0066

Sr. No. .....

ENTRANCE TEST-2022
School of Engineering
B.Tech./BE Lateral Entry

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. 6 4 1 0 6

1. Write your roll number in the space provided at the top of this page of question booklet and fill up the necessary information in the spaces provided on OMR Answer sheet.
2. OMR Answer sheet has an original copy and a candidate's copy glued beneath it at the top. While making entries in the original copy, candidate should ensure that the two copies are aligned properly so that the entries made in the original copy against each item are exactly copied in the candidate's copy.
3. All entries in the OMR answers sheet including answers to questions are to be recorded in the original/Carbon copy.
4. Use only blue/ black ball point pen to darken the circle of correct / most appropriate response. In no cas gel/ ink pen or pencil should be used.
5. Do not darken more the one circle of option for any question. A question with more than one darkene response shall be considered wrong.
6. There will be negative marking for wrong answers. Each wrong answer will led to the deduction of 0.25 marks from the total score of the candidate.
7. Only those candidates who would obtain positive score in entrance test examination shall be eligible for admission
8. Do not make any stray mark on the OMR sheet
9. Calculators and mobiles shall not be permitted inside the examination hall.
10. Rough work, if any, should be done on the blank sheets provided with the question booklet.
11. OMR answer sheet must be handled carefully and it should not be folded or mutilated in such case it will not be evaluated.
12. Ensure that your OMR Answer sheet has been signed by the invigilator and the candidate himself/herself.
13. At the end of the examination hand over the OMR answer sheet to the invigilator who will first tear off the original OMR sheet in presence of the candidate and hand over the candidate's copy to the candidate.
14. If any of the information in the response Sheet/Question Paper has been found missing or not mentioned as stated above the candidate is solely responsible for that lapse.

SEAL

1. What is the partial differential of $z = \varphi\ x + y$ where φ is an arbitrary function?

a) $\frac{\partial z}{\partial x} = \frac{\partial z}{\partial y}$

b) $\frac{\partial z}{\partial y} = y\frac{\partial z}{\partial x}$

c) $\frac{\partial z}{\partial y} = x\frac{\partial z}{\partial x}$

d) $x\frac{\partial z}{\partial y} = ay\frac{\partial z}{\partial x}$

2. Which of the following partial differential equation is Lagrange's equation?

a) $p\ x, y, z\ \frac{\partial z}{\partial x} + p\ x, y, z\ \frac{\partial z}{\partial y} = R\ x, y, z$

b) $p\ x, y, z\ \left(\frac{\partial z}{\partial x}\right)^2 + p\ x, y, z\ \frac{\partial z}{\partial x} = R\ x, y, z$

c) $p\ x, y, z\ \left(\frac{\partial z}{\partial x}\right)^2 + p\ x, y, z\ \left(\frac{\partial z}{\partial y}\right)^2 = R\ x, y, z$

d) None of these

3. What is the Lagrange's auxiliary equation for $x^2p + y^2q + z^2 = 0$?

a) $\frac{dx}{x^2} = \frac{dy}{y^2} = \frac{dz}{x^2}$

b) $\frac{dx}{x^2} = \frac{dy}{y^2} = \frac{dz}{z^2}$

c) $\frac{dx}{x^2} = \frac{dy}{y^2} = \frac{dz}{-z^2}$

d) None of these

4. What is the general solution of the given partial differential equation?

$xp + yq = z.$

a) $\varphi\left(\frac{x+1}{y}, \frac{y}{z}\right) = 0$

b) $\varphi\left(\frac{xy}{z}, \frac{y}{z}\right) = 0$

c) $\varphi\left(\frac{x}{y}, \frac{y}{z}\right) = 0$

d) $\varphi\left(\frac{x}{4}, \frac{y}{z}\right) = 0$

5. What is the complementary function of the given equation?

$(DD' + aD + bD' + ab)Z = e^{mx+ny}$

a) $e^{-by}\emptyset_1\ y + e^{-ax}\emptyset_2\ y$

b) $e^{-bx}\emptyset_1\ y + e^{-ay}\emptyset_2\ x$

c) $\emptyset_1\ y + \emptyset_2\ x$

d) None of these

6. The solution of the given equation is

$(D^2 + 3DD' + 2D'^2)Z = x + y$

a) $Z = \emptyset_1\ y - x + \emptyset_2\ y - 2x + \frac{1}{36}\ x + y^3$

b) $Z = \emptyset_1\ y + x + \frac{1}{36}\ x + y^3$

c) $Z = x + e^y\emptyset_1\ y + e^x\emptyset_2\ y$

d) None of these

7. What is the particular integral of the given equation?
$(D^2 - 4DD' + D - 1)Z = e^{3x-2y}$.

a) $\frac{e^{3x-2y}}{35}$

b) e^{3y+x}

c) $\frac{e^{3x+2y}}{35}$

d) None of these

8. What is the order of the given equation?
$\tan y \frac{\partial z}{\partial x} + \tan x \frac{\partial z}{\partial y} = \sec^2 z$.

a) 2

b) 1

c) 0

d) -1

9. For the maximum Compton Shift, the scattering angle (φ) should be

a) π

b) 2π

c) $\pi/2$

d) 0

10. If the temperature increases, then Wien's Displacement Law states

a) That the wavelength of thermal radiations increases

b) That the wavelength of thermal radiations decreases

c) That the wavelength of thermal radiations remains the same

d) None of the above

11. According to Heisenberg's uncertainty principle,

a) An electron can reside inside the nucleus in any state

b) An electron can reside inside the nucleus in a stationary state

c) An electron cannot reside inside the nucleus

d) None of the above

12. If we plot the log of power radiated by the black body versus the log of temperature, the slope of the line should be

a) 2

b) Infinite

c) Not defined

d) 4

13. The thermodynamic probability (Ω) is related to entropy (S) as (K is Boltzmann Constant)

a) $S = K \ln \Omega$

b) $\Omega = K \ln S$

c) $K = S \ln \Omega$

d) $K = \Omega \ln S$

14. The ultraviolet catastrophe occurs at
a) Medium frequencies
b) Higher wavelengths
c) Medium wavelengths
d) Higher frequencies

15. A blackbody radiates energy at
a) Lower frequencies
b) Higher frequencies
c) All frequencies
d) A blackbody does not radiate any energy

16. The Ray-Leigh Jeans law fails at
a) Lower wavelengths
b) Higher wavelengths
c) Lower frequencies
d) All frequencies

17. Which type of hybridisation is possible in square planar molecules?
a) sp^3d
b) dsp^3
c) dsp^2
d) sp^3d^2

18. The compound having pentagonal bi-pyramidal geometry with two types of bond angle is
a) BrF_5
b) ClF_3
c) IF_7
d) ClF_5

19. Polymer that changes reversibly into hard and rigid materials on heating and cannot be reshaped once it sets: is
a) Thermoplastics
b) Fibres
c) Thermosetting plastics
d) Elastomers

20. Rubber can be vulcanised to improve its properties by heating it with
a) Sulphur
b) Carbon powder
c) Silica
d) Alumina

21. Which of the following compounds will not exhibit NMR spectroscopy?
a) $_1H^1$
b) $_6C^{12}$
c) $_6C^{13}$
d) $_9F^{19}$

22. The number of signals obtained in the NMR spectra of tetramethyl silane, $Si(CH_3)_4$ are
a) 1

b) 2
c) 3
d) 4

23. The type of lubrication under conditions of slow speed and high load is
a) Thick film or hydrodynamic lubrication
b) Thin film or boundary lubrication
c) High-pressure lubrication
d) All the above

24. The type of lubricant used under the conditions of high temperature and high pressure is
a) Liquid lubricants
b) Semi-solid lubricants
c) Solid lubricants
d) All the above

25. Which of the following is not a metric thread?
a) BSW thread
b) V thread
c) American thread
d) Unified thread

26. Square threads are preferably used for
a) Power transmission
b) Clamping devices
c) Easy operation of engagement and disengagement
d) Fastening purpose

27. If the surface contours are complicated then
a) Auxiliary view for each surface is drawn single or double
b) Auxiliary view is drawn on single view
c) The top view is omitted and auxiliary view is drawn by transferring dimension
d) Auxiliary view for each surface can be drawn separately

28. Crane hook is drawn by which of the following method.
a) Full section
b) Half section
c) Removed section
d) Revolved section

29. The section which cuts the object at an angle is called
a) Removed section
b) Broken out section
c) Auxiliary section
d) Assembly section

30. The drawing in which we use the two vanishing points, the view is called
a) Parallel perspective view
b) Perpendicular perspective view
c) Angular perspective view
d) Perspective view

31. From which of the following view we get the piercing point _____

a) Perspective view
b) Side view
c) Top view
d) Front view

32. Double row roller Bearing is used _____
a) To take axial load
b) To take radial load
c) To take heavy axial load
d) To take heavy radial load

33. Resistivity of a wire depends on
a) Length
b) Material
c) Cross section area
d) None of the above

34. Kirchhoff's voltage law is based on law of conservation of
a) Charge
b) Energy
c) Momentum
d) None

35. Two bulbs marked 200 watt-250 volts and 100 watt-250 volts are joined in series to 250 volts supply. Power consumed in circuit is
a) 33 watt
b) 67 watt
c) 100 watt
d) 300 watt.

36. We have three resistances of values 2 Ω, 3 Ω and 6 Ω. Which of the following combination will give an effective resistance of 4 Ω?
a) All the three resistances in parallel
b) 2 Ω resistance in series with parallel combination of 3 Ω and 6 Ω resistance
c) 3 Ω resistance in series with parallel combination of 2 Ω and 6 Ω resistance
d) 6 Ω resistance in series with parallel combination of 2 Ω and 3 Ω resistance

37. The ratio of the resistance of a 100 W, 220 V lamp to that of a 100 W, 110 V lamp will be nearly
a) 4
b) 2
c) 1/2
d) 1/4

38. The peak value of a sine wave is 200 V. Its RMS value is
a) 127.4 V
b) 141.4 V
c) 100 V
d) 200V

39. The phase difference between voltage and current wave through a circuit element is given as 30°. The essential condition is that
a) Both waves must have same frequency
b) Both waves must have identical peak values
c) Both waves must have zero value at the same time
d) None of the above

40. Three 3 ohm resistors are connected to form a triangle. What is the resistance between any two of the corners?
a) 3/4 ohms
b) 3 ohms
c) 2 ohms
d) 4/3 ohms

41. When a pure semiconductor is heated, its resistance .....
a) Goes up
b) Goes down
c) Remains the same
d) Can't say

42. An n-type semiconductor is .....
a) Positively charged
b) Negatively charged
c) Electrically neutral
d) None of the above

43. The phase difference between the input and output voltages of a transistor connected in common emitter arrangement is .....
a) 0°
b) 180°
c) 90°
d) 270°

44. A crystal diode has forward resistance of the order of .....
a) $k\Omega$
b) Ω
c) $M\Omega$
d) None of the above

45. A zener diode is used as .....
a) An amplifier
b) A voltage regulator
c) A rectifier
d) A multivibrator

46. The collector of a transistor is ..... doped
a) Heavily
b) Moderately
c) Lightly
d) None of the above

47. In a transistor, $I_C = 100$ mA and $I_E = 100.2$ mA. The value of β is .....
a) 100
b) 50
c) about 1
d) 200

48. The relation between β and α is .....
a) $\beta = 1/(1-\alpha)$
b) $\beta = (1-\alpha)/\alpha$
c) $\beta = \alpha/(1-\alpha)$
d) $\beta = \alpha/(1+\alpha)$

49. The language of zeroes and ones is known as
a) Machine language
b) Assembly language
c) Pseudo language
d) Foreign language

Q50. SCSI stands for
a) Serial computer system interface
b) Synchronous computer system interface
c) Server computer system interface
d) Small computer system interface

51. Which of the following symbols represents the decision condition in a flowchart?
a) Ellipse
b) Rectangle
c) Diamond
d) Arrow

52. A collection of four bits is termed as a
a) Word
b) Byte
c) Nibble
d) Tupple

53. Google docs is a class of
a) System software
b) Application Software
c) Malware
d) Firmware

54. Which of the following cannot be a variable name in C language?
a) super123
b) 123super
c) _123super
d) s1u2p3er

55. In C language, a function which calls itself is called a
a) Relation

b) Inception
c) Expression
d) Recursion

56. What should be the output of the following piece of code?

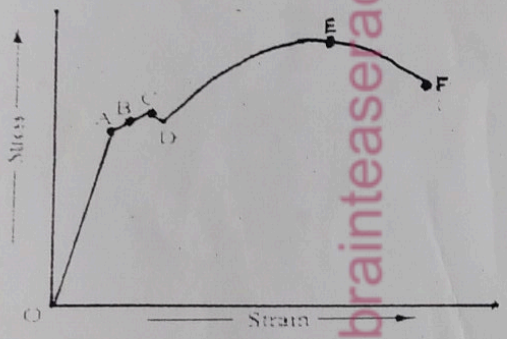
```
void main()
{
int a = 10/3;
printf("%d", a);
}
```

a) 3
b) 3.0
c) 3.33
d) 1

57. A copper bar is fixed at both ends. If the bar is heated, then the stress developed in the bar will be_____

a) Compressive axial stress
b) Tensile axial stress
c) Shear stress
d) Zero

58. The figure shown below represents the Stress-Strain curve for mild steel. The point 'E' in the curve represents _____?



a) Upper Yield Point
b) Lower Yield Point
c) Ultimate stress
d) Rupture point

59. A steel bar of 30 mm × 30 mm square cross-section is subjected to an axial tensile load of 350 kN. If the length of the bar is 2.5 m and E = 250 GPa, the elongation of the bar will be ___

a) 3.9 mm
b) 3.7 mm
c) 3.5 mm
d) 3.3 mm

60. Poisson's ratio is the ratio of_____

a) Longitudinal strain to transverse strain
b) Shear strain to longitudinal strain
c) Lateral strain to longitudinal strain
d) Transverse strain to shear strain