pmatrix}$  is

- (A)  $x^2 + 3y^2 - 2xy + 4xz + 8yz$       (B)  $y^2 + 3z^2 + 2xy - 4xz - 8yz$   
(C)   $y^2 + 3z^2 - 2xy + 4xz + 8yz$       (D)  $3z^2 + x^2 - xy + 2xz + 4yz$   
(E) Answer not known

114. Electronic Polarization is directly proportional to the

- (A)  Induced electric dipole moment      (B) Induced electric field  
(C) Induced magnetic moment      (D) Induced current  
(E) Answer not known

115. The ferromagnetic materials have

- (A) small magnetic susceptibility with temperature independence  
(B) large magnetic susceptibility with temperature independence  
(C)  large magnetic susceptibility with temperature dependence  
(D) ability to rotate atomic magnetic moments in the same direction at room temperature  
(E) Answer not known

116. The favourable condition for super conductivity is

- (A) a weak electron-phonon interaction  
(B)  a strong electron-phonon interaction  
(C) a weak phonon-phonon interaction  
(D) a strong phonon-phonon interaction  
(E) Answer not known

117. The coordination number incase of simple cubic crystal structure is

- (A) 12      (B) 8  
(C) 2      (D)  6  
(E) Answer not known



118. Match the following type of Lasers with its relevant examples

- |                          |                 |
|--------------------------|-----------------|
| (a) Solid state laser    | 1. $Co_2$ laser |
| (b) Liquid laser         | 2. Ruby laser   |
| (c) Gas laser            | 3. GaAsAl laser |
| (d) Semi conductor laser | 4. Dye laser    |

- |       | (a)              | (b) | (c) | (d) |
|-------|------------------|-----|-----|-----|
| (A)   | 4                | 1   | 2   | 3   |
| (B) ✓ | 2                | 4   | 1   | 3   |
| (C)   | 2                | 3   | 1   | 4   |
| (D)   | 3                | 1   | 4   | 2   |
| (E)   | Answer not known |     |     |     |

119. When white light is incident on a diffraction grating, the colour that will be more deviated from central image will be

- |                      |            |
|----------------------|------------|
| (A) Yellow           | (B) Violet |
| (C) Indigo           | (D) ✓ Red  |
| (E) Answer not known |            |

120. Diffraction effects are easier to notice in the case of sound waves than in the case of light waves because

- (A) Sound waves are longitudinal waves  
(B) Sound waves are mechanical waves  
(C) Sound waves are of shorter wavelength  
(D) ✓ Sound waves are of longer wavelength  
(E) Answer not known

121. The efficiency of a carnot engine operating between the boiling and Freezing points of water is

- |                      |           |
|----------------------|-----------|
| (A) 54 %             | (B) 108 % |
| (C) ✓ 27 %           | (D) 162 % |
| (E) Answer not known |           |

122. Infrasonic sound can be heard by
- (A) Dog (B) Bat  
 (C) ✓ Rhinoceroses (D) Human beings  
 (E) Answer not known
123. The intensity of sound
- (A) ✓ is directly proportional to square of frequency  
 (B) is inversely proportional to density of medium  
 (C) does not depend on speed of sound in the medium  
 (D) is inversely proportional to frequency of sound  
 (E) Answer not known
124. The relationship between Young's modulus  $Y$ , Bulk modulus  $K$  are Poisson's ratio  $\sigma$  is
- (A) ✓  $K = \frac{Y}{3(1-2\sigma)}$  (B)  $K = \frac{Y}{3(1+2\sigma)}$   
 (C)  $K = \frac{Y}{3(2\sigma-1)}$  (D)  $K = \frac{Y}{3(1-\sigma)}$   
 (E) Answer not known
125. Hooke's law defines
- (A) Stress (B) Strain  
 (C) Elastic limit (D) ✓ Modulus of elasticity  
 (E) Answer not known
126. A bicycle in motion does not fall because one of the following is conserved
- (A) linear momentum (B) ✓ angular momentum  
 (C) kinetic energy (D) potential energy  
 (E) Answer not known



127. Match the following

- |                          |                       |
|--------------------------|-----------------------|
| (a) Linseed oil          | 1. Antiskinning agent |
| (b) Linoleates of metals | 2. Drie               |
| (c) Turpentine           | 3. Film forming agent |
| (d) Phenol               | 4. Thinner            |

- |       | (a) | (b) | (c) | (d) |
|-------|-----|-----|-----|-----|
| (A)   | 1   | 2   | 3   | 4   |
| (B)   | 2   | 3   | 1   | 4   |
| (C) ✓ | 3   | 2   | 4   | 1   |
| (D)   | 3   | 2   | 1   | 4   |

(E) Answer not known

128. The hydrogen over voltage on the following metals is in the order

- |                              |                            |
|------------------------------|----------------------------|
| (A) ✓ Pt < Fe < Pb < Zn < Hg | (B) Hg > Zn < Fe < Pb < Pt |
| (C) Zn < Hg < Pt < Pb < Fe   | (D) Fe < Hg < Pt < Pb < Zn |
| (E) Answer not known         |                            |

129. Zirconia bricks are classed as

- |                            |                                  |
|----------------------------|----------------------------------|
| (A) ✓ Neutral Refractories | (B) Basic Refractories           |
| (C) Acidic Refractories    | (D) Partially basic Refractories |
| (E) Answer not known       |                                  |

130. Name the hardest artificially prepared abrasive

- |                      |             |
|----------------------|-------------|
| (A) ✓ Carborundum    | (B) Alundum |
| (C) Norbide          | (D) Garnet  |
| (E) Answer not known |             |

131. In a copolymer if the branch is of one kind and main chain is of another kind it is known as

- |                      |                         |
|----------------------|-------------------------|
| (A) Block copolymer  | (B) ✓ Graft copolymer   |
| (C) Random copolymer | (D) Alternate copolymer |
| (E) Answer not known |                         |

132. The Quality of diesel fuel is known by its
- (A) Octane number (B)  Cetane number  
(C) Heptane number (D) Compression ratio  
(E) Answer not known
133. The lubricants having thixotropic properties and undergo sol-gel transformation during operation and rest at are
- (A) Animal oils (B) Water/oil emulsions  
(C)  Greases (D) Silicone oils  
(E) Answer not known
134. Choose the sentences which are false in the following sentences.
1. Complaint letters should vent anger
  2. An adjustment letter is an attempt to satisfy an aggrieved customer
  3. The letter should be opened with an elaborate statement
  4. The letter may be closed with a good will expression
- (A)  1, 3 (B) 2, 4  
(C) 1, 2 (D) 2, 3  
(E) Answer not known
135. Rearrange the jumbled sentences in the following passages:
- S1: I was still resolved to settle down, and I looked about me.  
S6: I was a practical man in a practical world.  
P: I hadn't the money to go to a technical school or university besides, I didn't think much of schools.  
Q: But how to become an electrician.  
R: One thing was clear – unskilled labour didn't pay, I must learn a trade and I decided on electricity.  
S: The need for electricians was constantly growing.
- (A) Q P R S (B) P R S Q  
(C)  R S Q P (D) Q S P R  
(E) Answer not known



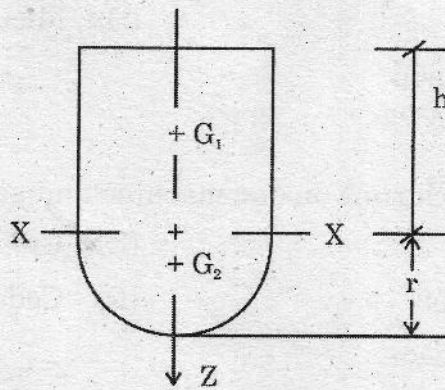
136. The firm pulled \_\_\_\_\_ from its agreement.
- (A) off (B) up  
(C)  back (D) in  
(E) Answer not known
137. Choose the correct answer from the given options.  
\_\_\_\_\_ means to the appropriate recipient.
- (A)  To whom it may concern (B) Pleased to meet you  
(C) As a matter of fact (D) In spite of  
(E) Answer not known
138. Choose the correct prefix according to the meaning given  
\_\_zero — less than zero
- (A) below (B) un  
(C)  sub (D) non  
(E) Answer not known
139. Choose the correct 'Antonym' for the italicised word from the options given:  
The contest was bitter, personal, *Hazardous* and full of intrigue
- (A) Refresh (B) Refines  
(C)  Safe (D) Strong  
(E) Answer not known
140. Choose the correct antonym of the word given below.  
Meek
- (A) Weakness (B)  Assertive  
(C) Renown (D) Likeness  
(E) Answer not known
141. Add suitable question tag to the statement below:  
Let us speak in English, \_\_\_\_\_?
- (A) will you? (B)  shall we?  
(C) won't they? (D) don't they?  
(E) Answer not known

142. Identify the correct conjunction from the options given:  
The ravine was full of sand now, ————— it had once been full of water
- (A) and (B) yet  
(C) for (D)  but  
(E) Answer not known
143. Fill in the blank with suitable Article  
Varanasi is ————— holy city
- (A) an (B)  a  
(C) the (D) zero article  
(E) Answer not known
144. Identify the correct preposition from the options given below:  
This library does not have the resources. I am looking.
- (A)  for (B) after  
(C) into (D) about  
(E) Answer not known
145. Find out the correct verb from the following  
The growing number of visitors ————— the footprints.
- (A) are damaging (B)  is damaging  
(C) damage (D) damages  
(E) Answer not known
146. He works hard so that he ————— get a job.
- (A) might (B)  may  
(C) should (D) shall  
(E) Answer not known



147. The OSI Model is composed of \_\_\_\_\_ ordered Layers.
- (A)  7 (B) 5  
(C) 2 (D) 1  
(E) Answer not known
148. Data which can be accessed by any function in a program is
- (A) local data (B)  global data  
(C) variable (D) string  
(E) Answer not known
149. In the case of the while structure
- (A) Condition is checked at the bottom of the loop  
(B)  Condition is checked at the top of the loop  
(C) Condition is checked at the top and bottom of the loop  
(D) No condition is checked  
(E) Answer not known
150. Preprocessor of compiler progress deals with
- (A) File extension (B)  Macro processing  
(C) Augmentation (D) Micro processing  
(E) Answer not known
151. System software which runs on one machine and generates code for another machine
- (A) Bootstrap (B)  Cross-compiler  
(C) Lexical Analyser (D) Code Converter  
(E) Answer not known
152. FAT stores
- (A)  Information about the files (B) Information about the forms  
(C) numbers (D) characters  
(E) Answer not known

153. The velocity of a body increases from 36 km/hr to 72 km/hr in 10 seconds. the acceleration of the body is
- (A)  $2 \text{ m/s}^2$  (B)  $3 \text{ m/s}^2$   
 (C)  $4 \text{ m/s}^2$  (D)  $1 \text{ m/s}^2$   
 (E) Answer not known
154. Centroid of a semicircle of radius 60 mm from the diametral axis is
- (A)  $60/\pi \text{ mm}$  (B)  $80/\pi \text{ mm}$   
 (C)  $90/\pi \text{ mm}$  (D)  $45/\pi \text{ mm}$   
 (E) Answer not known
155. The resistance of a three dimensional object to rotation is measured by
- (A) mass of the body (B) first moment of area  
 (C) second moment of area (D) mass moment of inertia  
 (E) Answer not known
156. Determine the maximum height "h" of the cylindrical portion of the body shown so that it is in stable equilibrium on its hemispherical base of radius "r".



- (A)  $\frac{r}{2}$  (B)  $\frac{r}{\sqrt{2}}$   
 (C)  $\sqrt{2}r$  (D)  $2r$   
 (E) Answer not known

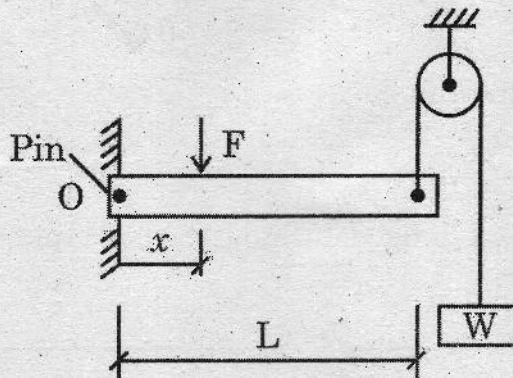


157. Assertion (A): A system of couples acting in one plane is in equilibrium if the algebraic sum of their moment is equal to zero

Reason (R): Resolution of a force into a force and a couple is not possible

- (A) (A) and (R) are true and (R) is correct explanation
- (B) (A) and (R) are true and (R) is not correct explanation
- (C) ✓ (A) is true, (R) is false
- (D) (A) is false, (R) is true
- (E) Answer not known

158. The beam shown must be kept in horizontal position. How far from 'O' must the force F be applied?



- (A) ✓  $\frac{WL}{F}$
- (B)  $\frac{2WL}{F}$
- (C)  $\frac{FL}{W}$
- (D)  $\frac{2FL}{W}$
- (E) Answer not known

159. Lame's theorem is stated as follows

- (A) Three forces acting at a point will be in equilibrium
- (B) Three forces acting at a point can be represented by a triangle, each side being proportional to force
- (C) If three forces acting upon a particle are represented in magnitude and direction by the sides of a triangle, taken in order, they will be in equilibrium
- (D) ✓ If three forces acting at a point are in equilibrium, each force is proportional to the sine of the angle between the other two
- (E) Answer not known

160. Which of the combinational circuit will yield the output 1 for the following condition.  
ABC

3 Inputs 1 output (F)

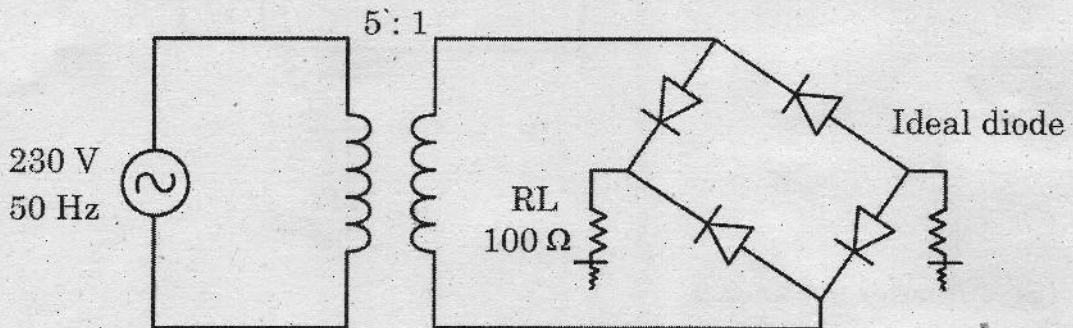
The output is 1 when the binary value of the inputs is less than or equal to 3 and output is zero otherwise

- (A)   $F = A'$
- (B)  $F = A$
- (C)  $F = B$
- (D)  $F = B'$
- (E) Answer not known

161. The simplified version of the expression  $\bar{X}\bar{Y}\bar{Z} + X\bar{Y}\bar{Z} + \bar{X}Y\bar{Z} + XY\bar{Z}$  is

- (A) logic '0'
- (B) logic '1'
- (C)  $\bar{X}\bar{Y}$
- (D)   $\bar{Z}$
- (E) Answer not known

162. For the Circuit shown in fig, determine the dc output voltage and dc output power.



- (A)  dc output voltage = 41.4 V  
dc output power = 17.14 W
- (B) dc output voltage = 207.07 V  
dc output power = 428.49 W
- (C) dc output voltage = 103.53 V  
dc output power = 106.64 W
- (D) dc output voltage = 29.28 V  
dc output power = 8.49 W
- (E) Answer not known



163. In Attraction type moving Iron Ammeters with spring control the instantaneous deflecting torque is proportional to
- (A) rms value of the current                      (B)  square of the current  
 (C) peak value of the current                      (D) average value of the current  
 (E) answer not known
164. The moving iron instrument connected through a current transformer is used to
- (A) DC quantities measurements  
 (B)  AC quantities measurements  
 (C) DC and AC quantities measurements  
 (D) Cannot be used for measurements  
 (E) Answer not known
165. In an electro-dynamometer type of wattmeter
- (A)  The current coil is made fixed  
 (B) The pressure coil is fixed  
 (C) Only of the two coils i.e. current coil or pressure coil can be made fixed  
 (D) Both the coils should be movable  
 (E) Answer not known
166. In a certain ac circuit, the complex power,  $S$  is given as  $S = P - jQ$ . This indicates that circuit has
- (A) More resistive load                      (B) More inductive load  
 (C) No resistance load                      (D)  More capacitive load  
 (E) Answer not known
167. A voltage  $V = 15 \sin 100 \pi t$  is applied to a  $3 \Omega$  resistor. The value of current flowing through the resistor and frequency are,  $i_R$  and  $f$ ,
- (A)  $5 \sin 33.33 \pi t$ ,  $100 \text{ Hz}$                       (B)  $5 \sin \pi t$ ,  $50 \text{ Hz}$   
 (C)  $3.53 \sin 100 \pi t$ ,  $33.33 \text{ Hz}$                       (D)   $5 \sin 100 \pi t$ ,  $50 \text{ Hz}$   
 (E) Answer not known

168. The organisation brings together and co-ordinates the activities of the sub systems to achieve \_\_\_\_\_ objectives.
- (A) Basic
  - (B)  Common
  - (C) Two or more objectives
  - (D) Functional
  - (E) Answer not known
169. Which leadership style is most suitable when the sub-ordinates are well trained, highly knowledgeable, self-motivated and ready to assume responsibility?
- (A) Autocratic leadership
  - (B)  Free-rein leadership
  - (C) Democratic leadership
  - (D) Participative leadership
  - (E) Answer not known
170. The contingency theory of leadership was suggested by
- (A) Robert. J. House
  - (B)  Fred. E. Fiedler
  - (C) Rensis Likert
  - (D) David. A. Kenny
  - (E) Answer not known
171. Which is the oldest and simplest method of performance appraisal system?
- (A) Rating – Scale
  - (B)  Ranking
  - (C) 360 Degree Appraisal
  - (D) Field Review
  - (E) Answer not known



172. The delegation of authority results in
1. decentralisation of branches at places
  2. avoiding responsibility by top management
  3. delegation of authority by top management without avoiding responsibility
- (A)  1 and 3 (B) 1, 2 and 3  
(C) 2 only (D) 1 and 2  
(E) Answer not known
173. \_\_\_\_\_ are responsible for the efficiency and effectiveness of an area such as accounting or marketing.
- (A)  Functional Managers (B) Top Managers  
(C) Supervisory Managers (D) Staff Managers  
(E) Answer not known
174. The process of delegation involves in the following activities such as
- (A)  Determination of results assignment of tasks, exaction of responsibility  
(B) Manpower planning, Manpower policy, Manpower  
(C) Organisation, Department, Authority  
(D) Planning, Directing, Staffing  
(E) Answer not known
175. Stoner and others have shown how groups can make decisions that are much less, or much more cautious than any member would take alone. What are these changes called?
- (A) Intensified predispositions  
(B) Polarisation  
(C)  Risk and cautious shift  
(D) Decision arrangement  
(E) Answer not known

176. The "desire to become more and more what one is to become everything that one is capable of becoming" is a case of which of the following needs in Maslow's theory of motivation
- (A) Physiological needs
  - (B) Social needs
  - (C) Esteem needs
  - (D)  Self actualisation needs
  - (E) Answer not known
177. The scientific management developed largely after the \_\_\_\_\_ revolution which established the factory system.
- (A) Green
  - (B) Russian
  - (C)  Industrial
  - (D) Blue
  - (E) Answer not known
178. "Human Relations Approach" to management was originated by
- (A) Henry Fayol
  - (B) Winslow Taylor
  - (C)  Elton Mayo
  - (D) Peter F. Drucker
  - (E) Answer not known
179. \_\_\_\_\_ is the art of getting things done by and with the help of others.
- (A)  Management
  - (B) Soft science
  - (C) Administration
  - (D) Profession
  - (E) Answer not known
180. Management is essential
- (A)  Every where
  - (B) Somewhere
  - (C) Only in the factory
  - (D) In industry only
  - (E) Answer not known



181. What is the quality control system used to ensure that the proportion of the defective items in the manufactured product is not beyond a certain limit?
- (A)  Process control (B) Systems control  
(C) Product control (D) Systematic control  
(E) Answer not known
182. \_\_\_\_\_ is a management system which enables an organisation to assess its performance from a "360 degree" perspective.
- (A)  Balanced score card (B) Bin card  
(C) Agility (D) CSR  
(E) Answer not known
183. Which company holds the registered trade mark of six sigma?
- (A) INTEL (B)  Motorola  
(C) Toyota (D) GEC  
(E) Answer not known
184. Defects can be found early in
- (A) Person orientation (B) Product orientation  
(C)  Process orientation (D) Principle orientation  
(E) Answer not known
185. Benchmarking exercise requires which of the following teams?
- (A)  Lead team, Preparation team, Visit team  
(B) Lead team, Preparation team  
(C) Lead team, Visit team  
(D) Preparation team, Visit team  
(E) Answer not known

186. Employee Training costs is a part of
- (A) Cost of quality (B)  Prevention cost  
 (C) Appraisal cost (D) Failure cost  
 (E) Answer not known
187. Which of the following is not a part of Deming's philosophy?
- (A) Constancy of purpose (B)  Management by objectives  
 (C) Drive out fear (D) Abolish quotas  
 (E) Answer not known
188. 'Quality is Free' and 'Quality without Tears' are the books authored by
- (A) Edward Deming (B) Joseph Juran  
 (C)  Phillip Crosby (D) Walter A. Shewhart  
 (E) Answer not known
189. "The breakthrough concept concerns two areas. The journey from symptom to cause and the journey from cause to remedy". Who has contributed the above concept?
- (A) Deming (B) Philip Crosby  
 (C)  Juran (D) Flippo  
 (E) Answer not known
190. Match the following :
- |                                   |                             |
|-----------------------------------|-----------------------------|
| (a) Dr. Deming believes           | 1. Common causes            |
| (b) Ishikawa development          | 2. To prevent defect        |
| (c) Type of variation is due to   | 3. Cause and effect diagram |
| (d) Crosby's objective of quality | 4. Histogram                |
- 
- |   | (a)              | (b) | (c) | (d) |
|---|------------------|-----|-----|-----|
| (A)                                     | 3                | 2   | 1   | 4   |
| (B)                                     | 2                | 3   | 4   | 1   |
| (C) <input checked="" type="checkbox"/> | 2                | 3   | 1   | 4   |
| (D)                                     | 4                | 3   | 1   | 2   |
| (E)                                     | Answer not known |     |     |     |



191. The maximum average permissible noise level during day time hours (6 am to 10 pm) in silence zone, according to specified ambient air quality standards laid down under the Environment Protection Act in India, is
- (A) ✓ 50 dB (B) 45 dB  
(C) 40 dB (D) 35 dB  
(E) Answer not known
192. Acceptable noise level for residential and business urban areas as per IS : 4954-1968 is
- (A) 25 – 35 dB (B) ✓ 40 – 50 dB  
(C) 50 – 60 dB (D) 70 – 80 dB  
(E) Answer not known
193. The maximum sound level beyond which it is certainly regarded as a pollutant, is
- (A) 20 dB (B) 40 dB  
(C) 45 dB (D) ✓ 80 dB  
(E) Answer not known
194. Leachate is a coloured liquid, that comes out of
- (A) Septic tanks (B) ✓ Sanitary landfills  
(C) Compost plants (D) Aerated lagoons  
(E) Answer not known
195. Use of fertilizers and pesticides will contaminate the soil by
- (A) Infiltration of organic pollutant  
(B) Infiltration of inorganic pollutant  
(C) ✓ Infiltration of both organic and inorganic pollutant  
(D) Infiltration of Heavy metals  
(E) Answer not known

196. What is the maximum allowable concentration of fluorides in drinking water?
- (A) 1.0 milligram per liter
  - (B) 1.25 milligram per liter
  - (C) ✓ 1.50 milligram per liter
  - (D) 1.75 milligram per liter
  - (E) Answer not known
197. The photochemical reaction leading to smog formation,  $\text{NO}_2 \rightarrow \text{NO} + \text{O}$ , takes place in the radiation wave length of
- (A) 190 – 260 nm
  - (B) 100 – 190 nm
  - (C) ✓ 290 – 400 nm
  - (D) 700 – 800 nm
  - (E) Answer not known
198. The ozone layer thickness is measured in
- (A) Decibels (db)
  - (B) ✓ Dobson Units (DU)
  - (C) Becquerel (Bq)
  - (D) Hertz (Hz)
  - (E) Answer not known
199. The international treaty which aims at controlling global warming and climate change is
- (A) Montreal Protocol
  - (B) ✓ Kyoto Protocol
  - (C) Ramsor convention
  - (D) CITES
  - (E) Answer not known
200. The most common method for controlling gaseous pollutants is
- (A) Settling chamber
  - (B) Activated sludge
  - (C) ✓ Condensation
  - (D) Venturi scrubbers
  - (E) Answer not known



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