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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT INSTRUMENTS

(2008 onwards)

Time : 3 Hours | Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. What do you understand by the term 'Standard atmosphere'. State the assumptions made by ICAO standard.

2. What is the difference between 'Pressure altitude' and 'indicated altitude'.

3. What do you understand by 'gim lock' and gimbal error'.

4. What is meant by apparent drift and read drift— Explain.

5. Define the following :—

   (i) Magnetic Variation.

   (ii) Isogonal lines.

   (iii) Agonal lines.

6. Define "Seebeck effect'. Peltier effect and Thomson effect.

7. Explain the terms gyroscopic inertia or rigidity, Precession.

8. What do you under stand by Compass swing.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Explain capacitance Type of fuel gauge system.

(*Or*)

(b) Explain Operating principle of thermo-emf. system State how engine parameters are measured with this system.

10. (a) Explain how Mach meter measures air speed and altimeter Variables in terms of Mach number.

(*Or*)

(b) With the aid of schematic diagram describe the construction of vertical speed indicator.

11. (a) What is the purpose of volumetric top-off system Explain briefly the operations of such system.

(*Or*)

(b) With the help of diagrams describe how ball type of indicators display.

(i) A correctly banked turn.

(ii) A skid to port.

(iii) A slip to star board.

12. (a) What do you understand by "Head up Display". With the aid of diagram describe how the required basic flight data is displayed to the pilot.

(*Or*)

(b) What are the methods of operating gyroscopic flight instruments.
Explain the disadvantages of Vaccum operations.

13. (a) Describe the construction and explain the operation of instrument used for measuring manifold pressure.

(*Or*)

(b) Describe magnet system of typical Radio compass. How the effect of dip is overcome ?

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

BASIC ELECTRICITY AND MAGNETISM

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. List the properties of magnetism.

2. Differentiate photoelectric and piezoelectric effect.

3. Explain the principle of capacitors.

4. How a pointer type moving coil galvanometer is converted into (i) a voltmeter and (ii) an ammeter.

5. What are the two types of generators ?

6. Differentiate natural magnets and electromagnets.

7. Find an expression for the combined capacity of three condensers of capacities C_1, C_2, C_3 connected in series.

8. Explain Voltage regulators and their applications.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) What is self inductance ? Obtain the formula for self inductance of a long solenoid of length 1, having total number of turns N and radius *r*.

(*Or*)

(b) Explain the principle working and construction of Vande graff generator.

10. (a) Write short notes on :

(i) Unit of electricity.

(ii) Electron theory.

(iii) Static electricity.

(*Or*)

(b) What are thermoelectric diagrams ? Explain neutral temperature, thermoelectric power and temperature of inversion. Show how all the thermo emfs in a couple could be represented by areas on the diagram.

11. (a) Explain in detail the construction, theory and uses of a transformer. What are energy losses and how they can be reduced to a minimum.

(*Or*)

(b) Derive an expression for the capacity of a parallel plate capacitor. What will be the capacity if the space between the plates is partially filled with a slab of thickness *d* having dielectric constant K.

12. (a) (i) State and explain Kirchoff's law (6)

(ii) With a neat sketch explain the working of multimeter.

(6)

(*Or*)

(b) Write short notes on :

(i) Voltmeter

(ii) Ammeter

(iii) Ohmmeter

13. (a) Explain the principle, construction and working of DC generator.

(*Or*)

(b) Explain the function of (i) AC dynamo (ii) Induction Motor.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

MATHEMATICS—II

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Evaluate : $\lim_{x\to\infty} \frac{2x^2 - 4x + 1}{4x^2 + 6x - 5}$.

2. If $u = \frac{xy}{x+y}$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = u$.

3. Evaluate : $\int_0^1 \int_0^2 (xy)\, dy\, dx$.

4. Find the distance between the parallel planes $2x-2y+z+3=0$ and $4x-4y+2z+5=0$.

5. Find the centre and radius of the sphere $2x^2+2y^2+2z^2-2x+2y-4z-5=0$.

6. If $\bar{a}$ and $\bar{b}$ are any two vectors then prove that $|\bar{a}\times\bar{b}|^2+(|a\cdot b|)^2=|\bar{a}|^2|\bar{b}|^2$.

7. Find the vector equation of a straight-line passing through the points (–5, 2, 3), (4, –3, 6).

8. If $A=\begin{pmatrix}1 & 2 & 3\\ 3 & 1 & 0\\ 2 & 1 & 3\end{pmatrix}, B=\begin{pmatrix}1 & -1 & 1\\ 0 & 1 & 0\\ 1 & 1 & 1\end{pmatrix}$, find AB.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) If $f(x)$ is continuous in the closed interval $a \le x \le b$ and $f'(x)$ exists in the open interval $a < x < b$, then prove that there is at least one value of x_1, between a and b s.t.

$$f'(x_1) = \frac{f(b) - f(a)}{b - a}$$

(*Or*)

(b) Discuss the maxima and minima of the function $x^3y^2(6 - x - y)$

10. (a) Evaluate $\iiint xyz\, dxdydz$ taken over the positive octant of the sphere $x^2 + y^2 + z^2 = a^2$.

(*Or*)

(b) Find the area of an Elliptic quadrant.

11. (a) Find the perpendicular distance of the point P (1, 1, 1) from the line $\frac{x-2}{3} = \frac{y+3}{2} = \frac{z}{-1}$. Also find the foot of the perpendicular.

(*Or*)

(b) Prove that the two spheres

$s_1 = x^2 + y^2 + z^2 - 2x + 4y - 4z = 0$ and

$s_2 = x^2 + y^2 + z^2 + 10x + 2z + 10 = 0$ touch each other and find the point of contact.

12. (a) With usual notation, prove that :

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}.$$

(*Or*)

(b) (i) For any two vectors $\bar{a}$ and $\bar{b}$, prove that

$$|\bar{a} + \bar{b}|^2 + |\bar{a} - \bar{b}|^2 = 2(|\bar{a}|^2 + |\bar{b}|^2)$$

(ii) If $\bar{a} + \bar{b} + \bar{c} = 0, |\bar{a}| = 3, |\bar{b}| = 5, |\bar{c}| = 7$, find angle between $\bar{a}$ and $\bar{b}$.

13. (a) Find the rank of the matrix

$$\begin{pmatrix} 0 & 1 & 2 & 1 \\ 2 & -3 & 0 & -1 \\ 1 & 1 & -1 & 0 \end{pmatrix}$$

(*Or*)

(b) Show that the equations :

$$2x - y + 3z = 8$$
$$x - 2y - z = -4$$
$$3x + y - 4z = 0$$

are consistent and solve them.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

NON METALS AND AIRCRAFT HARDWARE

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Explain briefly about Synthetic Resin plastics.

2. Describe about Thermosetting plastics.

3. Write about oak wood and its classification.

4. Write short notes on Alkaline phenolic glues.

5. What is the use of reinforcing tape ?

6. What is the purpose of dope ?

7. Discuss the classification of composites.

8. Write short notes on plain hex nut.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Explain briefly about molding process of plastic.

(*Or*)

(b) Write about lamination procedure of plastic.

10. (a) What are plywoods ? Explain its types.

(*Or*)

(b) What are glues ? Explain any three.

11. (a) Explain different fabrics used in Aircraft covering.

(*Or*)

(b) Explain different methods of Aircraft wing covering.

12. (a) Briefly explain honey comb construction and its advantages.

(*Or*)

(b) Discuss the functions and properties of Matrix materials.

13. (a) Explain briefly about screws used in Aircraft constructions.

(*Or*)

(b) Write about turn book fasteners.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

FLUID MECHANICS

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Determine the pressure at a deth of 6 m below the free surface of water where $\gamma = 9.8 \times 10^3 \text{N/m}^3$.

2. List out the factors affecting the total pressure.

3. Define an orifice and a mouth piece. What is the difference between them ?

4. What is meta center and meta centric height ?

5. What is center of gravity ?

6. State the momentum equation.

7. On what factors does the coefficient of friction depends ?

8. Explain the rate of flow of a liquid.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Explain the working of Diapharam, pressure gauge, and Dead weight pressure gauge with neat diagram.

(*Or*)

(b) Explain the working of a differential manometer with necessary diagram.

10. (a) Write notes on :

(i) Accumulator.

(ii) Hydraulic press.

(*Or*)

(b) Explain the principle of Venturimeter with a neat sketch. Derive an expression for the rate of flow of liquid through it.

11. (a) Explain how you will find the resultant pressure on a curved surface immersed in a liquid.

(*Or*)

(b) With neat sketches, explain the condition for equilibrium for floating body and submerged body.

12. (a) Explain Linear momentum and Angular momentum theorem

(5)

(b) A pipeline carrying oil of specific gravity 0.87 changes in diameter from 200 mm dia at a point A to 500 mm dia at a point B, which is 4 m at a higher level. If the pressure at A and B are 9.81 N/cm^2 and 5.886 N/cm^2 respectively, discharge is 200 l/s. Determine loss of head and direction of flow.

(7)

(*Or*)

(c) State and derive Bernoulli's theorem mentioning clearly the assumptions under-lying it.

13. (a) Find an expression for loss of head of a viscous fluid flowing through a circular pipeline.

(7)

(b) Smooth pipe of diameter 400 mm and length 800 m carries water at a rate of 0.04 m^3/s. Determine the head loss due to friction, wall shear stress and centerline velocities. Consider the kinematic velocity of water as 0.018 stokes.

(5)

(*Or*)

(c) Obtain an expression for the coefficient of friction in terms of shearing strain.

(7)

(d) A laminar flow is taking place in a pipeline of diameter 200 mm. The maximum velocity is 1.5 m.s find the mean velocity and radius at which it occurs. Also calculate the velocity at 4 cm from the wall of the pipe.

(5)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

MACHINE DRAWING

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** Questions.

1. Mention various types of drawings used on Aircraft structure by an Aeronautical Engineer.

2. Define Parabola.

3. Define isometric view.

4. Mention any 3 differences between isometric view and orthographic view.

5. Draw 3 sketches of screw threads.

6. Mention the types of bearings used in aircraft construction.

7. Mention the purpose of Universal coupling and their applications.

8. Mention the purpose of (i) Piston (ii) Crank shaft.

Part - B (5 × 12 = 60)

Answer **all** Questions.

9. (a) Construct a Parabola by Rectangular method.

(*Or*)

(b) Construct an involute of a circle of 40 mm geometrically.

10. (a) Construct an ellipse by a rectangle method of major axis 120 mm and minor axis 60 mm.

(*Or*)

(b) Construct a cycloid of the generating circle of diameter 40 mm.

11. (a) The area of a field is 50,000 sq. Metres. The length and the breadth of field on the map is 10 cm and 8 cm respectively. Construct a diagonal scale which can read upto 500 metres. Mark the length of 235 metres on the scale. What is the R.F. of the scale.

(*Or*)

(b) Explain different symbols of welded joints.

12. (a) Construct an involute of a given circle of diameter 30 mm.

(*Or*)

(b) Explain the terminology of screw threads

13. (a) Draw a neat sketch of connecting rod and crankshaft.

(*Or*)

(b) Draw different conventional symbols of pipes and pipe joints.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

MECHANICS OF FLIGHT

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. What is the significance of stratospheres ?

2. What is Bernoulli's principle ?

3. Define Autorotation.

4. What is Laminar flow and its significance ?

5. What is difference between compressible flow and incompressible flow ?

6. Define Induced drag.

7. What is the purpose of lift augmentation devices ?

8. Define neutral stability.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Describe about the various layers of atmosphere.

(*Or*)

(b) What is international Standard Atmosphere and its purposes ?

10. (a) Write the classification of aircraft and its definitions.

(*Or*)

(b) Explain about the helicopter flight controls.

11. (a) Describe about the effect of airflow at various speeds.

(*Or*)

(b) What is aerofoil ? Write the types of aerofoil and its significance.

12. (a) Write short notes about parasite drag.

(*Or*)

(b) What is lift force ? Write the lift formula and its significance.

13. (a) Write the effect of stability on longitudinal axis.

(*Or*)

(b) Describe about phugoid motion.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

BASIC ELECTRONICS

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. What is crystal diode ? Explain its rectifying action ?

2. Sketch the V-I characteristics of a Triac.

3. What is a transistor ? Why is it so called ?

4. What is the difference between a JFET and a bipolar transistor ?

5. Draw the circuit of a practical single stage transistor amplifier.

6. Write the rules for binary addition and subtraction.

7. Defie (i) an AND, (ii) a NOT gate with suitable examples.

8. Briefly mention the characteristics of semiconducting memories.

Part - B (5 × 12 = 60)

Answer **all** the questions.

9. (a) With a neat sketch, explain the working of (i) Centre-tap full wave rectifier (ii) Full-Wave bridge rectifier.

(*Or*)

(b) What is a Zener diode and explain the followings with neat diagrams.

(i) On state and Off state of Zener diode.

(ii) Zener diode as a Voltage stabilizer.

10. (a) Write short notes on the following :

(i) UJT relaxation.

(ii) Triac as an a.c. switch.

(iii) Diac as a triggering device.

(*Or*)

(b) Explain the construction and working of a JFET.

11. (a) Explain the push-pull amplifier circuit with a neat diagram.

(*Or*)

(b) Derive an expression for the voltage gain of inverting and noninvertising amplifier by using IC 741.

12. (a) What is the difference between a half adder and a full adder ? Give the truth table of a full adder and show that a full adder can be constructed using two half adders and an OR gate.

(*Or*)

(b) What is a multiplexer ? How can a decoder circuit be used as a demultiplier ? Give the block diagram of a 4-16 line demultiplexer.

13. (a) Describe the Analog to Digital converter and Explain the successive approximation method of ADC.

(*Or*)

(b) Explain R-2R ladder method with suitable block diagrams.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRFRAME STRUCTURE

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Explain the various Structural Stresses acting on aircraft.

2. What are push-pull rods ?

3. What are Swivel glands ?

4. Define ballast and its types.

5. Explain fin verticality of aircraft during rigging.

6. Define zoning of aircraft.

7. Explain the axes of an aircraft.

8. Explain honey comb construction and its advantages.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Explain various location numbering systems used in aircraft.

(*Or*)

(b) Briefly describe the construction of aircraft wing.

10. (a) Explain Fly By Wire (FBW) System.

(*Or*)

(b) Write short notes on :

(i) Flaps.

(ii) Spoilers.

(iii) Turnbuckle.

11. (a) Briefly explain the various components of landing gear in detail

(*Or*)

(b) Explain the hydraulic retraction system of landing gear.

12. (a) Describe the procedure for calculation of Empty Weight Centre of Gravity (EWCG) for various aircraft.

(*Or*)

(b) Write short notes on :

(i) Moment.

(ii) Maximum Ramp Weight.

(iii) Empty Weight Centre of Gravity (EWCG)

(iv) Useful Load.

13. (a) Explain the symmetry check of the aircraft with neat sketch

(*Or*)

(b) Write short notes on :

(i) Engine Alignment check.

(ii) Incidence angle check.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRFRAME SYSTEMS

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Write the classification of hydraulic fluids used in aircraft system.

2. What is the significance of orifice check valve ?

3. What is the purpose of silica gel used in pneumatic system ?

4. What are the advantages of Pneumatic system over Hydraulic system ?

5. What are the uses of air-conditioning system ?

6. What is rain repellant system ?

7. What is the basic principle of fluid de-icing system ?

8. How will you design integral tank of aircraft fuel system ?

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Explain about the various types of valves used in aircraft hydraulic system.

(*Or*)

(b) Describe the operation of landing gear system with hydraulic power.

10. (a) What is the purpose of pressure regulator and its operating principles ?

(*Or*)

(b) Write short notes on :

(i) Storage bottle.

(ii) Unloading valve.

11. (a) Write short notes on :

(i) Thermal Expansion valve.

(ii) Basic law of vapour cycle cooling system.

(*Or*)

(b) Describe about the Air cycle Machine (ACM).

12. (a) How will you prevent the ice formation on the wind shield ?

(*Or*)

(b) Describe about the pneumatic de-icing system.

13. (a) Explain about the fuel system for small aircraft.

(*Or*)

(b) Write short notes on :

(i) Aircraft Fuels.

(ii) Jettisioning.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

PISTON ENGINE AND PROPELLER

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Name the classification of Piston engine as per cylinder arrangement explain any one type.

2. Define Power and Horse power.

3. What is the purpose of crank pin and why the crank pin is hollow ?

4. Write the components fitted on cylinder and what are the requirements of cylinder.

5. What is the difference between internal and external superchargers ?

6. Write a note on automatic mixture control of float type carburettor.

7. Why Magneto Ignition is superior to Battery Ignition ?

8. What do you mean by Propeller clearance and explain about various propeller clearances ?

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Define the following :

(i) Power

(ii) Horse power.

(iii) Indicated horse power

(iv) Brake Horse power.

(*Or*)

(b) Write the construction detail of Radial Engine.

10. (a) What are the types of crankshaft and explain their construction ?

(*Or*)

(b) Explain briefly about Piston Engine cooling system.

11. (a) Describe the operation of the following in float type carburettor.

(i) Float mechanism.

(ii) Fuel strainers.

(iii) Main metering system.

(*Or*)

(b) Explain in detail the construction and characters of Magneto.

12. (a) Define bearings and describe various types of bearings.

(*Or*)

(b) Describe the construction detail and function of oil tank.

13. (a) Write a note on the following :

(i) Ground adjustable propeller.

(ii) Controllable pitch propeller.

(iii) Two position propeller.

(iv) Constant speed propeller.

(*Or*)

(b) Explain the function of propeller governor mechanism.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

TURBINE ENGINE

(Upto 2007 Batch)

Time : 3 Hours | Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** Questions.

1. What are the qualities should process the turbine fuel ?

2. List out the different types of fuel spray nozzle.

3. What should be done of synthetic lubricant oil is spill during the servicing of an aircraft ?

4. Explain the function of magnetic chip detector in oil sewerage system.

5. List out the main components of gas turbine engine ignition system.

6. What are the precautions to be observed while removing igniters for servicing.

7. Gas turbine engines are classified into four groups. What are they ?

8. List out three type of combustion chambers commonly used in turbine engines.

Part - B (5 × 12 = 60)

Answer **all** Questions.

9. (a) With the help of a diagram explain the type of combustion chambers used in jet engine.

(*Or*)

(b) Explain the gas turbine engine fuel components.

10. (a) Write down the sequence of operation takes place during starting of jet engine.

(*Or*)

(b) Write down the Garrett Digital Fuel control of the JFE – 731 – 5 engine.

11. (a) Draw a neat diagram explain the operation of oil pump of Rolls-Royce Engine.

(*Or*)

(b) Write down the oil indicating system and oil warning system.

12. (a) What are the components comes in a gas turbine engine ignition system ?

(*Or*)

(b) Explain water methonal injection system in thrust augmentation device.

13. (a) Explain with the help of a diagram the operation of 'Free turbine'.

(*Or*)

(b) Briefly explain the Propeller Control Unit (PCU).

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT INSTRUMENTS

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. State two commonly used units of atmospheric pressure measurement.

2. Define three principal codes used for altimeter pressure settings.

3. Define the following :

   (i) Magnetic meridian.

   (ii) Magnetic variation.

   (iii) Isogonal lines.

4. Define Seebeck effect, Peltier effect and Thomson effect.

5. What is gyroscope ? Explain gimbal system of free a space gyroscope.

6. On what principle remote indicating pressure gauge function ? What advantages over direct reading gauges ?

7. Why is preferable for fuel quantity indicating system to measure the fuel weight rather than fuel volume ?

8. Define Mach. Explain the function of Mach indicator.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Explain the function of Airspeed indicator. What are errors in ASI ? How they are compensated ?

(*Or*)

(b) With aid of schematic diagram describe construction of Vertical speed indicator.

10. (a) Explain the function of Twin and Bank indicator. Explain its display when aircraft is turning.

(*Or*)

(b) Explain the operating principle of thermo-emf system. State how Engine parameters are measured by such system.

11. (a) Explain what is meant by pressure error of air data system. How its effects are minimised ?

(*Or*)

(b) Describe magnet system of typical aircraft compass. How the effect of dip is overcome ?

12. (a) Describe briefly the principle of operation of directional gyro. How earth rate error is controlled in directional gyro ?

(*Or*)

(b) Describe the construction and explain the operation of instrument used for measuring manifold pressure.

13. (a) What is the purpose of volumetric top-off system ? Explain briefly the operation of such system.

(*Or*)

(b) What is the fundamental principle of Radiation Pyrometer system ? Briefly describe the function.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT ELECTRICAL SYSTEM

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** Questions.

1. What is the purpose of using shielded cables in Aircraft ? Explain about co-axial cables.

2. Why soldered joints are not preferred in Aircraft ? What are the disadvantages of soldered joints over crimping ?

3. What are the active materials used in lead acid cells and Nickel cadmium cells ? Express the Nominal voltages of lead acid cells and nickel cadmium cells.

4. What is the importance of bonding in Aircraft ? How the bondings are done in Aircrafts ?

5. What do you mean by self excited generator Explain. What are the methods of self exitation in a generator ?

6. What are the methods of producing Electricity ? Explain about the methods of Photo electric effect, Thermal effect, Chemical effect, Electromagnetic effect.

7. What is the purpose of static discharges ? Generally where these static discharges are located in aircraft ?

8. Explain the purpose of fuse, circuit breaker, Switches, Clamps, Conduct, Terminal Block etc. in Aircraft noising systems.

Part - B (5 × 12 = 60)

Answer **all** Questions.

9. (a) Explain in detail about the constructional details of lead acid battery.

(12)

(*Or*)

(b) Explain in detail about the constructional details of a Nickel cadmium battery .

(12)

10. (a) Write short notes on the following : (3 × 4 = 12)

(i) Landing lights.

(ii) Navigational lights (Position lights)

(iii) Cabin lights.

(iv) Anticollision lights.

(*Or*)

(b) What is the purpose of using voltage regulators ? Explain with necessary diagram about any type of voltage regulators used in Aircraft.

(12)

11. (a) (i) What do you mean by Negative Earth return system, which is used in Aircraft Electrical system ? Explain.

(ii) What is the use of Equilising circuits which is used in conjunction with the generators ?

(iii) What are the precautions to be observed while servicing the Aircraft batteries ?

(4 × 3 = 12)

(*Or*)

(b) (i) What are Built in Test Equipments (BITE) ? Explain in detail. How it is used in Aircrafts ?

(8)

(ii) What do you mean by Intercom and Interphone systems in Aircrafts ?

(4)

12. (a) Explain in detail about the constructional details of a D.C. generator with necessary diagrams.

(12)

(*Or*)

(b) What do you mean by CSD unit ? Explain in detail about CSD unit ? How IDG unit differ from CSD ?

(12)

13. (a) (i) What are the identification methods used for verifying the state of charge of lead acid battery ?

(ii) What is the difference between series generator and shunt wound generator ?

(iii) What are the characteristics to be noted for selecting aircraft wises ?

(4 × 3 = 12)

(*Or*)

(b) (i) What do you mean by primary and secondary cell, give examples and differences between them ?

(ii) Explain about a Dry cell.

(iii) What do you mean by conductor, semi-conductor and insulators ? Explain with examples.

(4 × 3 = 12)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT RULES AND AIRWORTHINESS REGULATIONS—I

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Describe the procedure for issue of an amendment to any issue of car.

2. State definitions.

   (a) Aircraft

   (b) Aircraft components.

   (c) Flight crew members.

3. What do you understand by concession ? Who grants it ?

5. Which documents required to be submitted for registration of aircraft ?

6. Explain classification of airworthiness certificate as per car 21.

7. List any six items that should be included in quality control manual.

8. What is unusable fuel ? Describe procedure to determine it.

Part - B (5 × 12 = 60)

Answer **all** Questions.

9. (a) Describe Rule 61 of aircraft Rule 1937 in detail.

(*Or*)

(b) What is the procedure followed for investigation of an accident as per aircraft Rules 1937 ?

10. (a) State requirements for revalidation of type certificate. What is design scope ?

(*Or*)

(b) State the categories of aircraft for issue of certificate of airworthiness. State validity of C of A.

11. (a) Describe all the categories of organisations as listed in car series E with their scope of work.

(*Or*)

(b) What are the duties and responsibilities of chief instructor of an approved AME training institute ?

12. (a) What is nationality and registration marking ? Where it affixed on different types of aircraft ?

(*Or*)

(b) What is aircraft log books ? State different sections, requirements and preservation periods for all log books.

13. (a) State precautions during fuelling and conditions for servicing and maintenance of aicraft during fuelling. What is fuelling place ?

(*Or*)

(b) Give brief idea about storage of fuel in bulk.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT MAINTENANCE

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Name three special equipments with their purpose, used for aircraft servicing.

2. What is major maintenance ?

3. Define Corrosion and its type.

4. Enumerate the occasions for carrying out the structural alignment of an aircraft.

5. What you understand by control surface rigging ?

6. What is the difference between spring oleo struts and air oleo shock strut ?

7. Why it is necessary to bleed the brake system ?

8. What is visual inspection ? Explain.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Briefly explain four special equipments used for aircraft maintenance.

(*Or*)

(b) Explain the daily and preflight inspection.

10. (a) Describe leveling and symmetry check carried out on a light aircraft.

(*Or*)

(b) Describe the special checks to be carried out on landing gear after heavy landing.

11. (a) State the various inspections carried out on aircraft control cables.

(*Or*)

(b) Explain in detail the adjustment of control surfaces.

12. (a) Describe the inspections of brake system.

(*Or*)

(b) Explain the inspections done on aircraft shock absorbers.

13. (a) Explain the procedure of flaring a rigid pipe with hand tool.

(*Or*)

(b) Explain the classification of damage.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AERO ENGINE MAINTENANCE

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. What is the function of carburettor ?

2. Define the term "Screening of ignition system.

3. What is the importance of propeller balance ?

4. Define Fine pitch stop.

5. What are the uses of engine throttle control ?

6. Write the classification of lubrication system.

7. What is the significance of engine warm up ?

8. Define Engine pre-heating.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) What are the causes of spark lead fouling ? And how will you rectify it ?

(*Or*)

(b) Write short notes on

(i) Three main parts of ignition harness

(ii) Spark plug inspection.

10. (a) Describe the static an dynamic balancing of propeller.

(*Or*)

(b) Explain the overspeeding propeller checks.

11. (a) List out the procedure of engine shut down.

(*Or*)

(b) Explain the operation of principle of pitch change mechanism

12. (a) Describe the inspections for combustion section.

(*Or*)

(b) Write short notes on :

(i) Inspection for air intake

(ii) Inspection for turbine blades

13. (a) Explain the internal condition checkings of engine.

(*Or*)

(b) List out the procedure for post-run check up.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT COMMUNICATION AND NAVIGATION SYSTEM

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** Questions.

1. What are the fields found in Radio wave ? Which one carries maximum power ?

2. Explain the functions of antenna coupler.

3. What are different types of amplifiers used in the radio system ? Explain its purposes.

4. Describe the operations of the low-pass filter.

5. Explain Frequency Modulation.

6. What intermediate frequency is most commonly used in superheterodyne receiver ? How is it achieved ?

7. What are the standards developed for communication, Navigation, Identification and digital data transfer system ?

8. What is the purpose of HF communication system ? Indicate its operating frequency.

Part - B (5 × 12 = 60)

Answer **all** Questions.

9. (a) Explain the operation of VOR transmitter with the help of suitable diagram.

(*Or*)

(b) Describe radio magnetic indicator.

10. (a) Draw a diagram of Horizontal situation Indicator and explain.

(*Or*)

(b) Describe Doppler Navigation system.

11. (a) What are the three modes of ATC transponder ? Explain each modes of transponder.

(*Or*)

(b) What is PPI ? Explain the principle of operation.

12. (a) Write short notes of the following :

(i) Selcal decoder.

(ii) Bite

(*Or*)

(b) What is the function of Marker Beacon ? Explain in details.

13. (a) Draw a block diagram of analog radar system and explain.

(*Or*)

(b) What are the functions of Emergency Location Transmitter ? Explain in detail.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT RULES AND AIRWORTHINESS REGULATIONS—II

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. What are the equipment required for an aircraft which fly at high altitude ?

2. Write short notes on 'ELT'.

3. Tabulate the requirement of first aid kit and physician kit *vs*. number of passengers.

4. Write short notes on 'Approved course'.

5. What are the circumstances under which duplicate AME licence is issued with and without fees payable ?

6. What is the purpose of defect investigation ?

7. What do you understand by 'Engine change' ?

8. What is the difference between authorisation and approval ?

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) What are the requirement of instruments and equipments required for seaplane and aircraft flying over extended water ?

(*Or*)

(b) What is GPWS ? Explain in detail about operational requirements of GPWS.

10. (a) What is special flight permit and explain in detail purpose of special flight permit ?

(*Or*)

(b) Write down the procedure for renewal of AME licence.

11. (a) Write down the certification privilages of AME licence holder, in various categories of light aircraft.

(*Or*)

(b) Write down the classification of major defects and also write down the periodicity of sending defect report by various operations.

12. (a) Who prepare the weight schedule of an aircraft and what are the information it contains ?

(*Or*)

(b) Explain the procedure of obtaining Flight Engineer licence.

13. (a) What are the various circumstances underwhich an aircraft shall be flight tested ? Also write down the flight crew requirements for carrying out flight test on private aircraft ?

(*Or*)

(b) Define Exit seat and explain what are the functions of a passenger who occupy exit row seat if called upon ?

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

INDUSTRIAL MANAGEMENT

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** Questions.

1. What are the purposes of forecasting ?

2. What do you understand by management by objectives.

3. Differentiate authority from power.

4. What is organisational structure ?

5. What is Ergonomics ?

6. What are the uses of work study ?

7. What is motivation ?

8. What is manpower planning ?

Part - B (5 × 12 = 60)

Answer **all** Questions.

9. (a) Explain the steps involved in planning process.

(*Or*)

(b) Briefly explain the importance of MBO.

10. (a) Discuss the steps involved in Recruitment and selection process.

(*Or*)

(b) What are the principles of organisation ? Explain.

11. (a) What are the different methods of motivation ? Explain.

(*Or*)

(b) What are the advantages and disadvantages of different channels of management communication ?

12. (a) Explain the scope and objectives of production management.

(*Or*)

(b) Briefly explain the different techniques adopted to manage time.

13. (a) Discuss in detail the different types of inventory control

(*Or*)

(b) Elaborate on the procedure for carrying out a work study.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRPORT AND AIR TRAFFIC SERVICES

(Upto 2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Write the objective of IATA.

2. What is the significance of visibility ?

3. What are the preliminary information required for runway ?

4. What is known as wind rose and its significance ?

5. Define Parking apron.

6. What is fillets ?

7. Write the two basic requirements of pilot for visual aids.

8. Write the three components of Air Traffic control.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Explain the objectives of ICAO ?

(*Or*)

(b) Describe the effect of noise in airport.

10. (a) What are the factors governing the location of exit runway ?

(*Or*)

(b) Write short notes on :

(i) Basic runway length

(ii) Sight distance.

11. (a) Describe the factor affecting size of an apron ?

(*Or*)

(b) Write short notes on :

(i) Loading apron.

(ii) Separation clearance.

12. (a) What are the information required by the pilot system during landing operation ?

(*Or*)

(b) Write short notes on :

(i) Airport Markings.

(ii) Runway Numbering.

13. (a) Explain about the precision approach radar.

(*Or*)

(b) Describe the three parts of Air Traffic Control (ATC) network.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

GROUND HANDLING, SAFETY AND SUPPORT EQUIPMENT

(Upto—2007 Batch)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Describe Tie down Anchorage ?

2. How variety of Aircraft not aligning with Anchorage Points are Secured ?

3. Describe Precautions to be taken while towing Nose wheeled and tail wheeled Aircraft ?

4. Define Aerodrome, Airport, Runway and taxi track ?

5. Describe three elements which Cause fire ?

6. Describe fire extinguishing agent—"Dry chemicals" ?

7. How GPUs are Parked near the Aircraft ?

8. Describe Health Precautions to be observed while fueling of an Aircraft ?

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) Discuss general Precautions to be observed for Securing an aircraft in wind storm conditions ?

(*Or*)

(b) Discuss Securing of heavy and multi engined aircraft ?

10. (a) Discuss tow bars and tow vehicles ?

(*Or*)

(b) Discuss Standard Signals of a Marshaller to a fixed wing aircraft ?

11. (a) Discuss different types of fire ?

(*Or*)

(b) Discuss "Halogenated hydro carbons" in extinguishing fire ?

12. (a) Discuss precautions taken in ground running of reciprocating engine ?

(*Or*)

(b) Discuss unsatisfactory starts of Turboject engine.

13. (a) Discuss fire precautions taken while fueling of an aircraft.

(*Or*)

(b) Discuss over wing fueling of an aircraft ?

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

MATHEMATICS—II

(2008 onwards)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Evaluate $\int_1^2 \int_1^3 xy^2 \, dxdy$.

2. Evaluate $\int_0^1 \int_0^2 \int_1^2 x^2 yz dxdydz$.

3. Prove that $\nabla^2 \left(r^n\right) = n\left(n+1\right) r^{n-2}$.

4. Find the work done in moving a particle in the force field $\bar{F} = 3x^2\, i + (2xz - y)\, \bar{j} + z\bar{k}$ along a straight line from (0, 0, 0) to (2, 1, 3).

5. Find the bilinear transformation which maps the points $z = 1, i, -1$ on to the points $w = i, 0, -i$.

6. Prove that $\int_c \frac{dz}{z-a} = 2\pi i$.

7. Find $L\left(te^{-t} \sin 3t\right)$.

8. Find $L^{-1}\left(\frac{s+2}{s^2 - 4s + 13}\right)$.

Part - B (5 × 12 = 60)

Answer **all** the questions.

9. (a) Change, the order of integration in $I = \int_0^1 \int_{x^2}^{2-x} xy\, dxdy$ and hence evaluate the same.

(*Or*)

(b) Find, by triple integration, the Volume of the sphere $x^2 + y^2 + z^2 = a^2$.

10. (a) Verify green's theorem for $\int_C \left[\left(xy + y^2\right) dx + x^2 dy\right]$ where C is bounded by $y = x$ and $y = x^2$.

(*Or*)

(b) Verify Stoke's theorem for $\overline{F} = \left(x^2 + y^2\right) i - 2xy\, \overline{j}$ taken around the rectangle bounded by the lines $x = \pm a, y = 0, y = b$.

11. (a) Prove that the function $f(z)$ defined by

$$f(z)=\frac{x^2(1+i)-y^3(1-i)}{x^2+y^2}(z\neq 0),\ f(0)=0$$ is

continuous and C – R equations are satisfied at the origin, yet $f'(0)$ does not exist.

(*Or*)

(b) Find the analytic function, whose real part is $(\sin 2x)/(\cos h\,2y-\cos 2x)$

12. (a) Find the Taylor's expansion of $f(z)=\frac{2z^3+1}{z^2+z}$ about the point $z=i$.

(*Or*)

(b) Determine the poles of the function $f(z)=\frac{z^2}{(z-1)^2(z+2)}$ and the residue at each pole.

13. (a) Use the Laplace transform, solve

$$\frac{d^2x}{dt^2} - 2\frac{dx}{dt} + x = e^t \text{ with } x = 2, \frac{dx}{dt} = -1 \text{ at } t = 0.$$

(*Or*)

(b) Solve the equation $y'' + 4y' + 3y = e^{-t}$, $y(0) = y'(0) = 1$ by Laplace transformation.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

FLUID MECHANICS

(2008 onwards)

Time : 3 Hours | Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. State Newton's law of Viscosity and given examples of its application.

2. What do you mean by Hydrostatic law ?

3. Define the terms 'buoyancy' and 'centre of buoyancy'.

4. What are the methods of describing fluid flow ?

5. Explain uniform flow with source and sink.

6. State Bernoulli's theorem. List out its engineering applications.

7. Define Laminar boundary layer.

8. Explain the concepts of laminar flow and turbulent flow.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) (i) The right limb of a simple U-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of sp.gr.0.9 is flowing. The centre of the pipe is 12 cm. below the level of mercury in the right limb. Find the pressure

of liquid in the pipe if the difference of mercury level in the two limbs is 20 cm.

(ii) Briefly explain the working of U-tube monometer.

(Or)

(b) Define Pressure. Obtain an expression for the pressure intensity at a point in a fluid.

10. (a) With neat sketches, explain the conditions of equilibrium for the floating and sub-merged bodies.

(Or)

(b) The time period of rolling of a ship of weight 29430 kN in sea water is 10 seconds. The centre of buoyancy of the ship is 1.5 m below the centre of gravity. Find the radius of gyration of the ship if the moment of inertia of the ship at the water line about fore and aft. axis is 1000 m^4. Take specific weight of sea water as 10100 N/m^3.

11. (a) Sketch the flow pattern of an ideal flow past a cylinder with circulation.

(Or)

(b) Explain the source and sink for an ideal flow of liquid. Evaluate the potential function for the doublet.

12. (a) Explain the principle of venturimeter with a neat sketch. Derive an expression for the rate of flow of liquid through it.

(Or)

(b) (i) What is a pitot-tube ? How will you determine the velocity at any point with the help of pitot tube ?

(ii) Define an orifice-meter. Prove that the discharge through an orifice - meter is given by the relation $Q = C_d\ a_0\ a_1 / \sqrt{\left(a_1^2 - a_0^2\right)} \times \sqrt{2gh}$.

13. (a) Discuss the pressure drag and friction drag. Explain drag coefficient. Discuss friction drag in turbulent boundary layer.

(Or)

(b) (i) Explain Magnus effect.

(ii) A jet plane which weighs 29430 N and has a wing area of $20m^2$ flies at a velocity of 250 km/hr. When the engine delivers 7357.5 kW, 65% of the power is used to overcome the drag resistance of the wing. Calculate the co-efficient of lift and co-efficient of drag for the wing. Take density of air equal to 1.21 kg/m^3.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

THERMODYNAMICS

(2008 onwards)

Time : 3 Hours | Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Explain the different modes of heat transfer.

2. State and explain zeroth law of thermodynamics.

3. State Boyle's law. Mention its uses.

4. Explain C_p and C_v and state why $C_p > C_v$.

5. Give the properties of mixtures of gases.

6. Write a note on calorific values of fuels.

7. Briefly explain the working of a air compressor.

8. Explain the Thermal efficiency of gas turbines.

Part - B (5 × 12 = 60)

Answer **all** the questions.

9. (a) (i) Explain thermodynamic equilibrium.

(ii) State and explain Law of Conservation of momentum.

(*Or*)

(b) (i) State and explain second law of Thermodynamics.

(ii) Write a note on steady flow processes.

10. (a) Deduce the gas equation. Mention its applications.

(Or)

(b) With suitable diagram explain the working of Otto cycle. Give its merits and demerits.

11. (a) (i) State and explain Avagadro's law.

(ii) Explain the properties of mixture of gases.

(*Or*)

(b) (i) State and explain Dalton's law of partial pressure.

(ii) Write a note on Internal energy and Enthalpy of gas mixtures.

12. (a) With neat diagram explain the working of a multistage compression.

(*Or*)

(b) Give the principle and working of rotary compressors.

13. (a) Explain the working of closed cycle gas turbines. Mention its merits and demerits.

(*Or*)

(b) Describe the principle and working of Rocket propulsion.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

BASIC ELECTRICITY AND ELECTRONICS

(2008 onwards)

Time : 3 Hours | Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Differentiate Nodal voltage analysis and mesh analysis.

2. Distinguish core type and shell type transformers.

3. What is the value of the electrical resistance equivalent to the mechanical load on an induction motor ?

4. What are cathode rays ? List their important properties.

5. State and explain superposition theorem.

6. State and explain Krichhoff's laws.

7. A coil of resistance 100 Ω is placed in a magnetic field of 1 m Wb. The coil has 100 turns and a galvanometer of 400 Ω resistance is connected in series with it. Find the average e.m.f. and the current if the coil is placed in 1/10th second from the given field to a field of 0.2 m Wb.

8. Explain rectification efficiency.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) (i) A coil takes 2.5 A when connected across 200 V, 50 c/s mains. The power consumed by the coil is found to be 400 W. Find the inductance and power factor of the coil.

(6)

(ii) An R.M.S. 200 V applied to an A.C. circuit produces and R.M.S. current of 1.15 A and the power consumed is 211.6 watts. Calculate the impedance and angle if lag.

(6)

(*Or*)

(b) State and explain Thevenin's theorem and explain how it can be applied to complicated circuits.

10. (a) Explain clearly the procedure for performing the short circuit test on a transformer. Show that the primary input in the short circuit test represent the total copper loss in the transformer.

(*Or*)

(b) Explain the construction and working of a DC generator with a neat sketch.

11. (a) Describe the principle of single phase induction motor and give the relation between a torque and power factor.

(*Or*)

(b) (i) Explain the Faraday's law of electromagnetic induction.

(ii) Two transformers are required for a scott connection operating from a 440 V, 3-phase supply for supplying two single-phase furnaces at 200 V on the two phase side. If the total output is 150KVA, calculate the secondary to primary turn ratio and the winding currents of each transformer.

12. (a) State and explain any two types of transistor and discuss the characteristics of each of them.

(*Or*)

(b) Discuss with neat sketch the working of a feedback amplifier.

13. (a) Explain with a neat sketch the working of Full wave rectifier.

Explain its characteristics.

(*Or*)

(b) Write notes on :

(i) SMPS.

(ii) Bridge rectifier.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

PISTON ENGINE AND PROPELLER

(2008 onwards)

Time : 3 Hours Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. List the advantages of In line type piston Engine ?

2. Write the various functions of crank case ?

3. Define engine cycle in case of IC Piston Engine.

4. Write the material of exhaust system components and mention its advantages.

5. What are the precautions to be observed during servicing of A/C fuel systems.

6. What is Battery Ignition system ?

7. What are the factors determining the amount of friction and explain ?

8. Define Blade station.

Part - B (5 × 12 = 60)

Answer **all** questions.

9. (a) How piston engines are classified ? Explain in detail.

(*Or*)

(b) What are the factors affecting piston Engine performance ? Explain about.

(a) Compression ratio.

(b) Density of air.

(c) Manifold Air pressure.

(d) Exhaust back pressure.

10. (a) Name four major section of crank case and explain in detail.

(*Or*)

(b) Explain the constructions function of the following :

(a) Air filter.

(b) Alternate air valve.

(c) Air heater muff.

(d) Air scoop and Ducting.

11. (a) Enumerate the requirement of A/C fuel system.

(*Or*)

(b) Describe the Operation Dry sump lubrication system.

12. (a) Explain the General Inspection and servicing of Magneto.

(*Or*)

(b) Draw a schematic diagram of Induction vibrator and explain.

13. (a) Explain in detail the Anti-icing and De Icing systems adopted in Propeller with neat sketch.

(*Or*)

(b) Write in detail about classification and Types of propeller.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

GAS TURBINE ENGINE

(2008 onwards)

Time : 3 Hours | Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Why aircraft turbine engines are called as "Power Plants" ?

2. Explain about Supersonic inlet of a gas turbine engine.

3. List out the requirement of fuel for a gas turbine engine.

4. What is the purpose of magnetic chip detector in the oil lubrication system ?

5. What is Air Impingment starter ?

6. Define "Free Turbine".

7. Explain the two methods of thrust production.

8. What is Cascade effect ?

Part - B (5 ×12= 60)

Answer **all** questions.

9. (a) Define "Thrust". Explain the various factors affecting thrust in detail.

(*Or*)

(b) Explain the Operation of gas turbine engine is detail.

10. (a) Explain the Operation of Axial flow Compressor.

(*Or*)

(b) Explain the different types of Combustion Chambers used in a gas turbine engine in detail.

11. (a) Explain Full Authority Digital Electronic Control (FADEC) system.

(*Or*)

(b) Write short notes on :

(i) Simplex Nozzle.

(ii) Duplex Nozzle.

12. (a) Explain the Operation of Air Turbine starter.

(*Or*)

(b) Explain the dry sump lubrication system in detail.

13. (a) Explain the forces acting on a Propeller.

(*Or*)

(b) Explain thrust reversal mechanism of a gas turbine engine.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Aeronautical Science

AIRCRAFT ELECTRICAL SYSTEM

(2008 onwards)

Time : 3 Hours | Maximum : 75 Marks

Part - A (5 × 3 = 15)

Answer any **five** questions.

1. Define voltage, current and resistance.

2. List the factors affecting capacitance of a conductor.

3. Write a short note on vibrator type voltage regulator.

4. Describe the operations of an equalizing circuit ?

5. What is the purpose of landing gear safety switches ?

6. What is split bus circuit system ?

7. What is ammeter troubleshooting ?

8. What is CRO ?

Part - B (5 ×12 = 60)

Answer all questions.

9. (a) Explain :

(i) Conductors.

(ii) Insulators.

(ii) Semi conductors.

(*Or*)

(b) Explain in detail about types of circuits with neat diagram.

10. (a) Explain the difference between primary cell and secondary cell.

(*Or*)

(b) (i) Explain the construction of lead-acid battery and its chemical actions.

(ii) What are the precautions are to be observed while servicing lead acid batteries.

11. (a) Explain the construction and purpose of a generator with a neat diagram.

(*Or*)

(b) Describe the basic operation of a split bus power distribution system.

12. (a) Describe the difference between a landing light and a taxi light.

(*Or*)

(b) Explain the procedure for soldering wires to connectors.

13. (a) Write in detail about CRO and its functions.

(*Or*)

(b) Explain—Multimeter trouble shooting.

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