Sr. No. 3193

ENTRANCE TEST-2024

B.Tech/BE (Lateral Entry) Programme

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. | | | | | | |

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. ' no case 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 o darkened response shall be considered wrong.**
6. There will be negative marking for wrong answers. Each wrong answer will lead to the deduction of 0.25.
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.

All questions have equal weightage. Attempt all questions

Q 1 Let x be the order and y be the degree of the partial differential equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = 0$. Then which of the following is correct?

a) x=2, y=2

b) x=1, y=2

c) x=2, y=1

d) x=1, y=1

Q 2 What is the partial differential equation of $z = f(x + 5y)$, where f is any arbitrary function

a) $\frac{\partial z}{\partial x} = 5\frac{\partial z}{\partial y}$

b) $\frac{\partial z}{\partial y} = 5\frac{\partial z}{\partial x}$

c) $\frac{\partial y}{\partial x} = 5\frac{\partial z}{\partial x}$

d) $\frac{\partial z}{\partial y} = 5\frac{\partial y}{\partial x}$

Q 3 Which of the following is the general solution of the partial differential equation $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = z$.

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

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

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

d) None of these

Q 4 The Lagrange's auxiliary equations for the equation $x^2p + y^2q + z^2 = 0$ are

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

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

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

d) None of these

Q 5 What is the form of second order linear differential equation with variable coefficients ?

a) $p_0(x)\frac{d^2y}{dx^2} + p_1(x)(\frac{dy}{dx})^2 + p_2(x)y = 0$

b) $p_0(x)(\frac{dy}{dx})^2 + p_1(x)\frac{dy}{dx} + p_2(x)y = 0$

c) $p_0(x)\frac{d^2y}{dx^2} + p_1(x)\frac{dy}{dx} + p_2(x)y^2 = 0$

d) $p_0(x)\frac{d^2y}{dx^2} + p_1(x)\frac{dy}{dx} + p_2(x)y = 0$

Q 6 The complementary function of the differential equation $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^x$ is

a) $(c_1 + xc_2)e^x$

b) $c_1e^x + c_2e^{2x}$

c) $c_1 + xe^{2x}$

d) $(c_1 + x^2c_2)e^x$

Q 7 What is the particular integral of the differential equation $(D^2 - 4)y = 2e^{3x}$?

a) $\frac{2}{5}e^{2x}$

b) $\frac{2}{3}e^{5x}$

c) $\frac{3}{5}e^{2x}$

d) $\frac{2}{5}e^{3x}$

Q 8 The differential equation $\left(3x^2 + y\right)dx + \left(x + 3y^2\right)dy = 0$ is

a) Not exact

b) Non-homogeneous

c) Exact

d) None of these

Q 9 The laws of black body is /are

a) Stefan-Boltzmann law

b) Wien's displacement law

c) Plank's radiation Law

d) All of these

Q 10 Which among the following has the most penetrating power

a) IR radiation

b) X-rays

c) Gamma rays

d) UV radiations

Q 11 The law" Good absorber of radiations is a good radiator too" is

a) Stefan's Law

b) Kirchhoff's law

c) Wien's law

d) Plank's law

Q 12 The change in the wavelength of incident photon equals the Compton wavelength, when the scattering angle (φ) is

a) Zero

b) π

c) 2π

d) $\frac{\pi}{2}$

Q 13 The Heisenberg's uncertainty principle cannot be applied to

a) Quantum particles

b) Moving particles

c) Stationery particles

d) None of these

Q 14 According to Bohr quantization condition, the angular momentum (L), for an electron to move in a circular orbit, is

a) $\frac{h}{2\pi}$

b) $\frac{2h}{n\pi}$

c) $\frac{nh}{2\pi}$

d) $\frac{2\pi}{nh}$

Q 15 The function that represents the matter waves must be

a) Real and infinite

b) Real and finite

c) Zero and finite

d) Complex and finite

Q 16 The harmonic oscillator is a system where the restoring force is proportional to

a) Displacement from equilibrium

b) Force constant (k)

c) Displacement from one extreme point to other

d) All of these.

Q 17 The square planar molecules undergoes which type of hybridization?

a) sp^3d

b) dsp^3

c) dsp^2

d) sp^3d^2

Q 18 Which of the following molecular orbitals has the lowest energy?

a) σ 2pz

b) $*\pi$ 2py

c) $*\sigma$ 2pz

d) $*\sigma$ 2s

Q 19 Polymer that can be softened on heating and hardens when cooled are called as?

a) Thermoplastics

b) Fibres

c) Thermosetting plastics

d) Elastomers

Q 20 Rubber can be vulcanised to improve its properties by heating it with

a) Sulphur

b) Carbon powder

c) Silica

d) Alumina

Q 21 Visible light lies between the wavelength range?

a) 3800–7600 Å

b) 2500–3800 Å

c) 3000–7000 Å

d) 7500– 8000 Å

Q 22 The number of NMR signals given by equivalent protons in a molecule is/are?

a) 1

b) 2

c) 3

d) 4

Q 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) Extreme pressure lubrication

d) All the above

Q 24 As temperature increases the viscosity of a lubricating oil

a) Increases

b) Decreases

c) Neither increases nor decreases

d) Either increases or decreases

Q 25 Which file extension is used for AutoCAD drawing files?

a) .pdf

b) .dwg

c) .txt

d) .doc

Q 26 Ssname command is used with:

a) Name of selection and index number

b) Name of entity and its length

c) Only name of selection set

d) Only index number

Q 27 If a block is to be used in another drawing file, the command to save the block is:

a) INSERT

b) BLOCK

c) WBLOCK

d) MINSERT

Q 28 If the drawing exceeds the drawing limits it is:

a) Not possible to plot a full drawing

b) Possible to plot only if the limits are increased

c) Possible to plot by zooming out the drawing

d) Possible to plot by making proper settings in additional parameter in Plot dialog box

Q 29. In the orthographic projection, the projectors are _____ to the plane of projection:

a) Parallel

b) Perpendicular

c) Inclined

d) None of The Above

Q 30 To draw a side view, an auxiliary vertical plane is imagined to be placed:

a) Perpendicular to both H.P and V.P.

b) Perpendicular to H.P and parallel to V.P.

c) Perpendicular to V.P and parallel to H.P.

d) None of the Above

Q 31 Which of the following is NOT included in title block.

a) Name of Organization

b) Title of Drawing

c) Abbreviations

d) None of the Above

Q 32 In the solid flanged couplings, the flange is:

a) Separate, mounted using a sunk key

b) Integral with the shaft

c) Fitted with interference fit

d) None of the above

Q 33 Which of the following statements is true about a parallel combination of Ohmic resistors?

a) The total resistance is the sum of individual resistances.

b) The total resistance is the product of individual resistances.

c) The total resistance is always smaller than the smallest individual resistance.

d) The total resistance is always larger than the largest individual resistance.

Q 34 An electric appliance at unity power factor consumes 1000 watts of power when connected to a 100-volt AC source. What is the peak current (in A) flowing through the appliance?

a) 10

b) 14.14

c) 7.07

d) None of the above

Q 35 A resistor has a conductance of 0.01 S. If a current of 0.5 amperes flows through it, what is the voltage across the resistor in Volts?

a) 0.005

b) 50

c) 0.02

d) 200

Q 36 What is the SI unit of electric current?

a) Volts (V)

b) Watts (W)

c) Amperes (A)

d) Ohms (Ω)

Q 37 3 resistors having resistances 1, 2, and 3 Ωs respectively, are connected in parallel across a 6 V dc source. What is the current drawn from the source in A?

a) 1

b) 11

c) 36

d) 36/11

Q 38 According to Ohm's Law, the relationship between voltage (V), current (I), and resistance (R) is given by:

a) $V = I/R$

b) $I = V/R$

c) $R = I/V$

d) $V = R/I$

Q 39 Which of the following statements is correct regarding Kirchhoff's Current Law (KCL)?

a) The algebraic sum of currents at any node is zero.

b) The algebraic sum of currents in any closed loop is zero.

c) The algebraic sum of voltages in any closed loop is zero.

d) The algebraic sum of voltages at any node is zero.

Q 40 A circuit contains a 12-volt battery, a 1-Ω resistor, and a 5-Ω resistor connected in series. What is the total power supplied by the battery in W?

a) 2

b) 24

c) 6

d) 48

Q 41 In a semiconductor fabrication, the activation energy of dopants:

a) Determines the intrinsic carrier concentration

b) Affects the dielectric constant of the material

c) Influences the depth of the depletion region in a pn junction

d) Determines the temperature coefficient of resistance

Q 42 In the input-output characteristics of BJT Common Emitter (CE) configuration, which statement is true?

a) The input characteristics curve shows the relationship between base current I_B and collector emitter voltage (V_CE) for a constant collector current (I_C).

b) The output characteristics curve shows the relationship between collector current (I_C) and base-emitter voltage (V_BE) for constant base current (I_B).

c) The Early effect causes the output characteristic curve to shift horizontally.

d) The input characteristic curve is linear because the BJT operates in the active region.

Q 43 In an indirect bandgap semiconductor, which process is less probable due to momentum conservation rules?

a) Absorption of photons

b) Emission of photons

c) Electron transitions between conduction and valence bands

d) Carrier recombination

Q 44

Assertion: Avalanche breakdown in a diode occurs when the reverse bias voltage exceeds a critical value.

Reason: This critical voltage causes a rapid increase in current due to the generation of electron-hole pairs through collision processes.

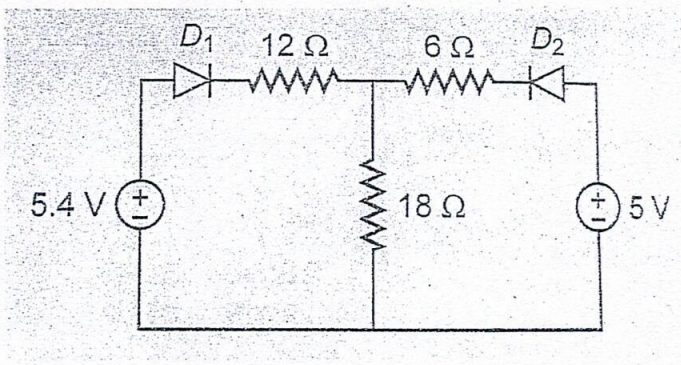
a) Both the assertion and reason are correct, and the reason is a correct explanation of the assertion.

b) Both the assertion and reason are correct, but the reason is NOT a correct explanation of the assertion.

c) The assertion is correct, but the reason is incorrect.

d) The assertion is incorrect, but the reason is correct

Q 45 In the circuit shown below, diode have cut-in voltage of 0.6V. The diode in ON state is/are



a) Only D1

b) Only D2

c) Both D1 and D2

d) None of these.

Q 46 Which of the following factors does NOT significantly affect the junction capacitance of a pn-junction diode?

a) Doping concentration

b) Applied reverse-bias voltage

c) Temperature

d) The material of the semiconductor (e.g., silicon, germanium)

Q 47 Which of the following statements is true regarding the temperature coefficient of a Zener diode with a breakdown voltage below 5V?

a) It has a positive temperature coefficient, meaning the breakdown voltage increases with temperature.

b) It has a negative temperature coefficient, meaning the breakdown voltage decreases with temperature.

c) It has zero temperature coefficient, meaning the breakdown voltage remains constant with temperature.

d) It has both positive and negative temperature coefficients depending on the current through the diode.

Q 48 What effect does increasing the load resistance have on the output voltage of a rectifier circuit?

a) It increases the ripple frequency of the output.

b) It decreases the output voltage due to increased voltage drop across the diodes.

c) It increases the output voltage due to reduced voltage drop across the diodes.

d) It decreases the ripple amplitude of the output.

Q 49 Consider the following statements about computer memory:
(I) Cache memory is used to store frequently accessed data.
(II) RAM is used to store the BIOS and firmware.
(III) Hard disk and CD-ROM are examples of secondary storage devices and belong to class of non-volatile memories.
Which of the above statement(s) is TRUE?

a) Only I is True.

b) Only II is True.

c) Only II and III are True.

d) Only I and III are True.

Q 50 Which of the following statement about computer ports is False?

a) A USB hub can be used to expand one USB port into several so that multiple devices can connect simultaneously.

b) VGA (Video Graphics Array) connector is a standard connector used for computer video output.

c) RJ-45 is not suitable for Ethernet networking.

d) HDMI stands for High-Definition Multimedia Interface, and it allows for the transmission of high-resolution audio and video signals to compatible devices.

Q 51 Consider the following statements about software:

(I) Operating System belongs to a class of Application software.
(II) Complier converts program written in High level language into Low level language.
(III) Microsoft Word and PDF reader are examples of application software.

Which of the above statements is TRUE?

a) Only I is True.

b) Only II is True.

c) Only I and II are True.

d) Only II and III are True.

Q 52 Which type of programming language allows for faster development and easier maintenance of large software projects?

a) High-Level language

b) Assembly language

c) Machine language

d) Low-Level language

Q 53 What will be the output of the following C program?

```
#include<stdio.h>
int main ()
{
        int i=0, a=10, b=20;
        if (a>b); {
        printf("a is greater than b");
        else
        printf("a is lesser than b");
        return 0;
}
```

a) Program will print "a is greater than b"

b) Program will print "a is lesser than b"

c) Program has some syntax error

d) None of the above

Q 54 What will be the output of the following C program?

```
#include <stdio.h>
int main()
{
int a=1;
while(a<5)
        {
         printf("hello ");
         i++;
        }
return 0;
}
```

a) hello hello

b) hello hello hello hello

c) hello hello hello hello hello

d) None of the above

Q 55 What is the purpose of the **scanf** function in C-Programming language?

a) To output data to the console

b) To read formatted input from the keyboard

c) To define a new variable

d) To perform arithmetic operations

Q 56 Which statement is used to exit a loop prematurely in C-Programming language?

a) exit

b) continue

c) break

d) return

Q 57 The ratio of elongation of a prismatic bar due to its total self weight W to that of a similar bar with an additional weight W attached at its free end is:

a) 1/3

b) 2/3

c) 3/4

d) 1/2

Q 58 A rod of length L and diameter D is subjected to a tensile load P. Which of the following is sufficient to calculate the resulting change in diameter?

a) Young's modulus

b) Shear modulus

c) Poisson's ratio

d) Both Young's modulus and shear modulus

Q 59 The Product of inertia of a rectangle of base b and height h with respect to an axis through the centroid would be:

a) Zero

b) $bh^3/8$

c) $bh^3/12$

d) $bh^3/36$

Q 60 For a composite bar consisting of a bar enclosed inside a tube of another material is compressed under a load W as a whole through rigid washers at the end of the bar. The equation of compatibility is given by (suffixes 1 and 2 refer to the bar and tube respectively):

a) $W = W_1 + W_2$

b) $W_1 + W_2 = constant$

c) $\frac{W_1}{A_1 E_1} = \frac{W_2}{A_2 E_2}$

d) $\frac{W_1}{A_1 E_2} = \frac{W_2}{A_2 E_1}$