

Sl. No. :

FAEGG

Register  
Number

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2018  
ENGINEERING  
(Degree Standard)

Time Allowed : 3 Hours]

[Maximum Marks : 300

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

IMPORTANT INSTRUCTIONS

1. The applicant will be supplied with Question Booklet 15 minutes before commencement of the examination.
2. This Question Booklet contains 200 questions. Prior to attempting to answer the candidates are requested to check whether all the questions are there in series and ensure there are no blank pages in the question booklet. **In case any defect in the Question Paper is noticed it shall be reported to the Invigilator within first 10 minutes and get it replaced with a complete Question Booklet. If any defect is noticed in the Question Booklet after the commencement of examination it will not be replaced.**
3. Answer all questions. All 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 mark the answers.
6. You will also encode your Question Booklet Number with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, action will be taken as per commission's notification.
7. Each question comprises *four* responses (A), (B), (C) and (D). You are to select **ONLY ONE** correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
8. In the Answer Sheet there are **four** circles (A), (B), (C) and (D) against each question. To answer the questions you are to mark with Blue or Black ink Ball point pen **ONLY ONE** circle of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. e.g. If for any item, (B) is the correct answer, you have to mark as follows :  

(A) ● (C) (D)
9. 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 Hall during the time of examination. After the examination is concluded, 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.
10. The sheet before the last page of the Question Booklet can be used for Rough Work.
11. Do not tick-mark or mark the answers in the Question Booklet.
12. Applicants have to write and shade the total number of answer fields left blank on the boxes provided at side 2 of OMR Answer Sheet. An extra time of 5 minutes will be given to specify the number of answer fields left blank.
13. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.

SEAL

1. Spot the error :

It being rainy day, / we decided not to go out / but to stay / at home and watch a movie

A

B

C

D

- (A) it being rainy day  
(B) we decided not to go out  
(C) but to stay  
(D) at home and watch a movie

2. Spot the error :

Students should not take part / in party politics and political demonstrations /

A

B

as they interfere in serious study / No error

C

D

- (A) students should not take part  
(B) in party politics and political demonstrations  
 (C) as they interfere in serious study  
(D) No error

3. Spot the error :

One of the most / widely spread / bad habit / is the use of tobacco

A

B

C

D

- (A) one of the most  
(B) widely spread  
 (C) bad habit  
(D) is the use of tobacco

4. To be torpid is to be :

- (A) sluggish (B) agreeable  
(C) clear (D) fearless

5. Her true feelings were \_\_\_\_\_ in her sarcastic quips

- (A) concealed (B) manifested  
(C) clear (D) developed



6. Find the nature and value of the singular point of an analytic function  $f(z) = ze^{\frac{1}{z^2}}$ .
- (A)  $z = 0$ , essential singularity
  - (B)  $z = 0$ , removable singularity
  - (C)  $z = 0$ , pole of order 2
  - (D)  $z = 0$ , pole of order 3
7. Find the zeros of  $f(z) = \sin\left(\frac{1}{z}\right)$ .
- (A)  $z = \pm n\pi$ ,  $n = 1, 2, 3, \dots$
  - (B)  $z = \pm \frac{1}{n\pi}$ ,  $n = 1, 2, 3, \dots$
  - (C)  $z = \pm in\pi$ ,  $n = 1, 2, 3, \dots$
  - (D)  $z = \pm \frac{1}{in\pi}$ ,  $n = 1, 2, 3, \dots$
8. Evaluate  $\int_C \tan z dz$ , where  $C$  is  $|z| = 2$ .
- (A)  $2\pi i$
  - (B)  $-2\pi i$
  - (C)  $4\pi i$
  - (D)  $-4\pi i$
9. What type of singularity the function  $f(z) = \frac{e^{2z}}{(z-1)^4}$  has?
- (A)  $z = 1$ , removable
  - (B)  $z = 1$ , pole of order 4
  - (C)  $z = 1$ , pole of order 3
  - (D)  $z = 1$ , simple pole

10. The elasticity of vulcanized Rubber \_\_\_\_\_ as the percentage of Sulphur content increases.
- (A) Increases
  - (B) Remains constant
  - (C) Increases twice
  - (D) Decreases
11. Raw rubber can be used in the temperature range of
- (A) 10 to 60°C
  - (B) 60 to 80°C
  - (C) 80 to 90°C
  - (D) 10 to 90°C
12. A thermoplastic is formed by the phenomenon of
- (A) Chlorination
  - (B) Condensation polymerisation
  - (C) Chain polymerisation
  - (D) Nitration
13. The initiator used in free radical addition polymerisation is
- (A) Styrene
  - (B) Hydrochloric acid
  - (C) Ethylene
  - (D) Benzoyl peroxide
14. The effect of low pH on corrosion is
- (A) greater
  - (B) smaller
  - (C) no corrosion
  - (D) negligible



15. The roof in the House of Quality is  
 (A) Technical correlation Matrix (B) Customer requirements  
 (C) Technical requirements (D) Inter relationship matrix
16. The matrix diagram is also called as  
 (A) QFD (B) Process decision chart  
 (C) Process improvement diagram (D) Root curve diagram
17. Business decisions are always  
 (A) Purely rational (B) Purely irrational  
 (C) Partially rational or irrational (D) Free from rationality
18. The concept of zero inventory is called  
 (A) Six sigma (B) Kaizen  
 (C) Kanban  (D) JIT
19. Which statement provides expected results expressed in Numerical terms?  
 (A) Programs  (B) Budgets  
 (C) Procedures (D) Strategies
20. What is "D" in DMAIC process improvement model?  
 (A) Define (B) Demonstrate  
 (C) Differentiate (D) Design
21. Which indicates mistake proofing technique?  
 (A) Kaizen (B) TPM  
 (C) Poka yoke (D) JIT
22. Choose the training method which provides practical training to the students during their academic learning  
 (A) Vestibule training  (B) Internship training  
 (C) Apprentice training (D) Induction Training
23. What is the major objective of a TQM system?  
 (A) Continuous improvement (B) Productivity improvement  
 (C) Business improvement (D) Process improvement

24. Antenna commonly used for microwave links are
- (A) Loop antenna (B) Log-periodic antenna  
 (C) Parabolic antenna (D) Rhombic antenna
25. For satellite communications, the frequency should be
- (A) less than the critical frequency of ionosphere  
 (B) more than the critical frequency of ionosphere  
(C) equal to the critical frequency of ionosphere  
(D) independent of the critical frequency of ionosphere
26. A 4 pole dc. machine has \_\_\_\_\_ magnetic circuits.
- (A) 2  (B) 4  
(C) 8 (D) 12
27. The deciding factor in the selection of a dc motor for a particular application is its \_\_\_\_\_ characteristics
- (A) Speed – Torque characteristic  
(B) Speed – Armature current characteristic  
(C) Torque – Armature current characteristic  
(D) Voltage – Armature current characteristic
28. An induction motor is preferred to a dc motor because it
- (A) Provides high starting torque (B) Provides fine speed control  
 (C) Has simple and rugged construction (D) Provides variable speed operation
29. An ideal crystal diode is one which behaves as a perfect \_\_\_\_\_ when forward biased.
- (A) Conductor (B) Insulator  
(C) Resistive material (D) Capacitor
30. The ripple factor of a half wave rectifier is
- (A) 2  (B) 1.21  
(C) 2.5 (D) 0.48

31. Find the stationary points of  $x^3 + y^3 - 3axy$

(A)  $(0, 0), (a, -a)$

(B)  $(0, 0), (-a, -a)$

(C)  $(0, 0), (a, a)$

(D)  $(0, 0), (-a, a)$

32. The Laplace equation for a function is in a Polar form is

(A)  $\frac{\partial^2 u}{\partial r^2} + \frac{\partial^2 u}{\partial \theta^2} = 0$

(B)  $\frac{\partial^2 u}{\partial r^2} + \frac{1}{r} \cdot \frac{\partial u}{\partial r} - \frac{1}{r^2} \cdot \frac{\partial^2 u}{\partial \theta^2} = 0$

(C)  $\frac{\partial^2 u}{\partial r^2} + \frac{1}{r} \cdot \frac{\partial u}{\partial r} + \frac{1}{r^2} \cdot \frac{\partial^2 u}{\partial \theta^2} = 0$

(D)  $\frac{\partial^2 u}{\partial r^2} + r \frac{\partial u}{\partial r} + r^2 \frac{\partial^2 u}{\partial \theta^2} = 0$

33. If  $u = 2xy$ ;  $v = x^2 - y^2$ ;  $x = r \cos \theta$ ;  $y = r \sin \theta$  then  $\frac{\partial(u,v)}{\partial(r,\theta)}$  is

(A)  $4r^3$

(B)  $-4r^3$

(C)  $-4r^2$

(D)  $-3r^4$

34. Evaluate :  $\int_C [x^2 y dx + (x - z) dy + xyz dz]$  where  $C$  is the arc of the parabola  $y = x^2$  in the plane  $z = 2$  from  $(0, 0, 2)$  to  $(1, 1, 2)$ .

(A)  $\frac{5}{17}$

(B)  $\frac{15}{17}$

(C)  $-\frac{5}{7}$

(D)  $-\frac{17}{15}$



35. The number of atoms in hydrogen gas is  $9.8 \times 10^{20}$  atoms/cc radius of the hydrogen atom is 0.053 nm. Calculate the relative permittivity
- (A) 0.0018       (B) 1.0018  
(C) 1.65      (D) 0.65

36. Match the following :

Magnetic materials		Spin alignment	
(a) Paramagnetic	1.	$\uparrow\downarrow \uparrow\downarrow \uparrow\downarrow$	
(b) Ferromagnetic	2.	$\uparrow\uparrow\uparrow\uparrow$	
(c) Anti ferromagnetic	3.	$\downarrow\downarrow \nearrow \searrow$	
(d) Ferrimagnetic	4.	$\uparrow\downarrow \uparrow\downarrow \uparrow\downarrow$	

	(a)	(b)	(c)	(d)
(A)	3	2	1	4
(B)	3	1	2	4
(C)	3	4	2	1
<input checked="" type="checkbox"/> (D)	3	2	4	1

37. InP is an example for
- (A) Intrinsic semi conductor  
 (B) Extrinsic semiconductor  
(C) Metal-Metolid compound  
(D) Direct Band gap material

38. One dimensional imperfection in crystals is
- (A) Vacancies  
 (B) Edge dislocation  
(C) Electronic defects  
(D) Grain boundaries

39. \_\_\_\_\_ means WAN.
- (A) Wire-And Network (B) Wire-Accessible Network  
(C) Widely-Accessible Network (D) Wide-Area Network
40. The function used to get the absolute value of a number is \_\_\_\_\_ in spreadsheets.
- (A) AB() (B) ABSOL()  
(C) ABS() (D) ABSOLUTE()
41. Pressing the backspace key deletes the character to the \_\_\_\_\_ of the insertion point.
- (A) right (B) left  
(C) top (D) bottom
42. Graphs in Spreadsheets are used for
- (A) Decoration of documents (B) Studying relationships  
(C) Comparing style of documents (D) Filling up in documents
43. Blending two images into one to create a new image is called
- (A) Compression (B) Animation  
(C) Morphing (D) Graphics
44. VRML stands for
- (A) Virtual Reality Markup Language  
(B) Virtual Real Modeling Language  
(C) Virtual Real Markup Language  
(D) Virtual Reality Modeling Language
45. An e-mail address has \_\_\_\_\_ parts.
- (A) 3 (B) 4  
(C) 2 (D) 5
46. With the \_\_\_\_\_ type e-commerce, the company first establishes a website on the Internet.
- (A) business-to-business (B) business-to-customer  
(C) digital middleman (D) customer-to-customer

47. A force  $\vec{F} = 30\vec{i} + 6\vec{j}$  newtons acts on a particle of mass 3 kg for 5 seconds. Its acceleration is
- (A)  $90\vec{i} + 18\vec{j}$  (B)  $150\vec{i} + 30\vec{j}$   
 (C)  $10\vec{i} + 2\vec{j}$  (D)  $6\vec{i} + 1.2\vec{j}$
48. The following system of parallel forces  $P = 30N$  (upward)  $Q = 150N$  (downward)  $R = 70N$  (upward) and  $S = 10N$  (downward) are acting on a rigid bar. The resultant of the system of forces is
- (A) 260 N (upward) (B) 60 N (upward)  
 (C) 60N (downward) (D) 260 N (downward)
49. The radius of gyration 'k' of a lamina of moment of inertia 'I' and Area 'A' is
- (A)  $\frac{I}{A}$  (B)  $\left(\frac{I}{A}\right)^2$   
 (C)  $\left(\frac{I}{A}\right)^{1/2}$  (D)  $\left(\frac{I}{A}\right)^{1/3}$
50. The power transmitted in terms of horse power by a belt drive equals to
- (A)  $\frac{T_1 \times v}{75}$  (B)  $\frac{T_2 \times v}{75}$   
 (C)  $\frac{T_1 \times T_2}{2} \times \frac{v}{75}$   (D)  $\frac{(T_1 - T_2) \times v}{75}$
51. In a simple screw sack the pitch of the screw is 9 mm and the length of the handle operating the screw is 45 cm, then the velocity ratio of system will be
- (A) 5 (B) 157  
 (C) 314 (D) 15.7
52. The equation of motion in normal direction is given by
- (A)  $\sum F_n = m \times a_n$  (B)  $\sum F_n = m \times \frac{1}{a_n}$   
 (C)  $\sum F_n = \sqrt{m^2 a_n}$  (D)  $\sum F_n = \frac{m^2}{a_n}$



53. \_\_\_\_\_ he was late for the meeting, his boss didn't get angry.

(A) In case

(B) But

(C) Even though

(D) Provided

54. Let us have some coffee now, \_\_\_\_\_ we?

(A) do

(B) will

(C) shall

(D) aren't

55. I wish I \_\_\_\_\_ her now.

(A) meet

(B) will meet

(C) met

(D) have met

56. All the damaged flats of the society \_\_\_\_\_ from the society's funds.

(A) got repaired

(B) is repaired

(C) were repaired

(D) was repaired

57. My grand father was ninety three when he

(A) kicked the bucket

(B) kicked the pot

(C) kicked the kettle

(D) kicked off

58. This year, the monsoon has \_\_\_\_\_ early.

(A) set out

(B) set up

(C) set in

(D) set aside

59. Newton's second law gives a measure of force as the rate change of
- (A) Linear momentum
  - (B) Angular momentum
  - (C) Linear acceleration
  - (D) Angular acceleration
60. Newton's first law is also called as
- (A) Law of force
  - (B) Law of mass
  - (C) Law of Inertia
  - (D) Law of momentum
61. A constant force ( $\vec{F}$ ) moves a body through a displacement ( $\vec{S}$ ) in the direction of force then the product of the above is called as
- (A) Kinetic Energy
  - (B) Momentum
  - (C) Work done
  - (D) Net force
62. The net work done by the forces acting on a body is \_\_\_\_\_ the change in the kinetic energy of the body.
- (A) half of
  - (B) equal to
  - (C) two times of
  - (D) same as
- 
63.  $L = K \log I$  refers the any one of the following
- (A) Loudness of sound
  - (B) Weber-Fechner law
  - (C) Sabine's formula
  - (D) Reverberation formula

64. Greases are not used to lubricate
- (A) Rail axle boxes
  - (B) Gears
  - (C) Bearings working at high temperature
  - (D) Delicate instruments
65. Which among the following is added as water-proofing agents to make water proof cements?
- (A) Dicalcium silicate
  - (B) Tricalcium silicate
  - (C) Plaster of Paris
  - (D) Calcium Stearate
66. Select a refractory material which possess refractoriness of about 2500°C
- (A) Zirconia
  - (B) Fireclay
  - (C) Silica
  - (D) Chromite bricks
67. Porosity of a refractory ————— the abrasion – resistance, and ————— the thermal spalling.
- (A) decreases ; increases
  - (B) increases ; decreases
  - (C) increases ; increases
  - (D) decreases ; decreases
68. Nitrocellulose is called as smokeless powder because it produces
- (A) N<sub>2</sub> alone
  - (B) N<sub>2</sub> and H<sub>2</sub>O
  - (C) CO<sub>2</sub>, CO
  - (D) CO<sub>2</sub>, CO, N<sub>2</sub> and H<sub>2</sub>O



69. Assertion (A) : Carbon dioxide content of the atmosphere has increased in the last 200 years  
Reason (R) : There has been widespread deforestation in many parts of the world
- (A) Both (A) and (R) are true and (R) is the correct explanation of (A)  
(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A)  
(C) (A) is true, but (R) is false  
(D) (A) is false, but (R) is true
70. Kigali Amendment pertaining to
- (A) Phase out of CO<sub>2</sub> (B) Phase out of NO<sub>2</sub>  
 (C) Phase out of HFCs (D) Phase out of CH<sub>4</sub>
71. Radiation is a health hazard because it leads to
- (A) Typhoid  (B) Cancer  
(C) Color Blindness (D) Pneumonia
72. COD stands for
- (A) Crops of Detective  (B) Chemical Oxygen Demand  
(C) Chemical of Depletion Curve (D) Chemical of Denitrification
73. Khecheopalri lake in Sikkim is a
- (A) Big lake in the world (B) Small lake in the world  
 (C) Sacred lake (D) Sacred pond
74. Resources recovery from solid wastes are
- (A) Wood, Microbes, Worms (B) Diseases, Sun light  
(C) Isotopes, Uranium  (D) Paper, Metals, Organics

75. Rearrange the sentences in logical order :

1. How did he learn to utter his first words?
2. If we accept the theory of evolution how long did it take for man to perfect his language skills?
3. No body could answer these questions with conviction.
4. It supposes that words were first associated with sounds heard in nature.
5. But several theories have been proposed of which one is Bow-Wow theory.

(A) 1, 2, 3, 4, 5

(B) 2, 1, 5, 4, 3

(C) 2, 1, 3, 4, 5

(D) 5, 2, 3, 4, 1

76. Arrange the sentences in logical order :

1. This fibre is, in fact, a reconstituted natural fibre.
2. The cellulose is obtained from shredded wood pulp.
3. Rayon is a man-made fibre.
4. It is made by dissolving cellulose in a solution of sodium hydroxide.

(A) 3, 2, 1, 4

(B) 3, 4, 1, 2

(C) 4, 3, 2, 1

(D) 3, 1, 4, 2

77. Reconstruct the sentences :

The Collector said that \_\_\_\_\_.

1. Supply of water for irrigation
2. Dams should receive water
3. Upto a particular level
4. To ensure uninterrupted

(A) 4, 1, 2, 3

(B) 1, 2, 3, 4

(C) 3, 1, 2, 4

(D) 4, 1, 3, 2

78. Spot the error :

Our Mathematics teacher / often emphasises on / the need for a lot of practice / No error  
A B C D

(A) our Mathematics teacher

(B) often emphasises on

(C) the need for a lot of practice

(D) no error

79. Spot the error :

The students were / awaiting for / the arrival of the chief guest / No error.  
A B C D

(A) the students were

(B) awaiting for

(C) the arrival of the chief guest

(D) no error

80. The force  $\vec{F}$  is said to be conservative, if the line integral of  $\vec{F}$  depends on the

- (A) path only
- (B) end points only
- (C) path and end points
- (D) path but not end points

81. If  $\vec{n}$  is the unit outward normal drawn to any closed surface  $S$ , then  $\iiint_V \text{div } \vec{n} dV$  is

- (A)  $S$
- (B)  $3S$
- (C)  $V$
- (D)  $3V$

82. Cauchy's Riemann equations for an analytic function  $f(z) = u + iv$  in Cartesian form are

(A)  $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$  and  $\frac{\partial u}{\partial y} = -\frac{\partial v}{\partial x}$

(B)  $\frac{\partial u}{\partial x} = -\frac{\partial v}{\partial y}$  and  $\frac{\partial u}{\partial y} = \frac{\partial v}{\partial x}$

(C)  $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$  and  $\frac{\partial u}{\partial y} = \frac{\partial v}{\partial x}$

(D)  $\frac{\partial u}{\partial x} = -\frac{\partial v}{\partial y}$  and  $\frac{\partial u}{\partial y} = \frac{\partial v}{\partial x}$

83. Find the bilinear transformation that maps the points  $z_1 = \infty$ ,  $z_2 = i$ ,  $z_3 = 0$  in the  $z$ -plane into the points  $w_1 = 0$ ,  $w_2 = i$ ,  $w_3 = \infty$  in the  $w$ -plane.

(A)  $w = \frac{1}{z}$

(B)  $w = \frac{-1}{z}$

(C)  $w = \frac{1}{z-1}$

(D)  $w = \frac{1}{z+1}$



84. The calorific value of LPG is
- (A) 24200 kcal/m<sup>3</sup> (B) 22,400 kcal/m<sup>3</sup>  
(C)  $\simeq$  27,800 kcal/m<sup>3</sup> (D)  $\simeq$  24,800 kcal/m<sup>3</sup>
85. Arrange LPG, water gas, producer gas and biogas in increasing order of their calorific value
- (A) producer gas < water gas < biogas < LPG  
(B) producer gas < LPG < water gas < biogas  
(C) producer gas < biogas < water gas < LPG  
(D) producer gas < water gas < LPG < biogas
86. The suitability of petrol fuel is decided by
- (A) Heptane number  
(B) Cetane number  
(C) Octane number  
(D) Butane number
87. When Bleaching powder is mixed with municipal water, the micro-organisms are killed due to the formation of
- (A) CaOCl<sub>2</sub> (B) HOCl  
(C) HCl (D) Ca(OH)<sub>2</sub>
88. Zeolites are
- (A) Sodium alumino silicates  
(B) Hydrated sodium alumino silicates  
(C) Sodium phospho silicates  
(D) Hydrated sodium phospho silicates

89. What is the type of communication usually present between a supervisor and a worker?  
 (A) Downward communication  (B)  Upward communication  
 (C) Diagonal communication  (D) Grapevine communication
90. Which S-containing amino acid is more sensitive to the attack of PAN?  
 (A)  Cysteine  (B) Methionine  
 (C) Glutamic acid  (D) Glycine
91. The primary pollutants are  
 (A) Hydro carbon and  $\text{NO}_2$   (B)  $\text{O}_3$  and NO   
 (C)  NO and  $\text{SO}_2$   (D)  $\text{HNO}_3$  and PAN
92. The effect of carbon monoxide (CO) is to  
 (A) irritate eyes  (B) induce coughing   
 (C) irritate respiratory tracts  (D)  reduce oxygen carrying capacity of blood
93. Match the following.
- | List I            |  | List II               |  |
|-------------------|--|-----------------------|--|
| (a) Freons        |  | 1. Acid Rain          |  |
| (b) $\text{SO}_2$ |  | 2. Gasoline           |  |
| (c) SPM           |  | 3. Ozone depletion    |  |
| (d) Pb            |  | 4. Carcinogenic agent |  |
- Codes :
- |   | (a) | (b) | (c) | (d) |
|---|-----|-----|-----|-----|
| (A)                                     | 2   | 3   | 1   | 4   |
| <input checked="" type="checkbox"/> (B) | 3   | 1   | 4   | 2   |
| (C)                                     | 4   | 1   | 2   | 3   |
| (D)                                     | 3   | 1   | 2   | 4   |
94. One Dobson unit = \_\_\_\_\_ cm thickness of pure ozone layer having density the same at 1 atmospheric pressure and  $0^\circ\text{C}$ .  
 (A)  0.001  (B) 0.1  
 (C) 0.01  (D) 1.0
95. Find the correct sequence of acids based on the contribution to acid rain  
 (A)  $\text{HNO}_3$ , HCl and  $\text{H}_2\text{SO}_4$   (B) HCl,  $\text{HNO}_3$  and  $\text{H}_2\text{SO}_4$    
 (C)  $\text{H}_2\text{SO}_4$ , HCl, and  $\text{HNO}_3$   (D)   $\text{H}_2\text{SO}_4$ ,  $\text{HNO}_3$  and HCl

96. A capacitor consists of two
- (A) Insulators separated by a dielectric
  - (B) Conductors separated by an insulator
  - (C) Ceramic plates and one mica disc
  - (D) Silver-coated insulators
97. A 100 Watt light bulb burns on an average of 10 hours a day for one week. The weekly consumption of energy will be \_\_\_\_\_ watt hours.
- (A) 7000
  - (B) 700
  - (C) 1000
  - (D) 100
98. Unit of susceptance is :
- (A) ohm
  - (B) mho
  - (C) ampere
  - (D) volts
99. In a pure inductive circuit if the supply frequency is reduced to half, the current will
- (A) be reduced by half
  - (B) be doubled
  - (C) be increased to four times
  - (D) be reduced to one fourth
100. The kwh meter can be classified as instrument
- (A) deflecting
  - (B) digital
  - (C) recording
  - (D) indicating
101. In a household single phase induction type watt meter, the meter can be reversed by
- (A) Reversing the supply terminals
  - (B) Reversing the load terminals
  - (C) Opening the meter connections and reversing either the potential coil terminals or current coil terminals
  - (D) Opening the meter and reversing connections of both current and potential coil circuits
102. An amplitude modulated wave is
- (A) the sum of the carrier and the modulating wave
  - (B) the difference between the carrier and the modulating wave
  - (C) the product of the carrier and the modulating wave
  - (D) sum of the carrier and its product with modulating signal



103. Which of the following quadratic form represents the symmetric matrix

$$A = \begin{pmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{pmatrix} ?$$

(A)  $6x^2 + 3y^2 + 3z^2 + 4xy - 2yz - 4xz$

(B)  $6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4xz$

(C)  $6x^2 + 3y^2 + 3z^2 + 4xy + 2yz + 4xz$

(D)  $6x^2 + 3y^2 + 3z^2 - 4xy + 2yz + 4xz$

104. Find the general solution of  $(D^4 + 2D^2 + 1)y = 0$  when  $D \equiv \frac{d}{dx}$

(A)  $y = (c_1 + c_2x)e^x + (c_3 + c_4x)e^{-x}$

(B)  $y = (c_1 + c_2x)\cos x + (c_3 + c_4x)\sin x$

(C)  $y = (c_1 + c_2x)x^2 + (c_3 + c_4x)x^4$

(D)  $y = (c_1 + c_2x)x \cos x + (c_3 + c_4x)x \sin x$

105. Transform the ODE  $x^2y'' - xy' + y = 2\log x$  into the ordinary differential equation with constant co-efficients, taking  $D \equiv \frac{d}{dz}$ ,  $x = e^z$ .

(A)  $(D^2 + 2D + 1)y = 2z$

(B)  $(D^2 - 2D + 1)y = 2z$

(C)  $(D^2 - 2D - 1)y = 2z$

(D)  $(D^2 + 2D - 1)y = 2z$

106. If  $y_1$  and  $y_2$  are linearly independent function on an interval then the Wronskian  $w(y_1, y_2)$  is

(A) zero

(B) not equal to zero

(C) sum of  $y_1$  and  $y_2$

(D) does not exist

107. The specific heat capacity of brass is \_\_\_\_\_ J/kg/K.

(A) 272

(B) 370

(C) 730

(D) 186

108. A Bimetallic strip is example for the following :

(A) Temperature

(B) Thermal expansion

(C) Thermal gradient

(D) Thermal strain

109. Which one of the following is a polarizer?

(A) Sodium chloride crystal

(B) Calcite crystal

(C) Diamond crystal

(D) Glass prism

110. Einstein's photoelectric equation is given by [where  $\phi$  = Work function of the metal,  $h$  = Planck's constant,  $\gamma$  = Frequency,  $V$  = Velocity of the photoelectron]

(A)  $h\gamma = 2\left[\phi - \frac{1}{2}mV^2\right]$

(B)  $h\gamma = \frac{1}{2}mV^2 - \phi$

(C)  $h\gamma = \phi - \frac{1}{2}mV^2$

(D)  $h\gamma = \phi + \frac{1}{2}mV^2$

111. The wavelength of the output beam produced by a He : Ne laser is

(A) 63.28 nm

(B) 6.328 nm

(C) 632.8 nm

(D) 0.632 nm

112. Batch processing is done
- (A) On priority basis
  - (B) On random basis
  - (C) On first come first serve basis
  - (D) Depending on the type of program
113. A special area of a high-speed memory located between the CPU and the main memory is known as
- (A) Cache memory
  - (B) RAM
  - (C) ROM
  - (D) Registers
114. The speed of supercomputers is specified by
- (A) GFLOPS
  - (B) GHZ
  - (C) GIPS
  - (D) MIPS
115. Programming a PROM is called
- (A) Flashing
  - (B) Burning
  - (C) Over writing
  - (D) Rewriting
116. The routing processor performs the functions of \_\_\_\_\_ layer.
- (A) Physical
  - (B) Data link
  - (C) Transport
  - (D) Network
- 
117. \_\_\_\_\_ is called web client.
- (A) Search engine
  - (B) Browser
  - (C) URL
  - (D) Web page



118. The angle of inclination of the plane at which the body begins to move down the plane is called as
- (A) angle of friction  (B) angle of repose  
 (C) angle of kinetic friction (D) angle of projection
119. The moment of inertia of a triangle of base 4 cm and height 3 cm about an axis passing through the centre of gravity and parallel to the base is
- (A)  $3 \text{ cm}^4$  (B)  $4 \text{ cm}^4$   
 (C)  $6 \text{ cm}^4$  (D)  $12 \text{ cm}^4$
120. Torque is directly proportional to rate of change of
- (A) Linear momentum  (B) Angular momentum  
 (C) Linear displacement (D) Angular displacement
121. The angle of rotation of a body is given by the expression.  $\theta = 2t^3 - 5t^2 + 8t + 6$ , where  $\theta$ , is in radians and 't' is in seconds. The angular acceleration of the body when  $t = 0$  seconds is
- (A)  $8 \text{ rad/s}^2$  (B)  $-6 \text{ rad/s}^2$   
 (C)  $10 \text{ rad/s}^2$   (D)  $-10 \text{ rad/s}^2$
122. The effective weight of an astronaut ordinarily weighing  $60 \text{ kg}_f$  when his rocket moves vertically upward with  $5g$  acceleration is
- (A)  $60 \text{ kg}_f$  (B)  $300 \text{ kg}_f$   
 (C)  $360 \text{ kg}_f$  (D)  $600 \text{ kg}_f$
123. A force 'p' acts on a body of mass 150 kg and produces an acceleration of  $3 \text{ m/s}^2$  in the direction of the force. The magnitude of the force is
- (A) 45 N (B) 50 N  
 (C) 450 N (D) 500 N
124. A particle moves from a point  $(3, -4, 2) \text{ m}$  to a point  $(-2, 3, 5) \text{ m}$  under the influence of a force  $\vec{F} = (-2\vec{i} + 3\vec{j} + 4\vec{k})$  Newton. The work done by the force is
- (A) 28 Joules  (B) 59 Joules  
 (C) 100 Joules (D) 210 Joules

125. Identify the connected version of the given sentence :

The committee is divided in its view about his guilt.

- (A) The committee are divided in their view about his guilt
- (B) The committee are divided in its view about his guilt
- (C) The committee is divided in their view about his guilt
- (D) The committee were divided in its view about his guilt

126. I should not have done that of I \_\_\_\_\_ you.

- (A) was
- (B) were
- (C) am
- (D) are

127. Spot the error :

I am waiting / here / for the last / two hours

A B C D

- (A) I am waiting
- (B) here
- (C) for the last
- (D) two hours

128. Spot the error :

Neither the father / nor his son / know / English.

A B C D

- (A) Neither the father
- (B) nor his son
- (C) know
- (D) English

129. Match the pair :

- |              |                     |
|--------------|---------------------|
| (a) Quantum  | 1. time without end |
| (b) Euphoria | 2. without          |
| (c) Devoid   | 3. share            |
| (d) Eternity | 4. optimism         |

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

130. Find  $L(e^{3t}f(t))$ , if  $L(f(t)) = F(s)$ .

- (A)  $F(s-3)$
- (B)  $F(s+3)$
- (C)  $F(s)+3$
- (D)  $F(s)-3$

131.  $L(t^2e^{-3t})$  is

- (A)  $\frac{1}{(s+3)^2}$
- (B)  $\frac{3}{(s+2)^2}$
- (C)  $\frac{1}{(s+2)^3}$
- (D)  $\frac{2}{(s+3)^3}$

132. Laplace transform of  $\cosh at$  is

- (A)  $\frac{s}{s^2+a^2}$
- (B)  $\frac{a}{s^2+a^2}$
- (C)  $\frac{s}{s^2-a^2}$
- (D)  $\frac{a}{s^2-a^2}$

133. An object is moving north. From only this information one can conclude that

- (A) there is a single force on the object directed north
- (B) there is a net force on the object directed north
- (C) these may be several forces on the object, but the largest must be directed north
- (D) nothing about the forces on the object



134. Wet or Electrochemical corrosion occurs when
- (A) A conducting liquid is in contact with metal
  - (B) Two dissimilar metals immersed in solution
  - (C) Two dissimilar metals partially immersed in solution
  - (D) All the three are correct
135. Hydrogen evolution type corrosion occurs in
- (A) Basic environment
  - (B) Neutral environment
  - (C) Acidic environment
  - (D) Inert environment
136. The rate of corrosion at the joints of wire mesh is
- (A) Very slow
  - (B) Slow
  - (C) Fast
  - (D) Moderate
137. The calculated standard emf of  $H_2 - O_2$  fuel cell. Given that  $E^\circ = -0.40$  V for  $H_2$  and  $E^\circ = 0.83$  V for oxygen half cell
- (A) 1.31 V
  - (B) 1.11 V
  - (C) 1.23 V
  - (D) 1.27 V
- 
138. The reduction potential of hydrogen half-cell will be negative if
- (A)  $p(H_2) = 1$  atm and  $[H^+] = 1$  M
  - (B)  $p(H_2) = 1$  atm and  $[H^+] = 2$  M
  - (C)  $p(H_2) = 2$  atm and  $[H^+] = 1$  M
  - (D)  $p(H_2) = 2$  atm and  $[H^+] = 2$  M

139. Noise damages Physiological and psychological effects in human stated by whom?  
 (A) Robert Alex Baron (B) Robert Koch  
 (C) Alexander Fleming (D) Watson crick
140. What are the sources of Ganga pollution at Kanpur?  
 (A) Jute, chemical, metal, tanneries, textile Industries  
 (B) Dyeing industries, sugar industries  
 (C) Nuclear power plants, soap industries  
 (D) Rubber industries, Tea industries
141. Montreal protocol is related to  
 (A) Global warming  (B) Protect stratospheric ozone  
 (C) Conservation of water (D) Saving fuel
142. Expand DDT  
 (A) Delhi Dangerous Thymol (B) Didentrite Thymol  
 (C) Diphenyl Dichloro Tetraethane  (D) Dichloro Diphenyl Trichloroethane
143. \_\_\_\_\_ are the pollutants from the agricultural sector.  
 (A) Metals (B) Ions  
 (C) Temperature  (D) Pesticides and Fertilizers
144. Ganga Action plan (1985) was approved by  
 (A) MOEF and CC (B) CSIR  
 (C) UGC (D) DST
145. \_\_\_\_\_ hampers haemoglobin formation in the human body.  
 (A) Carbon  (B) Lead  
 (C) Arsenic (D) Sulphur
146. What are the major sources of emissions of air pollutants?  
 (A) Agriculture and commercial products (B) Consumer and commercial products  
 (C) Industry and Agriculture  (D) Industry and Transportation

147. The power gain of a transistor connected in \_\_\_\_\_ arrangement is the highest.
- (A) Common collector (B) Common gate  
(C) Common base  (D) Common emitter
148. The solutions to the quadratic equation  $x^2 - 11x + 22 = 0$  are  $x = 3$  and  $x = 6$ . What is the base of the numbers?
- (A) 4 (B) 6  
 (C) 8 (D) 16
149. Find the complement of the expression  $Y = ABC\bar{C} + A\bar{B}C$
- (A)  $\bar{Y} = (A + \bar{B} + \bar{C}) \cdot (\bar{A} + B + C)$  (B)  $\bar{Y} = (\bar{A} + \bar{B} + C) \cdot (A + B + C)$   
(C)  $\bar{Y} = (A + B + C) \cdot (\bar{A} + B + C)$   (D)  $\bar{Y} = (\bar{A} + \bar{B} + C) \cdot (\bar{A} + B + C)$
150. 'Preset' and 'Clear' inputs are used in a Flip-flop for making  $\theta =$  \_\_\_\_\_ and \_\_\_\_\_ respectively.
- (A) 0, 0 (B) 1, 1  
 (C) 1, 0 (D) 0, 1
151. A ripple counter is \_\_\_\_\_ sequential circuit.
- (A) synchronous  (B) asynchronous  
(C) either synchronous and asynchronous (D) neither synchronous nor asynchronous
152. The resolution of a 12 bit D/A converter is \_\_\_\_\_ of the full scale output.
- (A) 1/1024 (B) 1/32798  
 (C) 1/4095 (D) 1/256
153. The latest statistics \_\_\_\_\_ his claim that the economy is expanding.
- (A) Affects (B) Convinced  
(C) Prohibit  (D) Refute



154.  $\int_1^b \int_1^a \frac{dx \cdot dy}{xy}$  is

(A)  $\log a \cdot \log b - 2$

(B)  $\log a \cdot \log b - 1$

(C)  $\log(a/b)$

(D)  $\log a \cdot \log b$

155.  $\int_0^2 \int_0^x f(x, y) dy dx$  is equal to

(A)  $\int_0^2 \int_y^2 f(x, y) dx dy$

(B)  $\int_0^2 \int_0^y f(x, y) dx dy$

(C)  $\int_0^2 \int_0^{y^2} f(x, y) dx dy$

(D)  $\int_0^2 \int_0^y f(x, y) dx dy$

156. Find  $\nabla \cdot \vec{r}$ , where  $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$

(A) 0

(B) 1

(C) 2

(D) 3

157. Find the directional derivative of  $\phi = xyz$  at the point (2, 2, 2) in the direction of  $\vec{i}$ .

(A) 4

(B) 2

(C) 1

(D) 3

158. Which one of the following tool is used for topography of nanomaterials?

(A) XRD

(B) UV-VIS

(C) FTIR

(D) SEM

159. Total number of atoms in a body centred cubic crystal is

(A) 8

(B) 4

(C) 6

(D) 2

160. One Bohr magnetron is equal to

(A)  $9.28 \times 10^{-20} \text{ A} \cdot \text{m}^2$

(B)  $9.28 \times 10^{-22} \text{ A} \cdot \text{m}^2$

(C)  $9.28 \times 10^{-24} \text{ A} \cdot \text{m}^2$

(D)  $9.28 \times 10^{-26} \text{ A} \cdot \text{m}^2$

161. What is the energy released by 1 kg of Uranium during fission?

(A)  $2.26 \times 10^7 \text{ kWh}$

(B)  $3.33 \times 10^5 \text{ kWh}$

(C)  $1.03 \times 10^4 \text{ kWh}$

(D)  $1.36 \times 10^3 \text{ kWh}$

162. The concept of magic numbers, representing the stability of a nucleus, is explained by

(A) Liquid drop model

(B) Nuclear shell model

(C) Gamow model

(D) Rutherford model

163. The railway reservation system is an example of  
 (A) E-commerce  (B)  E-Government  
 (C) GIS  (D) System software
164. Which one of the following does not contribute towards quality Assurance?  
 (A) Quality of Design  (B) Quality of conformance   
 (C) Quality of Inputs  (D) Quality of service
165. Which staffing function involves estimating the needs of human resource for the organisation?  
 (A) Man power planning  (B) Recruitment   
 (C) Selection  (D) Placement
166. "General and Industrial management" book was authored by  
 (A) Henry Fayol  (B) Elton Mayo  
 (C) F.W. Taylor  (D) Mary Parker Follett
167. An effective control system should always be  
 (A) Economical  (B) Simple   
 (C) Forward looking  (D) Motivating
168. Which system identified the three types of wastes 'MU's?  
 (A) Ford operational system   (B) Toyota production system  
 (C) Honda Maintenance system  (D) Kodak predictive system
169. As 9100 is applicable to \_\_\_\_\_ industry?  
 (A) Automobile   (B) Aerospace  
 (C) Telecommunications  (D) Food
170. "Muri" is related to  
 (A) Waste of motion   (B) Overburden  
 (C) Unevenness  (D) Processing waste



171. An aeroplane is moving horizontally with a velocity ' $v_0$ '. It drops a packet from a height of ' $h$ '. The time taken by the packet to reach the ground is

(A)  $\sqrt{\left(\frac{2h}{g}\right)}$

(B)  $\sqrt{2gh}$

(C)  $\sqrt{2gh^2}$

(D)  $\sqrt{(2/gh)}$

172. Newtons second law expressing the relation between

(A) mass, velocity, force

(B) force, mass, acceleration

(C) force, mass, angular velocity

(D) force, velocity, density

173. Centroid of ellipse lies at

(A) at major axis

(B) Intersection of major and minor axis

(C) at minor axis

(D) at focus

174. The equation of motion in tangential direction is given by

(A)  $\Sigma F_t = ma_t$

(B)  $\Sigma F_t = m/a_t$

(C)  $\Sigma F_t = m^2/a_t$

(D)  $\Sigma F_t = \sqrt{ma_t}$

175. The range of particle when thrown at an angle of  $15^\circ$  with the horizontal is 1.5 km. When it is thrown at an angle of  $45^\circ$  with the same initial velocity, the range is

(A) 2 km

(B) 3 km

(C) 5 km

(D) 2.5 km

176. The product of mass and velocity is known as

(A) work

(B) power

(C) momentum

(D) impulse

177. Moment of inertia ( $I$ ) and radius of gyration ( $K$ ) are related by

(A)  $I = AK^2$

(B)  $I = A/K^2$

(C)  $I = A^2K$

(D)  $I = K/A^2$

178. For quite a long time, I \_\_\_\_\_ of my boy friends.

- (A) have been thinking
- (B) had thought
- (C) have thought
- (D) had been thinking

179. One who believes in many gods is

- (A) polygamist
- (B) misogynist
- (C) misogymist
- (D) polytheist

180. Do you think he will come?

Ans : No, I \_\_\_\_\_

- (A) don't think
- (B) don't suppose
- (C) suppose not
- (D) won't

181. The product of eigen values of an orthogonal matrix are

- (A) 0
- (B) +1 or -1
- (C) +i or -i
- (D) 1 or i

182. If  $A$  is a square matrix of order  $n$ ,  $I_n$  is an unit matrix of order and  $\lambda$  is a scalar, then the characteristic equation of  $A$  is given by

- (A)  $|\lambda A| = 0$
- (B)  $\lambda|A| = 0$
- (C)  $|\lambda A - I_n| = 0$
- (D)  $|A - \lambda I_n| = 0$

183. A hall has a volume of  $5000 \text{ m}^3$ . It is required to have reverberation time of 1.5 second. What should be the total absorption in the hall?
- (A) 735 O.W.U.  $\text{m}^2$   
(B) 375 O.W.U.  $\text{m}^2$   
 (C) 537 O.W.U.  $\text{m}^2$   
(D) 628 O.W.U.  $\text{m}^2$
184. An ultrasonic source of 0.07 MHz sends down a pulse towards the seabed, which returns after 0.65 S. Calculate the depth of the sea. (Given velocity of the pulse = 1700 m/s)
- (A) 525.5 m  
(C) 255 m  
 (B) 552.5 m  
(D) 250.5 m
185. The natural frequency of a Piezo electric crystal is
- (A)  $\frac{1}{2l}\sqrt{\frac{E}{\rho}}$   
(C)  $2l\sqrt{\frac{E}{\rho}}$   
(B)  $\frac{1}{2}\sqrt{\frac{E}{\rho}}$   
(D)  $\frac{l}{2}\sqrt{\frac{E}{\rho}}$
186. The first law of thermodynamics is conservation of
- (A) momentum  
(C) temperature  
 (B) energy  
(D) heat
187. The change in entropy is
- (A) positive in a reversible change  
(B) negative in an irreversible change  
 (C) positive in an irreversible change  
(D) negative in a reversible change



188. Specify the name of the failure that occur when normally operating item suddenly becomes inoperative
- (A) Independent Failures (B) Creeping Failures  
(C) Degradation Failures  (D) Catastrophic Failures
189. "Grapvine" is the term used in relating to
- (A) Informal communication  
(B) Formal communication  
(C) Both in formal and informal communication  
(D) Not related to communication
190. Identify the hidden cost in the given options
- (A) Scraps (B) Inspection  
 (C) Reputation cost (D) Reworks
191. A Leader who takes decisions in consultation and participation with the subordinates is called as
- (A) Autocratic Leader  (B) Democratic Leader  
(C) Free-rein Leader (D) Institutional Leader
192. Who designed quality planning?
- (A) Edward Demings (B) Philip Irosby  
 (C) Joseph Juran (D) Masaaki Imai
193. Which managerial function establishes the superior-subordinate relationship in an organisation?
- (A) Planning  (B) Organising  
(C) Directing (D) Staffing
194. "A place for everything and everything in its place" is a maxim related to \_\_\_\_\_ practice.
- (A) Sort (B) Scrub  
 (C) Straighten (D) Systematise
195. One Manager one plan is based on
- (A) Concept of unity of Direction (B) Concept of unity of Commoma  
(C) Concept of division of work (D) Concept of Esprit de crows

196. Which of the following is an output device?

(A) Scanner

(B) Microphone

(C) Monitor

(D) Modems

197. Select the optical devices from the following options

(A) MICR

(B) Touch screen

(C) Track ball

(D) Joystick

198. A Double sided, 3.5 inch floppy disk, have 80 sectors, 18 sectors/track and can store 512 bytes/sectore. Calculate the storage capacity of the Floppy disk

(A) 1.47 GB

(B) 1.47 MB

(C) 2.47 MB

(D) 2.47 GB

199. The version of SDRAM, that includes a small SRAM cache to reduce delays in data access and speed up operations is

(A) Synchronous DRAM

(B) Enhanced SDRAM

(C) Double Data rate SDRAM

(D) Rambus DRAM

200. Computer software which allows a computer to interact with devices such as printers, scanners and video cards, is

(A) Educational software

(B) Productivity software

(C) Driver software

(D) Operating systems software