PRERNA AVIATION

DGCA CPL Practice Paper 08

Technical General — Systems & Instruments

ANSWER KEY & EXPLAINED SOLUTIONS

Original educational practice set. Not an official DGCA paper or a full-length examination simulation.

01 C	02 C	03 A	04 C	05 D
06 A	07 A	08 D	09 D	10 C
11 A	12 A	13 B	14 B	15 C
16 B	17 D	18 B	19 A	20 C
21 D	22 B	23 D	24 B	25 A

01. The correct sequence in a four-stroke spark-ignition piston engine is:

Answer: C. Induction, compression, power, exhaust

The cylinder draws in charge, compresses it, extracts work during combustion/expansion, then expels the exhaust gases.

Topic: Piston engine cycle | Study reference: SYS

02. In a conventional magneto-ignition piston engine, the magneto:

Answer: C. Generates ignition energy independently of the main battery once operating

A magneto is an engine-driven ignition source. This independence explains why switching off the aircraft master alone does not necessarily stop such an engine.

Topic: Ignition | Study reference: SYS

03. Detonation in a spark-ignition engine is:

Answer: A. Abnormal explosive combustion of the remaining charge

Detonation involves abnormal rapid combustion after ignition. Pre-ignition instead begins before the intended spark, often from a hot spot.

Topic: Combustion | Study reference: SYS

04. Pre-ignition is most accurately described as:

Answer: C. Ignition of the charge before the scheduled spark

A hot spot can ignite the mixture prematurely. This differs from detonation and can cause severe heating and damage.

Topic: Combustion | Study reference: SYS

05. In a carburettor, ice can form even when outside air temperature is above freezing because:

Answer: D. Fuel vaporisation and pressure reduction can cool the intake air

Vaporisation absorbs heat and pressure reduction also cools the air. Sufficient cooling and moisture can produce ice despite above-freezing ambient temperature.

Topic: Carburettor icing | Study reference: SYS

06. Applying carburettor heat generally makes the inducted air:

Answer: A. Warmer and less dense

Heating reduces the density of the inducted air. Power and mixture effects depend on the engine and installation; the approved procedure must be used.

Topic: Induction system | Study reference: SYS

07. The principal purpose of a turbocharger is to:

Answer: A. Compress intake air using an exhaust-driven turbine

An exhaust-driven turbine powers a compressor, increasing intake pressure and helping maintain engine performance as ambient pressure falls.

Topic: Turbocharging | Study reference: SYS

08. A constant-speed propeller governor normally controls RPM by varying:

Answer: D. Blade pitch

The governor changes blade angle so propeller load adjusts toward the selected RPM within the governing range.

Topic: Propeller governor | Study reference: SYS

09. Feathering a featherable propeller after the relevant engine failure primarily aims to:

Answer: D. Reduce windmilling drag

Feathering aligns the blades to reduce their resistance to the airflow. Applicability and procedure depend on the aircraft and must follow its manual.

Topic: Propeller | Study reference: SYS

10. In a gas-turbine engine, the main role of the compressor is to:

Answer: C. Increase air pressure before combustion

The compressor raises the pressure of the air delivered to the combustion section. The turbine then extracts energy to drive the compressor and other loads.

Topic: Gas turbine | Study reference: SYS

11. A turbine extracts energy primarily from:

Answer: A. Hot expanding gases

Energy from the high-energy gas flow is converted into shaft work. This drives the compressor and, depending on engine type, other loads.

Topic: Gas turbine | Study reference: SYS

12. In a simple circuit, voltage is 24 V and resistance is 6 ohms. What current flows?

Answer: A. 4 A

Ohm's law gives I = V/R = 24/6 = 4 A. Voltage divided by resistance gives current.

Topic: Electrical calculation | Study reference: SYS

13. A device uses 5 A from a 28 V supply. What electrical power does it consume?

Answer: B. 140 W

For this DC exercise, power P = V x I = 28 x 5 = 140 W.

Topic: Electrical calculation | Study reference: SYS

14. Two 4-ohm resistors are connected in series. Their equivalent resistance is:

Answer: B. 8 ohms

Series resistances add directly: 4 + 4 = 8 ohms. The reciprocal relationship is used for parallel resistances.

Topic: Electrical circuits | Study reference: SYS

15. Two equal 6-ohm resistors are connected in parallel. Their equivalent resistance is:

Answer: C. 3 ohms

For equal resistors in parallel, equivalent resistance is R/2 = 3 ohms. The extra current path lowers resistance.

Topic: Electrical circuits | Study reference: SYS

16. The main purpose of a circuit breaker is to protect against:

Answer: B. Excessive current

A circuit breaker interrupts excessive current that could overheat wiring. It is not a universal protection against all system faults.

Topic: Circuit protection | Study reference: SYS

17. A hydraulic system mainly transmits power through:

Answer: D. Pressurised liquid

Hydraulic systems use pressurised fluid to transmit force. Liquid's low compressibility supports effective power transmission.

Topic: Hydraulics | Study reference: SYS

18. A hydraulic actuator has effective area 4 square cm and pressure 100 N per square cm. Ignoring losses, what force is produced?

Answer: B. 400 N

Force = pressure x area = 100 x 4 = 400 N. The area and pressure units must be compatible.

Topic: Hydraulic calculation | Study reference: SYS

19. The function of a hydraulic accumulator is generally to:

Answer: A. Store hydraulic energy and help absorb pressure fluctuations

An accumulator stores energy, commonly using compressed gas separated from the hydraulic fluid. It can also smooth pressure fluctuations.

Topic: Hydraulic components | Study reference: SYS

20. An anti-skid braking system aims primarily to:

Answer: C. Prevent excessive wheel slip by modulating brake pressure

The system senses wheel behaviour and adjusts braking to reduce skidding. It does not remove the need to respect runway and performance limits.

Topic: Braking | Study reference: SYS

21. Cabin pressurisation is normally controlled largely by:

Answer: D. Regulating the outflow of air

Conditioned air is supplied and outflow is controlled to regulate cabin pressure. System details vary by aircraft.

Topic: Pressurisation | Study reference: SYS

22. An engine oil system commonly provides lubrication and also:

Answer: B. Helps remove heat and carry contaminants to filtration

Oil reduces friction and can transport heat and contaminants. It must remain within the engine's specified condition and operating limits.

Topic: Lubrication | Study reference: SYS

23. An airspeed indicator's green arc on a conventional light-aircraft dial generally identifies:

Answer: D. The normal operating speed range

The green arc represents the normal operating range. The white arc is associated with flap operation on conventional marked indicators.

Topic: Airspeed markings | Study reference: INST

24. The attitude indicator principally displays:

Answer: B. Pitch and bank attitude

An attitude indicator provides a reference for pitch and bank. It does not directly display ground track or fuel state.

Topic: Gyroscopic instruments | Study reference: INST

25. A conventional vertical speed indicator senses:

Answer: A. Rate of change of static pressure

A calibrated pressure lag allows the VSI to respond to the rate of static-pressure change. It therefore indicates climb or descent rate rather than absolute altitude.

Topic: Flight instruments | Study reference: INST

Study references & review notes

Use these sources to revise the concepts behind your answers. Questions and explanations are newly written; they are not reproduced from an official question bank.

INST — FAA PHAK, Chapter 8: Flight Instruments

https://www.faa.gov/sites/faa.gov/files/10_phak_ch8.pdf

SYS — FAA PHAK, Chapter 7: Aircraft Systems

https://www.faa.gov/sites/faa.gov/files/09_phak_ch7.pdf

Scope: foundation-to-intermediate CPL ground-subject practice. This set does not claim complete coverage of the latest DGCA syllabus. Consult the current DGCA CAR Section 7, Series B and Pariksha notices for the applicable syllabus and examination requirements. Aircraft-type-specific Technical Specific and a complete RTR(A) course are not included.

FAA references support general theory only, not Indian regulatory requirements. CAP 413 is used for standard phrase meanings, not UK-specific operating rules. Weather reports, fuel reserves and flight scenarios in questions are illustrative. For operational use, consult current approved publications and aircraft manuals.

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