Tribhuvan University

Institute of Engineering (IOE)

BE Entrance Examination- 2079

Attempt all Questions. **Time: 2 hrs**

Full Marks: 140 **Shift: Morning**

Select the best alternatives: (60*1=60)

Section-I

1. If the momentum of body is constant then which of the following will be constant?
   a)force b)torque
   c) velocity d)moment of inertia
2. Dimension of G is
   a)[M-1L3T-2] b)[M-1L3T2]
   c)[ML3T-2] d)[ML-3T2]
3. The torque produced in current carrying current depends upon
   a)Area b)Shape of coil
   c)Nature of the coil d)Perimeter of the coil
4. Pressure exerted by gas molecules is directly proportional to
   a)No. of molecules
   b) No. of molecules per unit volume
   c)1/3 No. of molecules per unit mole
   d)1/3 No. of molecules per unit volume
5. When two moving waves of intensity I moving in opposite direction having same amplitude and frequency superimpose then intensity of resultant wave is
   a)I b)2I
   c)I/2 d)0

6. Centripetal force from inertial frame is

   a)along the radius b)outwards the radius

   c)Along the direction of velocity d)opposite to the direction of velocity

7. Efficiency of X-ray experiment is

   a) 99% b)1%

   c)less than 1% d)none

8. The reading of voltameter is based on

   a)P=I2RT b)V=IR

   c)P=VI d)V=V1+V2

9. Unit of Heat Capacity is equal to

   a)Work b)Specific Heat capacity

   c)Gas constant d)Heat

10. Term of Resistivity is

    a) $m/ne^2\ \tau$ b)$m/ne\tau$

    c)$e^2/me\tau$ d)$e/me\tau$

11. What change in frequency of organ pipe f when half of it dipped into water?

    a)f/2 b)2f

    c)f d)4f

12. The rifle fires a bullet and gun recoils then which one is true

    a)KE of rifle is less than bullet b)KE of rifle is equal to the bullet

    c)KE of rifle is more than bullet d)no change in KE

13. New focal length of convex lens of F when it is dipped into water is

    a) f b)2f

    c)3f d)4f

14. Flux induced in coil is independent of

    a)Nature of coil b)time

    c)Flux density d)current

15. Taking small steps in ice is due to

    a)frictional force of ice is large b) frictional force of ice is large

    c)smaller normal reaction d)greater normal reaction

16. The dynamic mass of photon is

a)0 b)hc/ λ

c)h/ λ d)h/c× λ

17. Resolving power of microscope depends upon

a)the apertures of objective & eye lens

b)focal length of objective & eye lens

c) aperture of eye lens

d)the wavelength of light illuminating the object

18. Which one has highest O.N?

a)HClO2 b)HClO3

c)HClO4 d)HClO5

19. Ammonia gas is dried by

a)lime water b)Quick lime

c)carbon dioxide d)alcohol

20. Sodium benzoate treated with soda lime gives

a)Toluene b)Benzene

c)Benz aldehyde d)Benzoic Acid

21. Shorter bond length is in

a)sp b)sp2

c)sp3 d)none

22. CuSO4 detects water in

a)alcohol b)organic compound

c)acid d)none

23. Which one has maximum no. of unpaired electron?

a)Fe+++ b)Cr+++

c)Mn++ d)Zn++

24. Which one has highest metallic properties

a)F_2 b) Cl_2

c) Br_2 d) I_2

25. Permanent hardness of water is due to

a)calcium hydrogen bi-sulphate b)calcium sulphate

c)magnesium sulphate d)sodium chloride

26. By product of solvay-process

a)NaOH b)CaCl2

c)H2 & Cl2 d)H2 only

27. Self reduction takes place in extraction of

a) Zn b)Hg

c) Cu d)Both (ii)&(iii)

28. Acidic strength order

a) HI>HBr>HCl>HF b) HF>HCl>HBr>HI

c) HI>HCl>HBr>HF d) HF>HBr<HCl>HF

29. AΔB =

a)(A-B)U(B-A) b) (A-B)∩(B-A)

c) (AUB)-(A∪B) d)none

30. For what value of k matrix $\begin{bmatrix} k & 2 \\ -2 & k \end{bmatrix}$ will be skew-symmetric?

a)1 b)2

c)3 d)0

31. OA=a, OB=b & AB=3AC then c=

a) $\frac{b+2a}{3}$ b)b-c

c)c+a d)c+2a

32. If 3a=b+c, then $\tan\frac{A}{2}.\tan\frac{B}{2}$=

a)0 b)1

c)2 d)3

33. $\lim_{x\to 0} \frac{3^x-4^x}{x}$

a) log(12) b)log(3/4)

c)1 d)0

34. If (a+b+c).(a+b-c)+bc then $< C =$

a)30 b)120

c)60 d)45

35. $\lim_{x \to 0} sin \frac{1}{x}$

a)0 b)1

c)2 d)doesn't exist

36. The word SEE can be arranged so that vowel comes always together is

a)1 way b)2 ways

c)4 ways d)6 ways

37. $\sqrt{5 + 12i} + \sqrt{5 - 12i}$

a)0 b)2i

c)6 d)2

38. The maximum value of sinx+cosx=

a)1 b)$\frac{1}{\sqrt{2}}$

c)$\sqrt{2}$ d)2

39. If S_n=n^3-100 then t_{10}=

a)331 b)271

c)900 d)678

40. Eccentricity of conic $x^2 - y^2 = a^2$ is

a) 1 b)2

c)$\sqrt{2}$ d)$1/\sqrt{2}$

41. The period of |sinx| is

a)π b) 2π

c) $\pi/2$ d) $\pi/4$

42. $\sin^{-1} x + \cos^{-1} y = \frac{\pi}{2}$ then

a)x=0,y=0 b)x=y

c)x=1,y=0 d)both b & c

43. If $x^3y^2 = (x+y)^5$ *then* $\frac{dy}{dx}$=

a) y/x b)-y/x

c)x/y d)0

44. If k, 2k, 3k are dc′s of the line then the value of k is

a)$\frac{1}{\sqrt{13}}$ b)$\frac{1}{\sqrt{14}}$

c)$\sqrt{12}$ d)4

45. Which one is wrong?

a)IABI=IAI.IBI b)$(AB)^T = A^T.B^T$

c)$|kA|^n = k^n.|A|$ d)none

46. The equation of tangent to the equation $3x^2 + y = 4$ at (1,0) is

a)6x-y=6 b)6x+y=6

c)x+y=6 d)x-y=6

47. The distance of point (x,y) from x-axis is

a)y b)x

c)|y| d)0

48. The equation of pair of straight lines through the origin and perpendicular to a$x^2 + 2hxy + by^2 = 0$ *is*

a) a$x^2 - 2hxy + by^2 = 0$ b) $bx^2 + 2hxy + ay^2 = 0$

c) $bx^2 - 2hxy + ay^2 = 0$ d)none

49. The word "decoration" has its primary stress on the …….syllable.

a)1st b)2nd

c)3rd d)4th

50. The synonym of "suspect" is

a)defendant b)malicious

c)tacit d)unquestionable

51. Switch off the TV.

a) Let the TV be switched off. b) Let be the TV switched off.

c) Let TV be the switched off. d) You are requested to switch off the TV.

52. I helped him…….the road.

a)to cross b)crossing

c)cross d)to crossing

53. Her thinking leans……democracy.

a)with b)towards

c)for d)none

54. …….his principles, he has to be very careful.

a)with regard of b) with regard on

c) with regard to d)none

55. He crossed the broken bridge……..warning.

a)in spite of b)despite of

c)in spite off d)on

56. If she was free, she …….to you.

a)talked b)can talked

c)could talked d)would talked

57. A number of people at station……amazing.

a)was b)is

c)are d)none

58. I hate people laughing at me.

a) I hate being laughed at. b) I don't like people laughed at me.

c) People are being hated by me. d)none

59. The pattern for "This is a book"

a)S+V+O b) S+V+ adjunct

c) S+V d) S+V+ linking verb

60. Which one of them is incorrect?

a)lay off b)get off

c)see off d)put off

Section-II (40×2=80 marks)

61. When momentum of body increases by 100%, then its KE increases by

a)20% b)40%

c)100% d)300%

62. A pendulum having 1m length is mounted in a rocket. When a rocket accelerates upward with 4m/s^2 & the pendulum makes 2^0 with vertical then the time period of that pendulum is

a)1.8 sec b)2 sec

c)2.3 sec d)3 sec

63. The ratio of moment of inertia of two solid spheres is in 1:4 and that of diameter is 1:4, then what will be the ratio of their masses?

a)1:16 b)16:1

c)1:4 d)4:1

64. The equal length of two wires steel and copper are made of up same materials having a same area is elongated by same force & $\gamma_s = \frac{1}{2}\gamma_c$ then ratio of energy stored per unit volume of copper to steel wires is

a)1:2 b)2:1

c)1:4 d)4:1

65. In n-p-n transistor circuit, the collector current is 10mA. If the electrons emitted reach the collector, then

a)the emitter current will be 9mA b) the base current will be 9mA

c) the emitter current will be 11.1mA d) the base current will be 11.1mA

66. An air bubble in a glass slab with refractive index 1.5 (near normal incidence) is 8 cm deep when viewed from one surface and 6 cm deep when viewed from the opposite face. The thickness (in cm) of the slab is

a)24 cm b)12 cm

c)10 cm d)8 cm

67. The power rate of photoelectric device is 100KW and emitted the frequency of 10Hz then $\frac{n}{t}$=

a)$2\times10^{19}e^-$/s b) $2\times10^{-19}e^-$/s

c)$1.7\times10^{17}e^-$/s d) $1.7\times10^{-17}e^-$/s

68. If a 50kg person having efficiency 60% is provided 90kJ energy provided by food. The height that he can climb is

a)290m b)300m

c)310m d)310m

69. The force between two identical charge separated by 1m is 10N.At what distance the force will be 4N?

a)0.29m b)0.31m

c)0.5m d)0.9m

70. At what temperature the c.rms value of N_2 is same as H_2 at $0°C$?

a)$3258°C$ b)$3120°C$

c)$3430°C$ d)$3458°C$

71. Second overtone of the closed organ pipe and third overtone of the organ pipe are equal. If the length of the open organ pipe is 16cm then length of closed organ pipe is

a)25.6cm b)18cm

c)10cm d)3.33cm

72. A transformer with efficiency 80% works at 4kW and 100V. If the secondary voltage is 200V, then the primary and secondary currents are respectively

a)40A and 16A b) 16A and 40A

c) 20A and 40A d) 40A and 20A

73. Potentiometer of wire of length 1m is connected in series with 490Ω and 2V battery. If 0.2V/cm is the potential gradient, then resistance of the potentiometer wire is

a)4.9Ω b)7.9Ω

c)5.9Ω d)6.9Ω

74. In Young's double-slit experiment, 0.28mm separation between the slits and the screen is placed 1.4m away. 1.2cm is the distance between the central bright fringe and the fourth bright fringe. Determine the wavelength of light used in the experiment.

a)60nm b)600nm

c)70nm d)700nm

75. At 80°C distilled water has H_3O^+ concentration equal to 1 x 10^{-6} mol/L. The value of K_w at this temperature will be

a)1×10^{-12} b) 1×10^{-15}

c) 1×10^{-6} d) 1×10^{-9}

76. Equal volume of solution pH=4 & pH=10 are mixed together. The resulting pH of solution is

a)2 b)4.3

c)7 d)8.2

77. Lead acetate paper turns black when it contacts with

a)SO_3 b)SO_2

c)H_2S d)HCl

78. The reaction taking place at the anode when a dilute aqueous solution of CuSO4 is electrolyzed using inert Pt electrodes

a) Cu→ $Cu^{2++}+2\,e^-$ b) $2SO_4^{-2}\rightarrow S_2O_3^{2-}+2e^-$

c) $2H_2O\rightarrow O_2+4H^++4e^-$ d) $2H^++2e\rightarrow H_2$

79. Addition of CCl4 in alkane is

a)Nucleophilic substitution b)free radical substitution

c)Oxidation d)Electrophilic addition

80. The metal like Cu and Zn react with conc.HNO_3 to give

a)NO_2+H_2O b)Metal Nitride+ NO_2+H_2O

c)Metal Nitrite NO_2+H_2O d)Metal Nitrate+ NO_2+H_2O

81. The gas formed by AgI treated with chloroform passed through alkaline $KMnO_4$ gives

a) Ethane b)Ethanoic acid

c)Ethane-1,2-dioic acid d)Ethyl glycol

82. The domain of $e^{5x}+\log_5 x+3$ is

a)[1,∞] b)[0,∞]

c)(0,∞] d)(1,∞)

83. If s(s-a)=kbc, then k∈

a)$\Re$ b)(0,∞)

c)[0,1] d)[-1,1]

84. The coefficient of a^3 in the expansion of $\frac{3a^2+2a+1}{e^a}$ is

a)$\frac{8}{5}$ b) $\frac{-8}{5}$

c) $\frac{-7}{3}$ d) $\frac{7}{3}$

85. The value of $\tan^{-1}(\frac{\cos x+1}{\sin x})$

a)- $\frac{\pi}{4}-\frac{x}{2}$ b)0

c)1 d) $\frac{\pi}{4}-\frac{x}{2}$

86. $\int \tan^{-1} x$

a) $x\tan x+\log(1+x^2)+C$ b) $x\tan x-\log(1+x^2)+C$

c) $x\tan x+\frac{1}{2}\log(1+x^2)+C$ d)$x\tan x-\frac{1}{2}\log(1+x^2)+C$

87. Find the equation of the plane passing through the origin and perpendicular to each of the planes x + 2y – z = 1 and 3x – 4y + z = 5.

a) x -2y -5z = 0 b) x - 2y + 5z = 0

c) x + 2y + 5z =0 d) x + 2y - 5z = 0

88. If $y=\sin x+\cos x$, then $\frac{d^2y}{dx^2}+y=$

a)1 b)y

c)0 d)-y

89. If A=$\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$, then A^2-5A is equal to

a)2I b)-2I

c)3I d)null matrix

90. A person has got 12 acquaintances whom of 8 are relatives. In how many ways can he invite 7 guests so that 5 of them may be relatives?

a) 336 b)420

c)720 d)900

91. $\lim_{x\to\frac{\pi}{4}} \frac{\tan x-1}{x-\frac{\pi}{4}}$

a)1 b)1/2

c)2 d)4

92. Find the area bounded by the line, y=2x-4, y=1 and y-axis

a)$\frac{25}{4}$ b) $\frac{7}{3}$

c) $\frac{-25}{4}$ d) $\frac{15}{4}$

93. If a,b,c are in A.P. then the value of $\frac{(a-b)^2}{(b^2-ac)^2}$=

a) 1 b)2

c)3 d)4

94. The length of latus rectum of the ellipse $4x^2 + 9y^2 = 36\ is$

a)4/3 b)3/4

c)8/3 d)3/8

95. Find two numbers whose sum is 15 and when the square of one multiplied by the cube of the other is maximum

a)10 & 5 b)8 &7

c)8 & 7 d)6 & 9

A. Read the passage carefully and check the best option:

The achievement of science in the twentieth century has been very great. Its influence can be felt in every sphere of life. From the small pins and needles to the huge iron sheets and joints, most of the things we require for our everyday use, come out of factories where scientific principles are utilized for practical ends. Science has enabled man to bring forces of nature under control and to use them for his own advantage. It has brought the distant parts of the world close together. Our knowledge of the universe has been much widened on account of the untiring efforts of the astronomers like Jeans and Eddington. Remarkable cures of human diseases have been possible owing to the discovery of some wonderful medicines.

97. **What is the main idea of the given passage?**

A. The impact of science can be felt in every sphere of life

B. Science is an anathema

C. Nothing is beyond the purview of science
D. Science can work miracles

98. **The mode of approach is**
A. logical
B. anatomical
C. descriptive
D. expository

99. **Science has proved a great boon for**
A. scientists
B. artists
C. explorers
D. mankind

100. **What is the most appropriate title for the given passage?**
A. Science is a curse
B. Science, a great boon
C. Achievements of science
D. None of these