PULEET – 2019

Important: *Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.*

Roll No.   *(In Figure)*   *(In Words)*

O.M.R. Answer Sheet Serial No.

Signature of Candidate: _____   *Signature of Invigilator:* _____

Time: 100 Minutes   Number of Questions: 100   Maximum Marks: 100

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.

INSTRUCTIONS:

1. Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point/Black Gel Pen.**
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. Please check that this Question Booklet contains **100** Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
5. Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point/Black Gel Pen. There shall be negative marking for wrong answer, ¼ of the marks of the question will be deducted for every wrong answer.**
6. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
7. **35 minutes Extra would be given to the visually handicapped/PwD Candidates.**
8. **Darken** the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
9. If you want to change an already marked answer, erase the shade in the darkened bubble completely.
10. For rough work only the blank sheet at the end of the Question Booklet be used.
11. The University will provide Logarithmic table. Borrowing of log table or other material is not allowed.
12. The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Communication equipment such as mobile phones, pager, wireless set, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.**
17. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1. Find the sum of the finite series $1+2+3+4+\cdots+100$.
   (A) 2000   (B) 5050   (C) 1600   (D) 3100

2. Find the rank of the matrix $M = \begin{bmatrix} 1 & -2 & 0 & 1 \\ 2 & 1 & 5 & -3 \\ 0 & 1 & 3 & 5 \end{bmatrix}$.
   (A) 4   (B) 2   (C) 3   (D) 1

3. Find an equation of the line(s) through the point (3,2) and making angle 45° with the line $x-2y=3$.
   (A) $3x-y-7=0$, $x+3y-9=0$ (B) $2x+y=8$
   (C) $3x+2y=13$, $-3x+2y+5=0$ (D) $4x-y-10=0$, $2x+3y=12$

4. Let $f(x,y,z) = 0$. Then find the value of $\left(\frac{\partial x}{\partial y}\right)_z \left(\frac{\partial y}{\partial z}\right)_x \left(\frac{\partial z}{\partial x}\right)_y$.
   (A) 0   (B) 1   (C) 2   (D) -1

5. Find the point on the plane $x+2y+3z=13$ closet to the point $(1,1,1)$.
   (A) (3/2, 2, 5/2)   (B) (1,0,4)   (C) (0,2,3)   (D) (2,4,1)

6. Find the general solution of the differential equation: $y\,dx - x\,dy = x\,y^3 dy$.
   (A) $\ln(xy) = c$ (B) $\ln(xy) + y^3 = 1$
   (C) $\ln\left(\frac{x}{y}\right) - y^3 = c$ (D) $\ln\left(\frac{x}{y}\right) + y^3 = c$

7. Find the area of the region cut from the first quadrant by the cardioid $r = (1 + \sin\theta)$.
   (A) 2π (B) $3\frac{\pi}{8} + 1$ (C) $3\frac{\pi}{8} - 1$ (D) $2\pi + 1$

8. Find the curvature for the helix $\vec{r}(t) = (a\cos t\ \hat{\imath} + a\sin t\ \hat{\jmath} + b\,t\ \hat{k}$, $a,b \geq 0$, $a^2 + b^2 \neq 0$.
   (A) $\frac{a}{b}$ (B) $\frac{a}{a+b}$ (C) $\frac{b}{a^2+b^2}$ (D) $\frac{a}{a^2+b^2}$

9. Let C be the boundary of a region on which Green's theorem holds. Use Green's theorem to calculate $\oint_C f(x)dx + g(y)dy$.
   (A) 0   (B) Area enclosed by curve C
   (C) -1   (D) 1

10. Find the volume of the solid generated by revolving the region bounded by
    $x = \sqrt{5}\,y^2$, $x = 0$, $y = -1$, $y = 1$ about y-axis.
    (A) 2π (B) 3π (C) π (D) 4π

11. The length of a copper wire is increased to three times its original length with no change in its volume. The new resistance of the wire will be
    (A) 9 times   (B) 1/9 times   (C) 3 times   (D) Remains same

12. At high temperatures, the lattice specific heat of a solid varies as
    (A) T^3 (B) T   (C) A constant   (D) 1/T

13. When a moving charged particle is entered in a uniform magnetic field in a direction parallel to field lines, the particle's
    (A) Direction is changed
    (B) Velocity is changed.
    (C) Energy is changed
    (D) Motion is unaffected.

14. An ideal gas is enclosed in a rigid container of volume V. When the temperature of gas sample is increased, then the gas exerts more pressure on the walls because its molecules
    (A) Lose more P.E. when they strike the walls
    (B) Are in contact with the walls for very short duration
    (C) Have higher average velocities and they strike the walls more often
    (D) Lose KE when they strike the walls

15. Polarisation cannot occur in
    (A) Light waves   (B) Sound waves   (C) X-rays   (D) Radio waves

16. In a Michelson interferometer experiment, if fringe pattern gets shifted by 100 fringes when the movable mirror is moved by 29.5μm, the wavelength of light used is
    (A) 590 nm   (B) 295 nm   (C) 450 nm   (D) 530 nm

17. The packing fraction of the fcc structure is
    (A) 68%   (B) 52%   (C) 74%   (D) 92%

18. The de-broglie wavelength, λ, of a moving particle is associated with its K.E.., E as
    (A) $\lambda \propto E$ (B) $\lambda \propto 1/E$ (C) $\lambda \propto \sqrt{E}$ (D) $\lambda \propto 1/\sqrt{E}$

19. The change in P.E. when a body of mass m is moved from a point at a depth 'd' from ground level to a point at a height 'd' from ground level is
    (A) mgd   (B) 2mgd   (C) –mgd   (D) zero

20. The fire engine with a 500 Hz siren approaches a stationary car at 20m/s. The frequency of siren heard by a person in the car is
    (A) 531 Hz   (B) 472 Hz   (C) 500 Hz   (D) 495 Hz

21. A choke which is purely inductive is subjected to a voltage of 50V, 50Hz and takes a current of 1 ampere. The frequency is increased to 500 Hz keeping the voltage same. The current
    (A) Will fall to 0.1 A
    (B) Will fall to less than 0.1A
    (C) Will rise
    (D) Will remain at 1.0 A

22. In each of the three coils of a three phase generator, an alternating voltage having an effective value of 220V is induced. Which of the following values is indicated by the voltmeters?
    (A) 220V x $\sqrt{3}$=380 V
    (B) 220V/ $\sqrt{3}$=127 V
    (C) 220V
    (D) 220V x $\sqrt{2}$=310V

23. The current in series circuit is (6-j8) amperes when the applied voltage is (60+j20)V. The impedance of the circuit is
    (A) (2-j6)Ω (B) (2+j6)Ω (C) (5.2+j3.6)Ω (D) (5.2-j3.6)Ω

(2)

24. A uniform ring of mild steel (μ_r =500) ha s a cross sectional area of 40 cm^2 and a mean circumference of 15 cm. The mmf necessary to produce a flux of 0.5 mWb in ring will be approximately
(A) 100 AT   (B) 200 AT   (C) 300 AT   (D) 400 AT

25. The form factor is the ratio of
(A) average value to rms value   (B) rms value to average value
(C) peak value to average value   (D) peak value to average value

26. If the starting winding of a single phase induction motor is left in the circuit
(A) The motor will run faster
(B) The motor will run slower
(C) There will be undue sparking
(D) The auxiliary winding will get overheated due to continuous flow of current and may get damaged

27. A dc shunt generator builds up 230 volts when driven in clockwise direction. Now if it is driven in anti clockwise direction, with other things remaining unchanged, then voltage build up is
(A) 230V   (B) A little less than 230 volts
(C) More than 230 volts   (D) Not possible

28. Short circuit test on a transformer cannot be used to determine
(A) Full load copper losses   (B) Equivalent resistance and reactance
(C) Regulation   (D) Core losses

29. The maximum possible speed of a 3-phase squirrel cage induction motor running at a slip of 4% is
(A) 1440 rpm   (B) 3000 rpm   (C) 2880 rpm   (D) 960 rpm

30. What is the step angle of a permanent- magnet stepper motor having 8 stator pole and 6 rotor poles?
(A) 60°   (B) 45°   (C) 30°   (D) 15°

31. The reverse bias current in a p-n diode is due to
(A) Minority carriers   (B) Majority carriers
(C) Electrons only   (D) Holes only

32. A BJT is a
(A) Current –Controlled device   (B) Voltage - Controlled device
(C) Power- Controlled device   (D) Field- Controlled device

33. A device that converts thermal energy into electrical energy is called a:
(A) Solar cell   (B) Thermocouple
(C) Piezoelectric device   (D) generator

34. Field Effect Transistor (FET) is a unipolar device because:
    (A) V_{DS} of one polarity is used
    (B) V_{GS} of one polarity is used
    (C) I_D constitutes either electrons or holes
    (D) All the charge carriers flow towards a single pole

35. The ripple factor of a full-wave rectifier is nearly:
    (A) 1.21   (B) 0.87   (C) 0.48   (D) 0.23

36. Output impedance of an ideal op-amp is:
    (A) Infinite   (B) Very high   (C) Low   (D) Zero

37. Which of the following oscillator is will give most stable output oscillation frequency?
    (A) Colpitts oscillator   (B) Clapp oscillator
    (C) Wein bridge oscillator   (D) Crystal Oscillator

38. Exclusive-OR (XOR) logic gates can be constructed from ....logic gates.
    (A) OR gates only   (B) AND gates and NOT gates
    (C) AND gates, OR gates, and NOT gates   (D) OR gates and NOT gates

39. A J-K flip-flop with J = 1 and K = 1 has a 20 kHz clock input. The Q output is _____.
    (A) A 20 KHz square wave   (B) A 10 KHz square wave
    (C) Constantly Low   (D) Constantly High

40. Calculate power in each sideband, if power of carrier wave is 176W and there is 60% modulation in amplitude modulated signal?
    (A) 13.36 W   (B) 15.84 W   (C) 52 W   (D) 176 W

41. Find output of following:-
```
#include<stdio.h>
int main()
{
char str[] = "Smaller";
int a = 100;
printf(a > 10 ? "Greater" : "%s", str);
return 0;
}
```
    (A) Compiler error   (B) 100   (C) Smaller   (D) Greater

42. Find output of following:-
```
#include<stdio.h>
int main()
{
int a = 100, b = 200, c = 300;
if(!a>= 500)
b = 300;
c = 400;
printf("%d,%d,%d",a, b, c);
return 0;
}
```
    (A) 100, 200, 300   (B) 100, 300, 300   (C) 100, 300, 400   (D) 100, 200, 400

43. The value of count in the given program will be

```c
#include <stdio.h>
int main()
{
inti = 0;
int count=0;
while(i<= 255)
{
printf("%d", i);
i+=3;
    count ++;
}
printf("\n%d", count);
 return 0;
}
```

  (A) 89   (B) 0   (C) 86   (D) 87

44. Which of the following is not a reserved keyword in C?
  (A) Print   (B) Default   (C) Case   (D) Auto

45. What is the correct value to be returned to operating system upon successful completion of the program?
  (A) 1   (B) -1
  (C) 0   (D) Programs don't return a value

46. What will be the output of the program

```c
#include <stdio.h>
int main()
{
  char ch;
inti;
ch ='G';
i =ch - 'A';
printf("%d",i);
  return 0;
}
```

  (A) 6   (B) 5   (C) 7   (D) Compiler error

47. Which option of rm command is used to remove a directory with all its subdirectories
  (A) –b   (B) –o   (C) –p   (D) –r

48. Consider the following C declaration

```c
struct {
    short s[5];
    union {
    float y;
    long z;
    }u;
    }t;
```

Assume that the objects of the type short, float and long occupy 2 bytes, 4 bytes and 8 bytes, respectively. The memory requirement for variable t is

(A) 22 bytes   (B) 18 bytes   (C) 14 bytes   (D) 10 bytes

49. Which concept allows you to reuse the written code?

(A) Encapsulation   (B) Abstraction   (C) Inheritance   (D) Polymorphism

50. Which of the following explains Polymorphism?

  (A)   int func(int, int);
        float func1(float, float);

  (B)   int func(int);
        int func(int);

  (C)   int func(float);
        float func(int ,int, char);

  (D)   int func();
        int new_func();

51. The dryness (x) fraction of superheated steam is taken as

(A) x= 0   (B) x= 0.9   (C) x= 0.999   (D) x= 1

52. A cyclic heat engine operates between a source temperature of 927 °C and a sink temperature of 27 °C. What will be the maximum efficiency of the heat engine?

(A) 100 %   (B) 80 %   (C) 75 %   (D) 70 %

53. The amount of heat required to raise a unit mass of substance through a unit rise in temperature is called as

(A) Heat capacity of a substance   (B) Specific heat of a substance
(C) Latent heat of a substance   (D) Sensible heat of a substance

54. In the relation ($T/J = G\theta/L = \tau/R$), the letter G denotes modulus of _____

(A) Elasticity   (B) Plasticity   (C) Rigidity   (D) Resilience

55. In cantilever beam, slope and deflection at free end is _____

(A) Zero   (B) Maximum   (C) Minimum   (D) Negligible

56. Which of the following sentences are true for Bernoulli's equation?
   1. Bernoulli's principle is applicable to ideal incompressible fluid
   2. The gravity force and pressure forces are only considered in Bernoulli's principle
   3. The flow of fluid is rotational for Bernoulli's principle
   4. The heat transfer into or out of fluid should be zero to apply Bernoulli's principle

(A) (1), (2) and (3)   (B) (1), (3) and (4)
(C) (1), (2) and (4)   (D) (1), (2), (3) and (4)

57. What is the correct formula for Euler's equation of motion?
Where, ρ = density of the fluid, p = pressure force, g = acceleration due to gravity, v = velocity of the fluid

(A) $(\partial p / \rho) + (\partial g / \rho) + (\partial v / \rho) = 0$ (B) $(\partial p / \rho) + (\partial g / \rho) + (v\, dv) = 0$
(C) $(\partial p / \rho) + (g\, dz) + (v\, dv) = 0$ (D) $(p\, dp) + (g\, dz) + (v\, dv) = 0$

58. Streamlines, pathlines and streaklines are virtually identical for
    (A) Uniform flow
    (B) Flow of ideal fluids
    (C) Steady flow
    (D) Non-uniform flow

59. Two shafts A and B are made of same material. The diameter of shaft B is twice that of shaft A. The ratio of power which can be transmitted by shaft A to that of shaft B is
    (A) ½
    (B) ¼
    (C) 1/8
    (D) 1/16

60. For a given set of operating pressure limits of Rankine cycle, the highest efficiency occurs for
    (A) Saturated cycle
    (B) Superheated cycle
    (C) Reheat cycle
    (D) Regenerative cycle

61. Ordinary Portland cement (OPC) has been classified into how many grades?
    (A) 2
    (B) 3
    (C) 10
    (D) 5

62. Which of the following bricks is not preferred?
    (A) Sharp-edged
    (B) Clamp burned
    (C) Sound-proofed
    (D) Kiln burned

63. What should be placed at the beginning of every header course in English bond to avoid vertical joint?
    (A) Queen closer
    (B) Half bat
    (C) Three fourth bat
    (D) King closer

64. Which of the below property of aggregates is not desirable?
    (A) Smooth texture
    (B) Well graded
    (C) Angular shape
    (D) Smaller size

65. Permanent dimension changes due to loading is termed as:
    (A) Strain
    (B) Extent
    (C) Creep
    (D) Ambit

66. In which beam tension capacity of steel is greater than combined compression capacity of steel and concrete?
    (A) Under-reinforced
    (B) Singly reinforced
    (C) Doubly reinforced
    (D) Over-reinforced

67. Which of the below leads to disturbance of nitrogen fixation in the soil?
    (A) Urban waste
    (B) Fertilizers
    (C) Pesticides
    (D) Industrial effluents

68. The curves used for drawing lines between points in a contour line is:
    (A) Radial curve
    (B) French curve
    (C) C-curve
    (D) Inverted curve

69. The design consideration of highways doesn't include:
    (A) Settlement
    (B) Cross section
    (C) Level of service
    (D) Sight distance

70. Which of the below is a disadvantage of frame structure?
    (A) Ease of construction
    (B) Economy
    (C) Speed of construction
    (D) Span length

71. 1 bar pressure is equal to
    (A) 10 kPa
    (B) 100 kPa
    (C) 1000 kPa
    (D) 10000 kPa

72. Find out the dimensionless quantity
    (A) Pressure
    (B) Reynolds number
    (C) Viscosity
    (D) Density

73. How many g moles of S are there in 22 g of H_2SO_4?
    (A) 0.4489
    (B) 0.2245
    (C) 0.1256
    (D) 0.3256

74. A cylinder contains 8 gm of He, 40 gm of Ne and 80 gm of Ar. (Molecular weights of the components are 4, 20 and 40 respectively).
    How many moles of He are there in the cylinder?
    (A) 1
    (B) 2
    (C) 4
    (D) 6

75. Specific volume is the inverse of
    (A) Volume
    (B) Pressure
    (C) Density
    (D) Flow rate

76. How many gm of NaCl are required to prepare 2.5 L of 0.6 M solution?
    (A) 22
    (B) 44
    (C) 66
    (D) 88

77. Heat capacity function for a liquid is given as
    Heat capacity = 311.4 + 0.128 T, where temperature (T) is expressed in °C.
    What is the relation of temperature with heat capacity if the temperature is expressed in terms of °R?
    (A) Heat capacity = 76.4 + 0.070°R
    (B) Heat capacity = 176.4 + 0.070°R
    (C) Heat capacity = 276.4 + 0.071°R
    (D) Heat capacity = 376.4 + 0.071°R

78. 40 psia equals
    (A) 175.64 kPa
    (B) 275.64 kPa
    (C) 375.64 kPa
    (D) 475.64 kPa

79. If the open end manometer's open end is closed and in the blank area there is vacuum. The manometer measures
    (A) Absolute pressure
    (B) Gauge pressure
    (C) Atmospheric pressure
    (D) Vacuum

80. If 1 kg of butane is burned with O_2, then how much kg of CO_2 will produce by 40 kg of butane?
    (A) 111.38
    (B) 121.38
    (C) 131.38
    (D) 141.38

81. Chemical with maximum ozone depleting potential is
    (A) Chlorine
    (B) Nitrogen oxide
    (C) Oxygen
    (D) Chloro Fluoro Carbons

82. Green House gases are
    (A) CH_4, N_2, CO_2
    (B) O_2, N_2, CO_2
    (C) CH_4, CFC, CO_2
    (D) CFC, NH_3, CO_2

83. The amount of heat liberated by complete combustion of unit quantity of fuel is known as
    (A) Agitation
    (B) Combustion
    (C) Calorific Value
    (D) Thermogenesis

84. Laboratory gas is obtained by the cracking of
    (A) Gasoline
    (B) Kerosene
    (C) Diesel
    (D) Fuel oil

85. Which of the following does not cause the permanent hardness in water?
    (A) Nitrates
    (B) Sulphates
    (C) Chlorides
    (D) Bicarbonates

86. How many grams of $MgCO_3$ dissolved per litre gives 84 ppm hardness?
    (A) 70.56 mg/L   (B) 48.23 mg/L   (C) 81.49mg/L   (D) 66.12 mg/L

87. Total dissolved solids (TDS) can be reduced by the following method
    (A) Distillation   (B) Reverse osmosis   (C) Ion exchange   (D) All of these

88. Chemical formula of rust is
    (A) Fe_2O_3 (B) FeO   (C) Fe_3O_4 (D) $Fe_2O_3.xH_2O$

89. Azimuthal quantum number actually represents
    (A) Shells   (B) Sub shells   (C) Energy   (D) Heat

90. The nucleus of an atom contains
    (A) Protons   (B) Electrons
    (C) Protons and neutrons   (D) Neutrons

91. The joke was --- bad taste.
    (A) of   (B) in   (C) with   (D) at

92. Pick the correct option:
    (A) Short hair suits her   (B) Short hair suits with her
    (C) Short hair suits of her   (D) Short hair suits in her

93. My neighbor is------an operation tomorrow
    (A) Taking   (B) Having   (C) Going   (D) Getting

94. --------Saturday, we go shopping.
    (A) On every   (B) In every   (C) Every   (D) Every one

95. Empty vessels ------- the most sound
    (A) Make   (B) Create   (C) Hear   (D) Produce

96. It was dark inside so I ------ a match.
    (A) Lit   (B) Lighted   (C) Lighting   (D) Light

97. Find the next number in sequence – 104, 109,115, 122, 130, …
    (A) 138   (B) 139   (C) 141   (D) 135

98. In a certain code PURPOSE is written as UPPRSOE, then WATER is written as
    (A) RETAW   (B) AWTER   (C) AWETR   (D) AWRTE

99. If DOG is 26, then what is CAT
    (A) 23   (B) 24   (C) 25   (D) 26

100. A man goes 3 km east from point A and then takes a right turn from point B to move 4 Km to point C What is the minimum distance from point A to Pont C.
    (A) 3.6   (B) 5   (C) 6   (D) 3

x-x-x

(9)