Syllabus for the subject

of

WORKSHOP CALCULATION & SCIENCE

(For 3rd & 4th semester)

Under

CRAFTSMEN TRAINING SCHEME (CTS)

(For Mechanic Mining Machinery)

Re-Designed

in

2015

By

Government of India

Ministry of Skill Development & Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

Block - EN - 81 SECTOR - V, SALT LAKE CITY, KOLKATA - 700 091

SYLLABUS FOR WORKSHOP SCIENCE AND CALCULATION
For the trade of Mechanic Mining Machinery
SEMESTER-III

Sl. No	Workshop Calculation	Hrs.	Sl. No	Workshop Science	Hrs.
1	- Area of cut-out regular surfaces: circle and segment and sector of circle.	21	1	- Forces definition. - Definition and example of compressive, tensile, shear forces, axial and tangential forces. Simple problem on lifting tackles like, Jib, crane, etc.	21
2	- Area of irregular surfaces by Simpson's Rule. - Application related to shop problems (viz. area of gasket, sheet of developed surface, etc.)		2	- Temperature measuring instruments. Specific heats of solids & liquids, Latent heat, quantity of heat with practical examples.	
3	- Volume of cut-out solids: hollow cylinders, frustum of cone, block section. - Volume of simple solid blocks.		3	- Thermal Conductivity, Heat loss and heat gain, with simple examples.	
4	- Finding the value of unknown sides and angles of a triangle by trigonometrical method.		4	- Average Velocity, Constant Acceleration. - Related problems.	
5	- Finding height and distance by trigonometry.		5	- Practical examples on Newton's laws of motion	
6	- Application of trigonometry in shop problems. (viz. taper angle calculation), Areas of polygons using trigonometric formulae, Sine rule and Cos rule for finding out unknown sides and angles of triangles		6	- Circular Motion: Relation between circular motion and Linear motion, Centrifugal force, Centripetal force	
7	Calculation of Power and Efficiency of Hydraulic and Pneumatic system		7	- Friction- co-efficient of friction. Advantages and disadvantages. Simple problem related to friction in horizontal plane.	
			8	Heat treatment – Principle, different processes.	
	Revision & Test				

SYLLABUS FOR WORKSHOP SCIENCE AND CALCULATION
For the trade of Mechanic Mining Machinery
SEMESTER-IV

Sl. No	Workshop Calculation	Hrs.	Sl. No	Workshop Science	Hrs.
1	**Algebra** : Solving Quadratic Equation	21	1	- Centre of gravity, simple experimental determination, stable, unstable & neutral equilibrium, simple examples	21
2	Co-ordinate Geometry: - Problems on distance between two points, collinear, equidistance from third point, isosceles triangle, distance of diagonals of quadrilateral.		2	- Magnetic substances- natural and artificial magnets. - Method of magnetization. Use of magnets.	
3	- Read images, graphs, diagrams – bar chart, pie chart. - Graphs: abscissa and ordinates, graphs of straight line, related to two sets of varying quantities.		3	- Simple electric circuits, simple calculations. - Illustration on Ohm's law. - Concept of earthing.	
4	Transmission of power by belt, pulleys & gear drive. - Illustration of Transmission of power by belt pulley and gear drive. Advantages & disadvantages of belt & gear drive.		4	- Stress, strain, Hooks law, ultimate strength, factor of safety, simple problems on stress & strain. - Basic study of stress-strain curve.	
5	Calculation of Electrical power, Energy and Power Factor		5	- Effects of forces on materials for Bending, Twisting and Shearing problems Concept of pressure – units of pressure, conversions, atmospheric pressure, absolute pressure, gauge pressure – gauges used for measuring pressure Introduction to pneumatics & hydraulics systems and their elements like valves, cocks and pressure gauges.	
	Revision & Test				