

Group Code <b>AE</b>	COURSE	
	<b>AERONAUTICAL ENGINEERING</b>	
MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
180	200 Minutes	180 Minutes

MENTION YOUR DIPLOMA CET NUMBER				BOOKLET VERSION CODE				SERIAL NUMBER			
				<b>A1</b>				<b>244321</b>			

DOs:

1. This question booklet is issued to you by the invigilator after the 2<sup>nd</sup> bell i.e., after 9.50 am.
2. Check whether the DCET Number has been entered and shaded in the respective circles on the OMR answer sheet.
3. The version code and serial number of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
4. The Version Code and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts:

1. THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.
2. The 3<sup>rd</sup> bell rings at 10.00 am, till then;
  - Do not remove the seal present on the right hand side of this question booklet.
  - Do not look inside this question booklet or start answering on the OMR answer sheet.

### IMPORTANT INSTRUCTIONS TO CANDIDATES

1. In case of usage of signs and symbols in the questions, the regular textbook connotation should be considered unless stated otherwise.
2. This question booklet contains 180 (items) questions and each question will have one statement and four different options / responses & out of which you have to choose one correct answer.
3. After the 3<sup>rd</sup> Bell is rung at 10.00 am, remove the paper seal on the right hand side of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
4. Completely darken / shade the relevant circle with a blue or black ink ballpoint pen against the question number on the OMR answer sheet.

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD	ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHOD											
(A) ● (C) (D)	⊗	(B)	(C)	(D)	(A)	(B)	(C)	⊗	(A)	●	●	(D)
(A) ● (C) (D)	⊗	(B)	(C)	(D)	(A)	●	(C)	(D)				

5. Please note that even a minute unintended ink dot on the OMR answer sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
6. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
7. Last bell will ring at 1.00 pm, stop marking on the OMR answer sheet.
8. Hand over the OMR answer sheet to the room invigilator as it is.
9. After separating the top sheet (Office copy), the invigilator will return the bottom sheet replica (candidate's copy) to you to carry home for self-evaluation.

AE-A1

**PART - A**  
**APPLIED SCIENCE**

1. Which of the following is the supplementary unit of SI System?
- (A) Candela (B) Kelvin  
(C) Radian (D) Mole
2. The main scale of Slide Calipers is divided into millimeter, the length of Vernier is 19 mm and is divided into 20 equal parts. The least count is
- (A) 0.01 cm (B) 0.001 cm  
(C) 0.05 cm (D) 0.005 cm
3. Which one of the following is not a vector quantity?
- (A) Velocity (B) Acceleration  
(C) Speed (D) Force
4. The magnitude of resultant of two forces  $\vec{P}$  and  $\vec{Q}$  acting in the same line and in opposite direction is
- (A)  $P + Q$  (B)  $P - Q$   
(C)  $\frac{P}{Q}$  (D)  $\frac{Q}{P}$
5. Two forces 3N and 5N are acting at a point making an angle of  $60^\circ$ . The magnitude of the resultant is
- (A) 15 N (B) 2 N  
(C) 7 N (D) 8 N
6. Torque produces
- (A) rotational motion (B) linear motion  
(C) both rotational and linear motion (D) neither rotational nor linear motion

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Space For Rough Work

7. Which one of the following is not related to couple?
- (A) Kicking of football (B) Opening and closing of tap  
(C) Rotation of steering wheel (D) Pedalling of bicycle
8. Within elastic limit, stress is
- (A) independent of strain (B) zero  
(C) directly proportional to strain (D) inversely proportional to strain
9. The length of a wire increases by 1% on suspending a load of 2 N from it. The tensile strain in the wire is
- (A) 0.01 (B) 0.5  
(C) 2 (D) 1
10. Pressure at any point inside a liquid
- (A) remains zero (B) increases with depth  
(C) decreases with depth (D) independent of depth
11. The pressure at the bottom of a swimming pool 20m wide and the water 2m deep (given density of water  $1000 \text{ Kg/m}^3$  and  $g = 10 \text{ m/s}^2$ ) is
- (A)  $2 \times 10^3 \text{ Pa}$  (B)  $40 \times 10^3 \text{ Pa}$   
(C)  $10 \times 10^3 \text{ Pa}$  (D)  $20 \times 10^3 \text{ Pa}$
12. In the case of liquids, as the temperature increases, the surface tension generally
- (A) remains constant (B) decreases  
(C) increases (D) zero

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Space For Rough Work

13. The property of a liquid to oppose the relative motion between different layers is called
- (A) density (B) elasticity  
(C) viscosity (D) capillarity
14. An expression for coefficient of viscosity is (if  $F$  = viscous force;  $A$  = Area,  $V$  = difference in Velocity,  $x$  = distance between two layers)
- (A)  $\eta = -\frac{FA}{xV}$  (B)  $\eta = -\frac{FV}{Ax}$   
(C)  $\eta = -\frac{Fx}{AV}$  (D)  $\eta = -\frac{FxA}{V}$
15. The expression that represents Charle's law is
- (A)  $PV = \text{constant}$  (B)  $VT = \text{constant}$   
(C)  $\frac{P}{V} = \text{constant}$  (D)  $\frac{V}{T} = \text{constant}$
16. The pressure of a gas at  $27^\circ\text{C}$  is one atmospheric pressure. Keeping the volume constant, if the temperature is raised to  $60^\circ\text{C}$ , then its pressure will be
- (A) 1.11 atmospheric pressure (B) 1.5 atmospheric pressure  
(C) 2.2 atmospheric pressure (D) 2 atmospheric pressure
17. Hot water at  $80^\circ\text{C}$  will exchange heat with surroundings maintained at  $25^\circ\text{C}$  till the temperature of water becomes
- (A)  $80^\circ\text{C}$  (B)  $50^\circ\text{C}$   
(C)  $55^\circ\text{C}$  (D)  $25^\circ\text{C}$
18. Radiator in automobiles works on the principle of
- (A) Conduction (B) Convection  
(C) Radiation (D) Evaporation

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Space For Rough Work

19. In the expression  $C_p - C_v = R$ , notation R represents
- (A) Resultant force (B) Planck's constant  
(C) Universal gas constant (D) Resonance
20. Physical quantity that represents the energy of the mechanical wave is
- (A) Wave length (B) Frequency  
(C) Amplitude (D) Wave period
21. Which one of the following is not an example of simple harmonic motion?
- (A) Swinging of cradle (B) Oscillations of simple pendulum  
(C) Vibrations of tuning fork (D) Motion of hands of clock
22. In the equation for velocity of sound in air, which of the following options does not hold good according to Laplace?
- (A) Poor conductivity of air (B) Rapid pressure changes  
(C) Maintaining constant temperature (D) Rise and fall of temperature
23. Distance between two consecutive nodes in a stationary wave is equal to
- (A) Wavelength of individual wave (B) Difference of wavelengths of two waves  
(C) Sum of wavelengths of two waves (D) Half of wavelength of individual wave
24. When the tension on the sonometer wire is increased by 15 N, its frequency is doubled. The original tension is
- (A) Zero (B) 5 N  
(C) 10 N (D) 15 N

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Space For Rough Work

25. Two identical waves superpose on one another, then the beat frequency is
- (A) Zero (B) One  
(C) Ten (D) Infinity
26. Damage to the suspension bridge by marching military troops is due to
- (A) Reverberation (B) Resonance  
(C) Beats (D) Noise
27. A tuning fork produces waves in a medium. The parameter that changes with temperature of the medium is
- (A) Wavelength (B) Frequency  
(C) Amplitude (D) Period
28. The electromagnetic radiation used to detect the artificial gems from the original gems is
- (A) Microwave (B) Radio wave  
(C) Ultraviolet ray (UV ray) (D) X-ray
29. During excitation of an atom from ground state to excited state, the number of photons absorbed by the single atom is
- (A) 2 (B) 1  
(C) 3 (D) 0
30. In Nano-technology, the manipulation of atom is done in the range of
- (A) 1 nano meter – 100 nano meter (B) 1 micro meter – 100 micro meter  
(C) 1 pico meter – 100 pico meter (D) 1 millimeter – 100 millimeter

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Space For Rough Work

31. Live telecast of a programme can be viewed by

- (A) Manual communication
- (B) X-ray communication
- (C) Landline communication
- (D) Satellite communication

32. Optical Fibre is used in

- (A) Endoscopy
- (B) Biometric Machine
- (C) Simple Microscope
- (D) Simple Telescope

33. Acetic acid is an example for

- (A) Strong Electrolyte
- (B) Neutral Solution
- (C) Weak Electrolyte
- (D) Non-Electrolyte

34. The process of coating tin over iron and steel is known as

- (A) Alloying
- (B) Galvanizing
- (C) Tinning
- (D) Refining

35. The batteries which are recharged and reused are called

- (A) Primary Battery
- (B) Secondary Battery
- (C) Fuel Cell
- (D) Alkaline Battery

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Space For Rough Work

36. PAFC is a type of

(A) Primary Cell

(B) Secondary Cell

(C) Solar Cell

(D) Fuel Cell

37. The easily fusible material which is formed when Flux reacts with gangue is

(A) Slag

(B) Alloy

(C) Polymer

(D) Mineral

38. Which of the below given polymers is obtained by condensation polymerization?

(A) Poly ethene

(B) Nylon

(C) PVC

(D) Poly propane

39. Which of the following is not a composite material?

(A) Fibreglass

(B) Concrete

(C) Ceramic

(D) Bronze

40. The pH value of Lemon juice is about

(A) 2.4

(B) 8.2

(C) 10.2

(D) 14

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Space For Rough Work



**PART – B**  
**ENGINEERING MATHEMATICS**

41. The value of  $\begin{vmatrix} \cos 50^\circ & \sin 10^\circ \\ \sin 50^\circ & \cos 10^\circ \end{vmatrix}$  is

(A)  $\frac{1}{\sqrt{2}}$

(B)  $\frac{\sqrt{3}}{2}$

(C)  $\frac{-1}{2}$

(D)  $\frac{1}{2}$

42. The values of  $x$  &  $y$  from the simultaneous equations  $3x + 4y = 7$  and  $7x - y = 6$  are.

(A)  $x = 1, y = 1$

(B)  $x = -1, y = -1$

(C)  $x = 1, y = -1$

(D)  $x = -1, y = 1$

43. If  $\begin{vmatrix} x & 3 \\ 3 & x \end{vmatrix} = 0$  then the value of  $x$  is

(A)  $\pm 1$

(B)  $\pm 3$

(C)  $\pm 9$

(D)  $\pm \sqrt{6}$

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

(A)  $\begin{bmatrix} -2 & 6 \\ 8 & -10 \end{bmatrix}$

(B)  $\begin{bmatrix} -1 & 4 \\ 3 & -5 \end{bmatrix}$

(C)  $\begin{bmatrix} -2 & 8 \\ 6 & 8 \end{bmatrix}$

(D)  $\begin{bmatrix} -2 & 8 \\ 6 & -10 \end{bmatrix}$

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Space For Rough Work

45. If A is a given square Matrix then

(A)  $\text{adj } A = \frac{A^{-1}}{|A|}$

(B)  $\text{adj } A = \frac{|A|}{|A^{-1}|}$

(C)  $\text{adj } A = |A| \cdot A^{-1}$

(D)  $AA^{-1} = \text{adj } A \cdot |A|$

46. The characteristic Equation of the Matrix  $A = \begin{bmatrix} -5 & 6 \\ -2 & 1 \end{bmatrix}$  is

(A)  $\lambda^2 - 6\lambda + 12 = 0$

(B)  $\lambda^2 - 4\lambda + 17 = 0$

(C)  $\lambda^2 + 4\lambda + 7 = 0$

(D)  $\lambda^2 - 4\lambda + 7 = 0$

47. The unit vector in the direction of  $\vec{a} = 3i + 4j - 2k$  is

(A)  $\hat{a} = \frac{3i + 4j - 2k}{\sqrt{26}}$

(B)  $\hat{a} = \frac{3i + 4j - 2k}{\sqrt{29}}$

(C)  $\hat{a} = i + j - 2k$

(D)  $\hat{a} = \frac{3i + 4j - 2k}{\sqrt{21}}$

48. If  $\vec{a} = i + \lambda j$  and  $\vec{b} = 2j + 3k$  and  $\vec{a} \cdot \vec{b} = 0$  then ' $\lambda$ ' is Equal to

(A)  $-\frac{2}{3}$

(B)  $\frac{2}{3}$

(C)  $\frac{3}{2}$

(D) 0

49. Area of the triangle whose adjacent sides are  $\vec{a} = 2i - j + 2k$  and  $\vec{b} = 3i - j$  is

(A)  $\sqrt{41}$  sq.units

(B)  $\frac{\sqrt{41}}{2}$  sq.units

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

(D)  $\frac{\sqrt{65}}{2}$  sq.units

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Space For Rough Work

50. The number of possible outcomes in the sample space when two dice of different colours are rolled is

- (A) 36 (B) 6  
(C) 9 (D) 12

51.  $\sin \theta$  is positive and  $\tan \theta$  is negative when  $\theta$  is in

- (A) I quadrant (B) II quadrant  
(C) III quadrant (D) IV quadrant

52. The value of

$$\frac{\tan(\pi - \alpha)}{\tan(-\alpha)} + \frac{\cos(\frac{\pi}{2} - \alpha)}{\sin(2\pi - \alpha)} + \frac{\operatorname{cosec}(\frac{3\pi}{2} + \alpha)}{\sec(\pi + \alpha)} \text{ is}$$

- (A) -1 (B) 2  
(C) -2 (D) 1

53. The value of  $\sin(105^\circ)$  is

- (A)  $\frac{\sqrt{3} + 1}{2\sqrt{2}}$  (B)  $\frac{\sqrt{3} - 1}{2\sqrt{2}}$   
(C)  $\frac{1 - \sqrt{3}}{2\sqrt{2}}$  (D)  $\frac{\sqrt{3}}{2\sqrt{2}}$

54. The value of  $\frac{1 - \cos A + \sin A}{1 + \cos A + \sin A}$  is

- (A)  $\tan A$  (B)  $\tan\left(\frac{A}{2}\right)$   
(C)  $\cot\left(\frac{A}{2}\right)$  (D)  $\cot A$

55. If  $\sin A = \frac{1}{3}$ , then the value of  $\sin 3A$  is

- (A)  $-\frac{3}{27}$  (B) 1  
(C)  $\frac{-4}{27}$  (D)  $\frac{23}{27}$

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Space For Rough Work

56. The value of  $2 \cos 3A \cdot \sin 2A$  is

(A)  $\sin 5A + \sin A$

(B)  $\cos 5A + \cos A$

(C)  $\sin 5A - \sin A$

(D)  $\cos 5A - \cos A$

57. The polar form of  $1 + i$  is

(A)  $\sqrt{2} \left[ \cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right]$

(B)  $\sqrt{2} \left[ \cos \frac{\pi}{4} - i \sin \frac{\pi}{4} \right]$

(C)  $\sqrt{2} \left[ \sin \frac{\pi}{4} + i \cos \frac{\pi}{4} \right]$

(D)  $\sqrt{2} \left[ -\cos \frac{\pi}{4} - i \sin \frac{\pi}{4} \right]$

58.  $\lim_{x \rightarrow -3} \frac{x^2 - 5x + 6}{x^2 - 3x} =$

(A)  $\frac{-5}{3}$

(B)  $\frac{1}{3}$

(C)  $\frac{-1}{3}$

(D)  $\frac{5}{3}$

59.  $\lim_{x \rightarrow a} \frac{\sqrt{x^3} - \sqrt{a^3}}{x - a} =$

(A)  $\frac{3}{2} \sqrt{a}$

(B)  $\frac{3}{2\sqrt{a}}$

(C)  $\sqrt{a}$

(D)  $\frac{1}{\sqrt{a}}$

60.  $\lim_{\theta \rightarrow 0} \frac{\cos 3\theta - \cos \theta}{\theta \sin 2\theta} =$

(A)  $\tan 2\theta$

(B) 2

(C) -2

(D) 1

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Space For Rough Work

61. Equation of the straight line passing through the point (1, 3) and having slope - 2 is

(A)  $2x - y + 5 = 0$

(B)  $x + 2y + 5 = 0$

(C)  $x - 2y - 5 = 0$

(D)  $2x + y - 5 = 0$

62. Equation of the straight line passing through the origin and perpendicular to the line  $5x - 4y - 1 = 0$  is

(A)  $5x - 4y = 0$

(B)  $4x + 5y = 0$

(C)  $5x - 4y + 1 = 0$

(D)  $4x + 5y + 1 = 0$

63. If  $y = \frac{x^2 - 5}{x^2 + 3}$ , then  $\frac{dy}{dx} =$

(A)  $\frac{4x^3 - 4x}{(x^2 + 3)^2}$

(B)  $\frac{16x}{(x^2 + 3)^2}$

(C)  $\frac{4x}{(x^2 + 3)^2}$

(D)  $\frac{-16x}{(x^2 + 3)^2}$

64. If  $y = \sin^{-1}(\cos x)$ , then  $\frac{dy}{dx} =$

(A)  $\frac{1}{\sqrt{1-x^2}}$

(B)  $\frac{-\sin x}{\sqrt{1-x^2}}$

(C) 1

(D) -1

65. If  $y = \sqrt{y \log x}$ , then  $\frac{dy}{dx} =$

(A)  $\frac{1}{x(2y-1)}$

(B)  $\frac{1}{x}$

(C)  $\frac{1}{x(1-2y)}$

(D)  $\frac{1}{xy}$

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Space For Rough Work

66. If  $x = a \cos^2 \theta$  and  $y = b \sin^3 \theta$ , then  $\frac{dy}{dx} =$

(A)  $-\frac{3b}{2a} \sin \theta$

(B)  $-\frac{3b}{2a}$

(C)  $\frac{2a}{b} \cos \theta$

(D)  $\frac{-2a}{3b \sin \theta}$

67. If  $y = x^y$ , then  $\frac{dy}{dx} =$

(A)  $\frac{y^2}{x(1-\log x)}$

(B)  $\frac{y^2}{x(1+\log y)}$

(C)  $\frac{y^2}{x(1-y \log x)}$

(D)  $\frac{y^2}{x(1+\log x)}$

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

(A)  $2 \cos 2x$

(B)  $2 \sin 2x$

(C)  $2 \sin x \cos x$

(D)  $2x \sin x$

69. The Equation of tangent to the curve  $y = \sin x$  at the point  $(\pi, 0)$  is

(A)  $x + y + 1 = 0$

(B)  $x - y - 1 = 0$

(C)  $x + y - \pi = 0.$

(D)  $x - y + \pi = 0.$

70. The rate of change of radius of the sphere is  $9\text{cm/s}$ . Then the rate of change of volume of the sphere when the radius is  $2\text{ cm}$  is equal to

(A)  $144\pi \text{ cm}^3/\text{s}$

(B)  $9\pi \text{ cm}^3/\text{s}$

(C)  $56\pi \text{ cm}^3/\text{s}$

(D)  $64\pi \text{ cm}^3/\text{s}$

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Space For Rough Work

$$71. \int \frac{1}{1 + \cos x} dx =$$

(A)  $\tan x + \sec x + c$

(B)  $\tan x - \sec x + c$

(C)  $-\cot x + \operatorname{cosec} x + c$

(D)  $\cot x - \operatorname{cosec} x + c$

$$72. \int (\sqrt{x} + \cot x) dx =$$

(A)  $\frac{2}{3} x^{3/2} + \log \sin x + c$

(B)  $\frac{3}{2} x^{2/3} + \log \sec x + c$

(C)  $\frac{2}{3} x^{3/2} - \log \sin x + c$

(D)  $\frac{3}{2} x^{2/3} - \log \sec x + c$

$$73. \int \frac{e^{\log x}}{x} dx =$$

(A)  $e^x + c$

(B)  $\log(e^x) + c$

(C)  $x \log e^x + c$

(D)  $e^{\log x} + c$

$$74. \int \log x \cdot dx =$$

(A)  $x \log x + x + c$

(B)  $x \log x - x + c$

(C)  $x + \log x + c$

(D)  $x - \log x + c$

$$75. \int \frac{x}{\sqrt{1+x^2}} dx =$$

(A)  $\sqrt{1+x^2} + c$

(B)  $\sqrt{1-x^2} + c$

(C)  $\frac{1}{\sqrt{1+x^2}} + c$

(D)  $\frac{1}{\sqrt{1-x^2}} + c$

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Space For Rough Work

76.  $\int_{-2}^1 (x + 1)(x - 1) dx =$

(A) 0

(B) 1

(C) -1

(D) -2

77. The area bounded by the curve  $y = \sin^2 x$ , the  $x$ -axis and the ordinates  $x = 0$  and  $x = \frac{\pi}{2}$  is

(A)  $\frac{\pi}{4}$  sq. units

(B)  $\frac{\pi}{2}$  sq. units

(C)  $\frac{\pi}{3}$  sq. units

(D)  $\frac{\pi}{6}$  sq. units

78. The order and degree of a differential equation  $4 \left( \frac{dy}{dx} \right)^3 + 8xy + \left( \frac{d^2y}{dx^2} \right)^2 - 7 = 0$  respectively are

(A) 1 and 3

(B) 2 and 2

(C) 2 and 3

(D) 2 and 1

79. The differential equation formed from the equation  $y^2 = 4ax$  by eliminating arbitrary constant is

(A)  $2x \frac{dy}{dx} - y = 0$

(B)  $2x \frac{dy}{dx} + y = 0$

(C)  $y \frac{dy}{dx} - 2x = 0$

(D)  $y \frac{dy}{dx} + 2x = 0$

80. For the differential equation  $\frac{dy}{dx} + (\tan x) \cdot y = \cos x$ , the integrating factor is

(A)  $\log x$

(B)  $\cot x$

(C)  $\operatorname{cosec} x$

(D)  $\sec x$

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Space For Rough Work



**PART – C**  
**AERONAUTICAL ENGINEERING**

81. Which layer of atmosphere has ozone?
- (A) Exosphere (B) Troposphere  
(C) Stratosphere (D) Mesosphere
82. ISA (International Standard Atmosphere) values for Pressure, Temperature at sea level are
- (A) 101.325 kpa, 20°C (B) 101.325 kpa, 15°C  
(C) 103.25 kpa, 20°C (D) 103.25 kpa, 15°C
83. Bernoulli's theorem for incompressible and inviscid flow is
- (A)  $P + \frac{1}{2} \rho V^2 = P_0$  (B)  $P_1 + \frac{1}{2} \rho V_1^2 = P_2 + \frac{1}{2} \rho V_2^2$   
(C)  $P_0 = \frac{1}{2} \rho V^2$  (D) None of these
84. Assumptions made during the analysis of 'Circulation theory of lift' is
- (A) Viscosity effects are negligible (B) Wing tip vortices are neglected  
(C) Both (A) and (B) (D) Neither (A) nor (B)
85. Magnus effect is defined as
- (A) Generation of lift, parallel to the direction of spin  
(B) Generation of lift, perpendicular to the direction of spin  
(C) Generation of drag, parallel to the direction of spin  
(D) Generation of drag, perpendicular to the direction of spin
86. If chord length (C) is 100mm, then the given airfoil NACA23012 has
- (A) 2mm camber located at 15mm from the leading edge and maximum thickness is 12mm  
(B) 2mm camber located at 30mm from the leading edge and maximum thickness is 12mm  
(C) 3mm camber located at 15mm from the leading edge and maximum thickness is 12mm  
(D) 3mm camber located at 30mm from the leading edge and maximum thickness is 12mm

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Space For Rough Work

87. In high speed aerodynamics, the assumptions are  
(A) Air is incompressible and pressure changes  
(B) Air is incompressible and constant pressure  
(C) Air is compressible and pressure changes  
(D) Air is compressible and constant pressure
88. Which metal is used in galvanizing process to create corrosion resistant structure?  
(A) Chromium (B) Aluminium  
(C) Zinc (D) Nickel
89. The property of metal which does not allow bending or deformation on application of load is called  
(A) Brittleness (B) Hardness  
(C) Strength of material (D) Toughness
90. Ability of material to absorb energy when loaded elastically and give back the same energy when load is removed is called  
(A) Proof stress (B) Resilience  
(C) Yield strength (D) None of these
91. SAE 2340 indicates  
(A) Nickel steel with 3% of nickel and 0.40% of carbon  
(B) Nickel chromium steel with 3% of chromium and 0.40% of carbon  
(C) Carbon steel with 0.40% carbon and an addition of 3% carbon  
(D) None of these
92. Which of the following does not combine with fibre to form composites?  
(A) Metals (B) Ceramics  
(C) Non-metals (D) Polymers
93. Oxygen system needs to be purged if  
(A) It has been depleted and not recharged  
(B) If any line or component is replaced  
(C) When it is suspected that the system has been contaminated  
(D) All of the above

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94. Basic 'T' grouping of instrument consists of
- (A) Airspeed Indicator, Approach horizon, Altimeter and course Indicator
  - (B) Airspeed Indicator, Gyro horizon, Altimeter and Turn and slip Indicator
  - (C) Airspeed Indicator, course Indicator, Altimeter and vertical speed Indicator
  - (D) Airspeed Indicator, Mach meter, Altimeter and vertical speed Indicator.
95. As per the priority consideration for flight deck display, Instruments such as Altimeter, Machmeter and vertical speed Indicator are placed under
- (A) Priority 1
  - (B) Priority 2
  - (C) Priority 3
  - (D) Priority 4
96. Cabin pressurization is the compression of air in the aircraft cabin to maintain
- (A) Cabin altitude higher than the actual flight altitude
  - (B) Cabin altitude same as the actual flight altitude
  - (C) Cabin altitude lower than the actual flight altitude
  - (D) None of these
97. An unexpected drop in cabin pressure at a speed faster than speed of air escape from lungs is known as
- (A) Rapid decompression
  - (B) Explosive decompression
  - (C) Slow decompression
  - (D) Differential pressure decompression
98. Stability about vertical axis is called
- (A) Lateral stability
  - (B) Longitudinal stability
  - (C) Directional stability
  - (D) Dynamic stability
99. In a pump feed fuel system, selector valve has three positions, namely 'Left', 'Right' and \_\_\_\_\_
- (A) Cross Feed
  - (B) Pump On
  - (C) Both (A) and (B)
  - (D) Off

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100. Modern aircraft fuel system must be designed to have lightning protection to prevent the ignition of fuel vapour within the system by
- (A) Direct lightning strike, swept lightning strike or corona of fuel vent outlet
  - (B) Direct lightning strike, swept lightning strike but not corona of fuel vent outlet
  - (C) Direct lightning strike but not from swept lightning strike
  - (D) Indirect lightning strike, direct lightning strike and swept lightning strike but not from corona of fuel vent outlet.
101. While fuelling over wing
- (A) Separate bonding of nozzle to the fuel filler port is not necessary if the refueller is already bonded to the aircraft
  - (B) Separate bonding of nozzle to the fuel filler port is not necessary if the nozzle is touching the filler port
  - (C) Separate bonding of nozzle to the fuel filler port is necessary by nozzle bonding cable with the filler port metallic port
  - (D) None of the above
102. Which of the following statements is correct?
- (A) Lateral axis is also called as transverse axis, Longitudinal axis as roll axis and vertical axis as yaw axis
  - (B) Lateral axis is also called as roll axis, longitudinal axis as transverse axis and vertical axis as yaw axis
  - (C) Lateral axis is also called as transverse axis, longitudinal axis as yaw axis and vertical axis as roll axis
  - (D) Lateral axis is also called as yaw axis, longitudinal axis as roll axis and vertical axis as transverse axis.
103. Identify the wrong statement
- (A) Bell crank is used in push-pull rod control system for changing direction of the force
  - (B) Pulley is used in cable control system for changing direction of force
  - (C) Turnbuckle is used in both push-pull rod and cable pulley system to change direction of force
  - (D) Sprocket is used in chain control system to change the direction of the force.
104. Data probes have \_\_\_\_\_ type of anti-icing system
- (A) Electro expulsive
  - (B) Electro Impulsive
  - (C) Electric heaters
  - (D) Chemical

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105. The fuselage construction which has no longitudinal member is  
 (A) Truss type (B) Monocoque  
 (C) Semi monocoque (D) Both (B) and (C)
106. In truss type of fuselage construction  
 (A) Vertical member and diagonal member carry the compression load  
 (B) Vertical member and diagonal member carry the tensile load  
 (C) Vertical member carries compression load and diagonal member carries tensile load  
 (D) Vertical member carries tensile load and diagonal member carries compression load
107. The three components of paint are  
 (A) Resin, pigment and solvents (B) Resin, enamels and solvents  
 (C) Lacquers, enamels and solvents (D) Resin, Lacquers and Finishing formulas
108. The standard finish used to protect and colour the fabric covering aircraft is  
 (A) Primers (B) Red iron oxide  
 (C) Dope (D) Epoxy
109. Common problem that occurs during the painting of aircraft is  
 (A) Blushing (B) Orange peel  
 (C) Wrinkling (D) All of the above
110. The ratio of lift of an aircraft to its weight is called  
 (A) Limit load (B) Load factor  
 (C) Factor of safety (D) Flight envelope
111. What was added to monocoque structure to support heavier aircraft?  
 (A) Bulk heads (B) Longerons  
 (C) Formers (D) Frames
112. Power transmission equation is given by  
 (A)  $\frac{2\pi NT}{45}$  (B)  $\frac{2\pi NT}{60}$   
 (C)  $\frac{WNT}{60}$  (D)  $\frac{3\pi NT}{60}$

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113. In thin cylindrical shell Hoop's stress equation is given by

(A)  $\sigma_c = \frac{P \times d}{2 \times t}$

(B)  $\sigma_c = \frac{2 \times t \times L}{P \times d}$

(C)  $\sigma_c = \frac{d \times L}{2 \times P \times t}$

(D)  $\sigma_c = \frac{2d}{L}$

114. The ratio of absolute strength to actual applied load is

(A) Hooke's law

(B) Factor of safety

(C) Hoop's law

(D) None of these

115. Relationship between modulus of elasticity and Bulk modulus is given by

(A)  $E = 3K(1 - 2\mu)$

(B)  $E = 2G(1 + \mu)$

(C)  $E = \frac{9KG}{3K + G}$

(D)  $E = K(1 + \mu)$

116. The ratio of direct stress to volumetric strain is

(A) Bulk modulus

(B) Modulus of rigidity

(C) Young's modulus

(D) Poisson's ratio

117. Extensive property of a system

(A) depends on the mass of the system

(B) does not depend on the mass

(C) depends on the path

(D) is a constant

118. Work done in a free expansion is

(A) +ve

(B) -ve

(C) Zero

(D) Maximum

119. Isochoric process is one in which

(A) Free expansion takes place

(B) No mechanical work is done

(C) Little mechanical work is done

(D) Mass and energy transfer do not take place

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120. Kelvin-Planck's law deals with
- (A) Conservation of work (B) Conservation of heat  
(C) Conversion of work into heat (D) Conversion of heat into work
121. Characteristic gas constant of a gas is equal to
- (A)  $C_p/C_v$  (B)  $C_v/C_p$   
(C)  $C_p + C_v$  (D)  $C_p - C_v$
122. The ignition quality of petrol is expressed by
- (A) Cetane number (B) Octane number  
(C) Calorific value (D) Specific heat
123. The power actually developed by the engine cylinder of an IC engine is
- (A) Theoretical power (B) Brake power  
(C) Indicated power (D) Actual power
124. The compression ratio is given by
- (A)  $V_{\max}/\text{Total volume}$  (B)  $V_{\min}/V_{\max}$   
(C)  $V_{\text{at TDC}}/V_{\text{at BDC}}$  (D)  $V_{\text{at BDC}}/V_{\text{at TDC}}$
125. Supercharging is the process of
- (A) Supplying the intake with air at a density greater than the density of the surrounding atmospheric air  
(B) Providing forced air for cooling  
(C) Supplying compressed air to remove waste gases  
(D) Raising the exhaust pressure
126. A 110cc engine has the following parameter as 110cc
- (A) Fuel tank capacity (B) Cylinder volume  
(C) Swept volume (D) Clearance volume
127. The highest heat to metal contact in a Jet engine is the
- (A) Combustion chamber (B) Turbine Blades  
(C) Exhaust cone (D) Turbine inlet guide vanes

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128. A method of comparing engine efficiencies is by comparing  
(A) Fuel consumption (B) Thrust to weight ratio  
(C) Specific fuel consumption (D) Speed
129. The two main functional components in a centrifugal compressor are  
(A) Rotor and stator (B) Impeller and Diffuser  
(C) Turbine and compressor (D) Blade and Vane
130. A bypass ratio of 4:1 indicates that the bypass flow is  
(A) equal to 1/4 of the hot stream (B) 4 times that of hot stream  
(C) 4 times that of cold stream (D) equal to that of hot stream
131. Compressor blades have a reduced angle of attack at the tips  
(A) To prevent turbine stall (B) To increase the velocity  
(C) To decrease the velocity (D) To allow uniform axial velocity
132. The air passing through the combustion chamber is  
(A) entirely combined with fuel and burned  
(B) used to support combustion and to cool the engine  
(C) used to cool the engine  
(D) used to reduce pressure
133. The maximum practical angle through which the gas flow can be turned during thrust reversal is  
(A)  $180^\circ$  (B)  $55^\circ$   
(C)  $135^\circ$  (D)  $90^\circ$
134. In EM wave propagation  
(A) Both electric and magnetic fields are present  
(B) Anyone of electric or magnetic field is enough for propagation  
(C) Electric and magnetic fields are transverse  
(D) Both (A) and (C) are correct
135. 1 to 2 GHz frequency band is called  
(A) C Band (B) X Band  
(C) S Band (D) L Band

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136. Low frequency or Long wave radio frequencies are those below \_\_\_\_\_ kHz  
(A) 500 Hz (B) 50 kHz  
(C) 500 kHz (D) 5000 kHz
137. The ultraviolet, alpha, beta and gamma rays from the Sun cause ionization of \_\_\_\_\_ which makes sky wave propagation possible  
(A) Ionosphere (B) Troposphere  
(C) Stratosphere (D) Exosphere
138. Which of the following statements is wrong?  
(A) Resonant antenna radiates almost the entire radio signal fed to the antenna  
(B) Resonant antenna radiates a radio signal close to its design frequency  
(C) Resonant antenna has a large bandwidth  
(D) Resonant antenna has a very high efficiency.
139. Polarization of the radio wave is defined as the orientation of the \_\_\_\_\_ field with respect to earth's surface  
(A) Magnetic (B) Electric  
(C) Circular (D) Linear
140. The information that can be derived by a radar system are  
(A) Range and Radial velocity  
(B) Radial velocity and height  
(C) Height and strength of target  
(D) Range, radial velocity, height and strength of target
141. IFF is a  
(A) Primary radar (B) Secondary radar  
(C) Tertiary radar (D) Active radar
142. Cockpit Voice Recorder (CVR) used in commercial aircraft records  
(A) Pilots voice (B) Flight crew voice  
(C) Sound inside cockpit (D) All of the above
143. NDBs transmit vertically polarized AM signals in the frequency range  
(A) 190 kHz to 1750 kHz (B) 120 kHz to 1850 kHz  
(C) 150 kHz to 1560 kHz (D) 110 kHz to 1789 kHz

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144. Wire is a
- (A) Single conductor
  - (B) Two conductor
  - (C) Multiple conductor
  - (D) Screened conductor
145. The conductor in a cable is normally classified as per
- (A) Gauge number or wire number
  - (B) Gauge number and wire number
  - (C) Gauge number only
  - (D) Gauge number, wire number and colour
146. Thermocouples are used for
- (A) Measuring cylinder head and exhaust gas temperature
  - (B) Measuring pressure
  - (C) Measuring flow rate
  - (D) Measuring humidity
147. Which of the following is not a type of cable routing?
- (A) Conduit
  - (B) Ducted loom
  - (C) Open loom
  - (D) Insulated cable
148. Which of the following is not a factor that governs the arrangement of power distribution in aircraft?
- (A) The type of aircraft and complexity of its electrical system
  - (B) Number of generators and sources
  - (C) Consumers
  - (D) Regulatory authority
149. Mercury switches have
- (A) Fast operating speed
  - (B) Slow operating speed
  - (C) Medium operating speed
  - (D) Operating speed does not depend on mercury
150. Flashing light in aircraft is called
- (A) Position light
  - (B) Anti-collision light
  - (C) Formation light
  - (D) Navigation light

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151. Availability is calculated by the formula

(A)  $Availability = \frac{Uptime}{Uptime + Downtime}$

(B)  $Availability = \frac{Uptime}{Downtime}$

(C)  $Availability = \frac{Downtime}{Uptime}$

(D)  $Availability = \frac{Uptime + Downtime}{Uptime}$

152. Probability that a failed machine or system can be restored to its normal operable state within a given time frame using prescribed practices and procedures is called

(A) Availability

(B) Maintenance

(C) Maintainability

(D) Non-failureability

153. Quality of being trustworthy or perform required functions with failure is called

(A) Maintainability

(B) Availability

(C) Reliability

(D) None of the above

154. MTBF is calculated by the formula

(A)  $MTBF = \frac{Operating\ time}{Number\ of\ failure}$

(B)  $MTBF = \frac{Operating\ time + Number\ of\ failure}{Operating\ time}$

(C)  $MTBF = \frac{MTTR}{MDT}$

(D)  $MTBF = \frac{Operating\ time}{Operating\ time + Number\ of\ failure}$

155. Hazard rate refers to the rate of death for an item of a given age and is calculated by the formula

(A)  $h(t) = \frac{f(t)}{R(t)}$

(B)  $h(t) = \frac{f(t) + R(t)}{R(t)}$

(C)  $h(t) = \frac{R(t)}{f(t)+R(t)}$

(D)  $h(t) = \frac{f(t)}{2R(t)}$

Where:

- $h(t)$  is the hazard rate
- $f(t)$  is the probability density function that it will fail in a specified interval
- $R(t)$  is the survival function or the probability that it will survive past a certain time.

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156. When an equipment fails anytime during working, it is called
- (A) Predicted failure (B) Chance failure  
(C) Random failure (D) Both (B) and (C)
157. Maintenance carried out to repair or replacement of facility, components or equipment that require immediate attention, because functioning of critical system is affected, is called
- (A) Unscheduled maintenance (B) Scheduled maintenance  
(C) Predictive maintenance (D) Emergency maintenance
158. TPM stands for
- (A) Total production maintenance (B) Total plant maintenance  
(C) Total productive maintenance (D) Timely preventive maintenance
159. Modern aircraft designs incorporate BITE in the systems, BITE is
- (A) Built in Test Equipment  
(B) A passive fault management system  
(C) A monitoring system that keeps monitoring health of the system when it is in operational use  
(D) All of the above
160. Global warming causes
- (A) Warmer atmosphere (B) Warmer Oceans  
(C) Rising sea levels (D) All of the above
161. The milling cutter in a milling machine is mounted on
- (A) Column (B) Arbor  
(C) Knee (D) Spindle
162. The material which produces chips with built-up edge on machining is
- (A) Brittle material (B) Tough material  
(C) Hard material (D) Ductile material
163. Drilling is an example of
- (A) Orthogonal cutting (B) Oblique cutting  
(C) Simple cutting (D) Hole cutting

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164. In \_\_\_\_\_ operation, the cutting force is maximum when the tooth begins its cut and reduces to minimum when the tooth leaves the work
- (A) Down milling (B) Up milling  
(C) End milling (D) Face milling
165. The angle between the face and flank of a single point cutting tool is
- (A) Rake angle (B) Clearance angle  
(C) Lip angle (D) Point angle
166. The gas used in TIG welding
- (A) Carbon (B) Oxygen  
(C) Argon (D) Acetelene
167. A low-velocity abrading process is called
- (A) Grinding (B) Honing  
(C) Lapping (D) Facing
168. Type of current used for welding non-ferrous materials by TIG
- (A) AC (B) DC  
(C) AC or DC (D) AC and DC
169. Electron beam machining works on the principle of conversion of
- (A) Potential energy of electrons into heat energy  
(B) Kinetic energy of electrons into heat energy  
(C) Light energy into heat energy  
(D) No conversion of energy
170. In centreless grinding the work piece is located by
- (A) Spindles (B) Fixture  
(C) Jig (D) Two rotary grinding wheels
171. The plane of rotation of a helicopter rotor in flight is
- (A) The plane of rotation is a plane formed by the average tip path of the rotor blades and which is normal to the axis of rotation  
(B) The plane of rotation is the plane of rotation of the tail rotor blades  
(C) The plane of rotation is the plane of rotation of anti-torque produced  
(D) Both (B) and (C)

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172. 'Advancing blade' in a helicopter in flight means

- (A) Advancing blade of a helicopter is the blade which always moves first during startup procedure.
- (B) Advancing blade of a helicopter is to be fitted first and aligned during major servicing.
- (C) Advancing blade is that blade of the rotor moving into the free stream air flow, when helicopter is on forward motion.
- (D) Both (A) and (B).

173. The velocity of air moving across the main rotor blade is

- (A) During hovering the velocity of air downwards is always very fast.
- (B) During hovering the velocity of air keeps on varying depending on load factor.
- (C) During hovering the velocity of air moving downward is always constant across the disc.
- (D) Both (A) and (B).

174. The meaning of 'teetering rotor' is

- (A) Teetering rotor is that rotor which has hinges fitted for all three degrees of freedom.
- (B) Teetering rotor is that rotor having hinge which allows only see-saw flap motion of the blades.
- (C) Teetering rotor is that rotor having hinges for 2 degrees of motion-pitch and yaw.
- (D) There is no rotor by name teetering rotor.

175. The 'anti-torque' system/method used in a multirotor system of helicopter is

- (A) In a multirotor drive system, the layouts have counter rotation of the main rotor to cancel the anti-torque reactions, thus eliminate the need of tail rotor.
- (B) In a multirotor system, each rotor will have a separate anti-torque rotor configuration, which eliminates the need of tail rotors.
- (C) In a multirotor system, each main rotor will have a tail rotor to counter the anti-torque.
- (D) None of the above.

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176. The main function of 'cyclic pitch control' is
- (A) to control the lift of the helicopter during vertical climb.
  - (B) to tilt the main rotor disc by changing the pitch angle of rotor blades in their cycle of rotation.
  - (C) to reduce the drag and increase the speed.
  - (D) Both (B) and (C).
177. The method of power transfer to drive in turboshaft engine:
- (A) The burnt gases in the combustion chamber of turboshaft engine turn the wheels of turbine which provide power to both engine compressor and main rotor system through an output shaft.
  - (B) In turboshaft engine, the exhaust gases provide tremendous power needed for turning the rotor blades.
  - (C) In turboshaft engine, the output power is directly taken out from combustion chamber without losing any amount.
  - (D) Both (B) and (C).
178. The function of 'Clutch' in a helicopter:
- (A) The clutch in a helicopter allows smooth changing of speeds in helicopter drives.
  - (B) The clutch in a helicopter allows the engine to be started and then gradually pick up the load of the rotor.
  - (C) The clutch in a helicopter allows the pilot to change gears smoothly.
  - (D) The clutch in a helicopter allows the rotor to be disconnected during emergency.
179. The three major factors affecting helicopter performance are:
- (A) Altitude, temperature and humidity
  - (B) Density, altitude, weight and wind
  - (C) Weight, balance and temperature
  - (D) None of the above
180. What happens in an 'Auto Rotation' function in a helicopter?
- (A) In auto rotation, the engine is disengaged from main rotor
  - (B) In auto rotation, the main rotor blades are driven solely by the upward flow of airflow through the rotor blades.
  - (C) In auto rotation, the main rotor automatically disengages after certain maximum speed of helicopter.
  - (D) Both (A) and (B)

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