| Question Booklet No. | Question Booklet Series: D |
|---|---|

# AUAT – 2019
## Lateral Entry to 2nd year of B.Tech. (38)
### (TEST BASED ON MCQ)

| Full Marks: 100 | Duration: 2 Hours |
|---|---|

Roll No. of the Candidate: _____

Date of Examination: _____

Name of Examination Centre: _____

Signature of the Candidate: _____

ture of the Invigilator on Verification

**IMPORTANT INSTRUCTIONS**

*Candidates should read the below instructions carefully and follow them accordingly.*

1. The Question Booklet has paper seal pasted on it. Please do NOT open the Question Booklet until you are asked to do so by the Invigilator.

2. The Candidates must check immediately after breaking the seal that the Question Booklet contains 100 multiple choice questions in two parts (Part – I and Part – II).

3. Answer of questions of Part – I and Part – II both will have to be given on the *OMR Answer Sheet* provided for this purpose. Fill up the necessary fields that are intended for you by writing and/ or shading appropriately. Otherwise the *OMR Answer Sheet* cannot be evaluated and will liable to be rejected. Question numbers progress from 1 to 100 continuously with alternative answers being shown as (a), (b), (c) and (d) for each question. Record your response by completely darkening the corresponding bubble. While responding, you should consider the best alternative answer and shade only one bubble with **black/ blue ball point pen only**. For each correct response you will be awarded 1 mark. There will be negative marking for wrong responses. For each wrong response, –0.25 will be awarded. Multiple responses against one MCQ will be treated as a wrong response.

4. On leaving the examination hall, candidates must submit the OMR Answer Sheet. They are allowed to keep the Question Booklet with them.

5. OMR answer Sheets will processed by electronic means. Any untoward/ irrelevant remarks, folding or putting stray notes on the answer sheet, any damage to the answer sheet will lead to the rejection of the same and the sole liability shall remain with the candidate.

6. Rough Work may be done at the end of the Question Booklet.

7. No Candidate will be allowed to leave the examination hall before 60 minutes of the commencement of examination. Candidates leaving the examination hall before conclusions of the examination will not be allowed to take the Question Booklet with them while going outside the examination hall.

8. Use of any Electronic device like Mobile, Programmable Calculator etc. is strictly prohibited.

SE

7A

## (Part I: Core Subject)

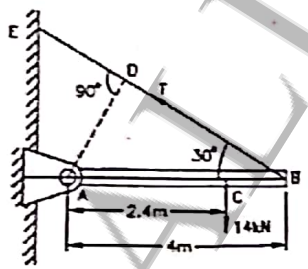
1. The basic architecture of computer was developed by
   (a) John Von Neumann
   (b) Charles Babbage
   (c) Blaise Pascal
   (d) Garden Moore

2. A —— in a table represents a relationship among a set of values.
   (a) Column
   (b) Key
   (c) Row
   (d) Entry

3. Two electric incandescent lamps whose resistances are in the ratio of 1:2 are connected in parallel to a constant voltage source. The power dissipated by them are in the ratio of
   (a) 4:1
   (b) 1:2
   (c) 2:1
   (d) 1:4

4. A problem in mechanics is given to three students A, B and C whose chances of solving it are
   (a) $\frac{3}{4}$
   (b) $\frac{2}{3}$
   (c) $\frac{4}{5}$
   (d) None of these

5. A light horizontal rod AB 4 m long is hinged at 'A'. A weight 14 kN is suspended from 'C'. Find the tension 'T' in the cord BE which supports the rod AB.




   (a) 12.6 kN
   (b) 18.6 kN
   (c) 21.8 kN
   (d) 16.8 kN

6. The parameter of linear network
   (a) changes in current.
   (b) changes in voltage.
   (c) does not change in current or voltage.
   (d) none of these.

7. A 20-turn iron-cored inductor is connected to a 100 V, 50 Hz source. The maximum flux density in the core is 1 wb/m$^2$. The cross-sectional area of the core is
   (a) 0.152 m$^2$
   (b) 0.345 m$^2$
   (c) 0.056 m$^2$
   (d) 0.0225 m$^2$

8. In order to tell Excel that we are entering a formula in cell, we must begin with an operator such as
   (a) $
   (b) @
   (c) =
   (d) #

9. The value of $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\tan^3 x}$ is
   (a) $\frac{\pi}{2}$
   (b) 1
   (c) 0
   (d) $\frac{\pi}{4}$

10. A bullet of mass $m$ travels with velocity $v$ and gets embedded in a block of mass $M$ initially at rest on a rough horizontal floor. The block with the bullet is seen to move a distance $s$ along the floor. Taking $\mu$ as the co-efficient of kinetic friction between the floor and the block, and $g$ as the acceleration due to gravity, the initial velocity $v$ of the bullet is given by
   (a) $\frac{M+m}{m}\sqrt{2\mu gs}$
   (b) $\frac{M-m}{m}\sqrt{2\mu gs}$
   (c) $\frac{m}{M+m}\sqrt{2\mu gs}$
   (d) $\frac{M+m}{2m}\sqrt{\mu gs}$

11. What will be the output of the following C code?

```
#include <stdio.h>
int main()
{
    while()
        printf("In while loop ");
    printf("After loop\n");
}
```

(a) In while loop after loop
(b) After loop
(c) Compile time error
(d) Infinite loop

12. A series resonance circuit magnifies

(a) current
(b) voltage
(c) power
(d) all of these

13. The value of $\int_0^2 |x^2 - 1| dx$ is

(a) $-\frac{1}{3}$
(b) 2
(c) 0
(d) $-2$

14. If the voltage of a transmission line is increased by $n$ times, the conductor size would

(a) increase by $1/n$ times
(b) increase by $n^2$ times
(c) increase by $n$ times
(d) increase by $1/n^2$ times

15. A DC motor series motor is most suitable for

(a) pumps
(b) cranes
(c) lathes
(d) punch presses

16. Select the proper sequence in case of tensile test a ductile material (i) Yielding (ii) Proportional lim (iii) Failure (iv) Elastic limit

(a) (ii), (iv), (i), (iii)
(b) (i), (ii), (iii), (iv)
(c) (iv), (ii), (i), (ii)
(d) (ii), (iv), (iii), (i)

17. Magnetic shielding is prepared by choosing mater als of

(a) zero permeability
(b) low permeability
(c) high permeability
(d) none of these

18. Silicon controlled rectifier (SCR) is a

(a) bidirectional switching element
(b) bidirectional triggering element
(c) unidirectional switching element
(d) unidirectional triggering element

19. Assuming

```
struct temp
    {
        int b;
    }s[50];
```

the correct syntax to access the member of the $i$th structure in the array of structures is

(a) `s.b.[i];`
(b) `s.[i].b;`
(c) `s.b[i];`
(d) `s[i].b;`

20. Area Moment of Inertia of the quadrant of a circle (of radius $r$) about its centroidal axis is given by –

(a) $0.11r^4$
(b) $0.055r^4$
(c) $0.0055r^4$
(d) $0.011r^4$

21. The data structure required for Breadth First Traversal on a graph is?

(a) Stack
(b) Array
(c) Queue
(d) Tree

22. A steel rod of 20 mm diameter and 5 m long is connected to two grips and is maintained at $80^0$C temperature. When the temperature falls to $30^0$C and the ends are allowed to yield by 2 mm, the pull exerted on the rod will be –
(Take $E = 200\text{kN/mm}^2$ and $\alpha = 12 \times 10^{-6}/^0C$)

(a) 37.69 kN
(b) 25.37 kN
(c) 12.57 kN
(d) 8.33 kN

23. The term —— is used to refer to a row.

(a) Attribute
(b) Tuple
(c) Field
(d) Instance

24. Which of the following is not a type of browser?

(a) Netscape
(b) Web
(c) IE
(d) Mozilla

25. One real root of the equation $x^3 + x - 5 = 0$ lies in the interval

(a) (3, 4)
(b) (2, 3)
(c) (1, 2)
(d) none of these.

26. The value of the integral $\int_{\pi}^{16\pi} |\sin x| dx$ is

(a) 0
(b) 32
(c) 30
(d) 28

27. A concentrated load $P$ acts on a simply supported beam of span $l$ at a distance $\frac{l}{3}$ from the left hand support. The bending moment at the point of application of load is given by -

(a) $\frac{Pl}{3}$
(b) $\frac{2Pl}{3}$
(c) $\frac{Pl}{9}$
(d) $\frac{2Pl}{9}$

28. Convert $(22)_8$ into its corresponding decimal number.

(a) 28
(b) 18
(c) 81
(d) 82

29. The resultant of two forces $P$ and $Q$ is $R$. If one of the forces is reversed in direction, the resultant becomes $S$. Then, to satisfy the condition: $R^2 + S^2 = 2(P^2 + Q^2)$, which of the following statement is correct -

(a) forces $P$ and $Q$ are collinear
(b) forces $P$ and $Q$ act at right angles to each other
(c) forces $P$ and $Q$ are inclined at $60^0$ to each other
(d) forces $P$ and $Q$ can have any angle of inclination between them

30. The solution of $xdy - ydx = \cos\left(\frac{1}{x}\right)dx$ is

(a) $\frac{y}{x} - \cos\left(\frac{1}{x}\right) = c$
(b) $\frac{y}{x} + \cos\left(\frac{1}{x}\right) = c$
(c) $\frac{y}{x} - \sin\left(\frac{1}{x}\right) = c$
(d) $\frac{y}{x} + \sin\left(\frac{1}{x}\right) = c$

31. The volume of the parallelepiped whose sides are given by $2i - 3j, i + j - k, 3i - k$ is

(a) $\frac{4}{13}$
(b) $\frac{2}{7}$
(c) 4
(d) none of these

32. The value of $a$ so that sum of the squares of the roots of the equation $x^3 - (a-2)x - a + 1 = 0$ assume the least value is

(a) 2
(b) 0
(c) 3
(d) 1

33. The slenderness ratio of a column is zero when –

(a) its length is exactly equal to its least radius of gyration

(b) the total load carried is less than half the dead weight

(c) the column is supported on all sides throughout its full length

(d) the concept of zero slenderness ratio does not exist

34. The area enclosed between $y^2 = x$ and $y = x$ is

(a) $\frac{2}{3}$ sq. units

(b) $\frac{1}{2}$ sq. units

(c) $\frac{1}{3}$ sq. units

(d) $\frac{1}{6}$ sq. units

35. A power triangle provides information about

(a) kVA

(b) kVAR

(c) power factor

(d) all of these

36. Bipolar junction transistor (BJT) is a

(a) current-controlled device

(b) voltage-controlled device

(c) both (a) and (b)

(d) none of these

37. The efficiency of a DC generator means its

(a) mechanical efficiency

(b) electrical efficiency

(c) overall efficiency

(d) none of these

38. If $|\vec{a}| = 2, |\vec{b}| = 3, |\vec{c}| = 4$ and $\vec{a} + \vec{b} + \vec{c} = 0$ then the value of $\vec{b}.\vec{c} + \vec{c}.\vec{a} + \vec{a}.\vec{b}$ is equal to

(a) $\frac{19}{2}$

(b) $-\frac{19}{2}$

(c) $\frac{29}{2}$

(d) $-\frac{29}{2}$

39. In Weston's differential pulley block, if the diameter of the smaller pulley in the upper block is half the diameter of the larger pulley (in the upper block) then Velocity Ratio will be –

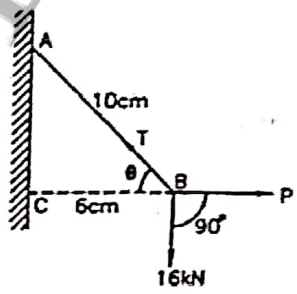
(a) 4

(b) 3

(c) 2

(d) 1

40. A body weighing 16 kN is suspended from a fixed point by a string 10 cm long and is kept at rest by a horizontal force P at a distance of 6 cm from the vertical line drawn through the point of suspension. Find the value of P if T = 20 kN.




(a) 11 kN

(b) 12 kN

(c) 13 kN

(d) 14 kN

41. A —— is a property of the entire relation, rather than of the individual tuples in which each tuple is unique.

(a) Rows

(b) Key

(c) Attribute

(d) Fields

42. A series AC circuit has a resistance and inductive reactance of 6Ω and 8Ω. It will be expressed in the rectangular form

(a) $(-6 + j8)\Omega$

(b) $(-6 - j8)\Omega$

(c) $(6 + j8)\Omega$

(d) $(6 - j8)\Omega$

43. A 3-phase induction motor is connected to a supply of normal voltage. The e.m.f. induced between the slip-rings at standstill is 72 V and the resistance and standstill reactance per phase are 0.5 Ω and 3.5 Ω respectively. The rotor is star-connected. The rotor phase current at starting is

(a) 11.67 A
(b) 7.24 A
(c) 9.82 A
(d) 14.25 A

44. A uniform flexible rope of 60 m length is partly lying on a rough table and partly hanging across the edge of the table. If the co-efficient of friction between the table and the rope is 0.2, then, the maximum length of the rope that can just hang is –

(a) 8 m
(b) 10 m
(c) 12 m
(d) 15 m

45. Particular Integral of the differential equation $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = e^{4x}$ is

(a) $\frac{e^{4x}}{4}$
(b) $\frac{e^{4x}}{2}$
(c) $\frac{xe^{4x}}{2}$
(d) none of these

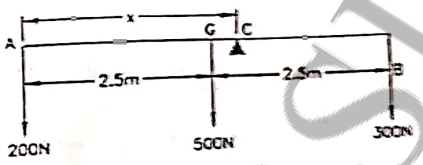
46. In an AC circuit, the instantaneous voltage and current are given respectively by $v = V_m \sin(\omega t + \pi/3)$ and $i = I_m \sin(\omega t - \pi/6)$. The power factor of the circuit will become

(a) lagging
(b) leading
(c) unity
(d) none of these

47. The commonly used technique for strengthening thin pressure vessels is –

(a) auto-frettage
(b) multi-layered construction
(c) shrink fitting
(d) wire winding

48. A sea-saw plank 5 m long weighs 500 N. Two boys weighing 200 N and 300 N sat at both ends of the plank. Find the value of '$x$' if the plank is hinged at 'C'.




(a) 3.75 m
(b) 4.75 m
(c) 2.75 m
(d) 3.25 m

49. An aluminium wire is stretched so that its length is increased by 0.1%. The change in itsresistance is

(a) 0.2%
(b) 0.3%
(c) 0.4%
(d) none of these

50. If $x = -9$ is a root of $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$, then the other two roots are

(a) 3, 7
(b) 2, 7
(c) 3, 6
(d) 2, 6

51. A data structure in which elements can be inserted or deleted at/from both the ends but not in the middle is?

(a) Queue
(b) Circular queue
(c) Dequeue
(d) Priority queue

52. If the specific gravity of electrolyte ($H_2SO_4$) in a lead-acid cell increases, the internal resistance of the cell

(a) will decrease
(b) will increase
(c) will remain unchanged
(d) none of these

53. In which topology there is a central controller or hub?

(a) Star
(b) Mesh
(c) Ring
(d) Bus

54. A simply supported beam has been subjected to unsymmetrical loading. The deflection would be maximum at a section where –

(a) slope is maximum
(b) slope is zero
(c) shear force is maximum
(d) bending moment is maximum

55. A system of three forces is acting on a body and keeps it in equilibrium. The forces need to be–

(a) coplanar only
(b) concurrent only
(c) coplanar as well as concurrent
(d) coplanar but may or may not be concurrent

56. MOSFET is a

(a) current-controlled device
(b) voltage-controlled device
(c) both (a) and (b)
(d) none of these

57. Which of the following statements is wrong?

(a) Materials for wire drawing should have high ductility
(b) An isotropic material exibits the same elastic properties in all directions
(c) A zero value of Youngs modulus of elasticity implies that the material is highly elastic
(d) Hardness is the ability of a material to resist scratch, indentation, abrasion & plastic deformation

58. The octal equivalent of 1100101.001010 is ——

(a) 624.12
(b) 145.12
(c) 154.12
(d) 145.21

59. Which is not an application layer protocol?

(a) HTTP
(b) SMTP
(c) FTP
(d) TCP

60. An integrating factor of the differential equation $\frac{dy}{dx} + x\log x + 2y = \log x$ is

(a) $(\log x)^2$
(b) $x^2$
(c) $\log x$
(d) none of these

61. A bag contains 8 white and 6 red balls. The probability of drawing two balls of the same colour is

(a) $\frac{15}{91}$
(b) $\frac{23}{91}$
(c) $\frac{43}{91}$
(d) None of these

62. For a perfectly rigid body, Young's modulus is –

(a) zero
(b) infinity
(c) 1
(d) $-1$

63. If $u = \frac{x^2+y^2}{3xy}$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ equals to

(a) $u$
(b) 0
(c) $3u$
(d) $4u$

64. If $A$ is orthogonal matrix then $A^{-1}$ equals

(a) $A^T$
(b) $AA^T$
(c) $A$
(d) none of these

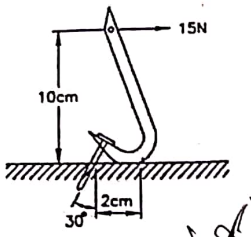
65. The watt-hour meter is

(a) an indicating instrument
(b) an integrating instrument
(c) a recording instrument
(d) none of these

66. The slope at any point of a curve $y = f(x)$ is given by $\frac{dy}{dx} = 3x$ and it passes through $(-1, 1)$. The equation of the curve is

(a) $y = x^3 + 2$
(b) $y = -x^3 + 4$
(c) $y = 3x^3 + 4$
(d) $y = -x^3 - 2$

67. Find the pull exerted on the nail when a horizontal force of 15 N is applied to the handle of the wrecking rod.




(a) 67.7 N
(b) 86.6 N
(c) 33.3 N
(d) 76.6 N

68. The percentage reduction in area during tensile test on a cast iron specimen is –

(a) Negligible
(b) 5%
(c) 10%
(d) 15%

69. The Newton-Raphson method converges fast, if $f'(\alpha)$ is ($\alpha$ the exact value of the root)

(a) large
(b) small
(c) 0
(d) none of these.

70. To deliver a message to the correct application program running on a host, the —— address must be consulted.

(a) IP
(b) MAC
(c) Port
(d) None of the mentioned

71. An air-cored choke coil and an electric bulb are connected in series with AC input supply. On introducing a soft iron bar in the coil, the intensity of the bulb

(a) remains unchanged
(b) goes dark
(c) increases
(d) decreases

72. If the mean of a set of observations $x_1, x_2, x_3, \ldots, x_{10}$ is 20 then the mean of $x_1+4, x_2+8, x_3+12, \ldots, x_{10}+40$ is

(a) 34
(b) 42
(c) 38
(d) 40

73. Which one of the following is not a function of network layer?

(a) routing
(b) inter-networking
(c) congestion control
(d) none of the mentioned

74. A CE voltage amplifier using BJT amplifies

(a) Current only
(b) voltage only
(c) both (a) and (b)
(d) none of these

75. The maximum value of $\left(\frac{1}{x}\right)^x$ is

(a) $e^e$
(b) $e^{-e}$
(c) $e^{-\frac{1}{e}}$
(d) $e^{\frac{1}{e}}$

76. A light sensitive device that converts drawing, printed text or other images into digital form is

(a) Plotter
(b) Scanner
(c) OMR
(d) Keyboard

77. Which of the following circuit is used as a 'Memory device' in computers?

(a) Rectifier
(b) Flip Flop
(c) Comparator
(d) Attenuator

78. What will be the output of the following C code?

```
#include <stdio.h>
int main()
{
    int i = -3;
    int k = i % 2;
    printf("%d\n", k);
}
```

(a) Compile time error
(b) −1
(c) 1
(d) Implementation defined

79. A —— is a device that forwards packets between networks by processing the routing information included in the packet.

(a) bridge
(b) firewall
(c) router
(d) all of the mentioned

80. Centre of mass of a body -

(a) must lie somewhere inside the body
(b) is located at the geometric centre of the body
(c) lies at the geometric centre of the body provided it is of uniform density
(d) is synonymous with centre of gravity

**(Part II: General Knowledge, General English & Islamic History and Culture)**

81. Sir Syed Ahmed was born in
স্যার সৈয়দ আহমেদ খান এর জন্ম সন

(a) 1811 AD
(b) 1817 AD
(c) 1821 AD
(d) 1827 AD

82. The —— of a snow clad mountain is exciting.

(a) site
(b) cite
(c) sight
(d) none of these

83. Who first translated Quran in Bengali completely?
কে প্রথম বাংলায় সম্পূর্ণ কুরআন অনুবাদ করেন?

(a) Keshab Chandra Sen
(b) Girish Chandra Sen
(c) Raja Ram Mohan Roy
(d) Swami Vivekananda

84. Which day is observed as World Food Day?
কোন দিনটি 'বিশ্ব খাদ্য দিবস' হিসেবে পরিচিত?

(a) September 10
(b) August 16
(c) November 4
(d) October 16

85. Who among the following was a martyr in the battle of Uhud?
ওহদের যুদ্ধে শহীদ হয়েছিলেন -

(a) Hazrat Abu Talha
(b) Hazrat Abu Zubair
(c) Hazrat Ali Akbar
(d) Hazrat Amir Hamza

86. What is the adjective form of "Season"?

(a) seasonal
(b) seasoning
(c) seasonable
(d) seasoned

87. Film and Television Institute of India is located at
Film and Television Institute of India কোথায় অবস্থিত?

(a) Pune (Maharashtra)
(b) Rajkot (Gujarat)
(c) Pimpri (Maharashtra)
(d) Perambur (Tamilnadu)

88. How old was Prophet Muhammad (PBUH) when he received his first revelation?
নবুয়ত প্রাপ্তির সময় মোহাম্মদ (সাঃ) এর বয়স ছিল -

(a) 40 years
(b) 42 years
(c) 40 years
(d) 46 years

89. The currency of Denmark is:
ডেনমার্কের মুদ্রা কোনটি?

(a) Krone
(b) Franc
(c) Colon
(d) Yuan

90. Who among the following first recognized Muhammad (PBUH) as a future Prophet?
মোহাম্মদ (সাঃ) কে ভবিষ্যতের নবী হিসেবে কে প্রথম সনাক্ত করেন ?

(a) Amanulla
(b) Bahira
(c) Heroic
(d) Waraka bin Nawfal

91. The word Iqra means
'ইকরা' শব্দের অর্থ হল

(a) write
(b) read
(c) hear
(d) see

92. Abdul Muttalib was —— of Prophet Muhammed (PBUH)?
আবদুল মুত্তালিব ছিলেন মোহাম্মদ (সাঃ) এর -

(a) paternal uncle
(b) maternal uncle
(c) paternal grandfather
(d) maternal grandfather

93. Masjid-ul-Aqsa is presently situated in
মসজিদুল আকসা বর্তমানে কোন দেশে অবস্থিত

(a) Syria
(b) Iran
(c) Turkey
(d) None of these

94. What did Galileo invent?
গ্যালিলিও কী আবিষ্কার করেছিলেন?

(a) Barometer
(b) Pendulum clock
(c) Microscope
(d) Thermometer

95. Pick out the word similar in meaning to "innocent":

(a) guilty
(b) naive
(c) responsible
(d) blameworthy

96. This is —— best Mexican restaurant in the country.

(a) no article
(b) a
(c) the
(d) Either (b) or (c)

97. Hazrat Ali is buried in the city
হজরত আলী যে শহরে শায়িত আছেন

(a) Mecca
(b) Medina
(c) Baghdad
(d) Najaf

98. Which is the shortest chapter in the Holy Qur'an?
পবিত্র কুরআনের সংক্ষিপ্ততম সূরা হল

(a) Surah Fatihah
(b) Surah Feel
(c) Surah Kawthar
(d) Surah Tawbah

99. The woman is looking —— her diamond ring.

(a) inside
(b) at
(c) to
(d) in

100 Which is known as 'Garden City of India'?
কোনটি 'ভারতের উদ্যান নগরী' নামে পরিচিত ?

(a) Trivandram
(b) Imphal
(c) Simla
(d) Bangalore

60×5
=300

$x^3+x-5=0$

$$\frac{b \pm \sqrt{b^2-4ac}}{2a}$$

$$= \frac{1 \pm \sqrt{1-4\times1\times-5}}{2\times1}$$

$$= \frac{1 \pm \sqrt{1+20}}{2}$$

$x^3+$

$\frac{b\pm}{}$

$\frac{1\pm}{}$

$\frac{1\pm}{}$