

**Answers on the Written Examination Limited Departmental
Competitive Examination held on 29 Aug 2009 Paper I**

Answer of descriptive question is for guidance and may vary from candidate to candidate based on his experience which should fundamentally be correct. Question No. 2 and 4 are objective with multiple choices.

PART 1

1	Solve any two	
1.1	Put $a=17.5$ and $b=29.3$ and solve. Answer 2 irrespective of value of a and b	
1.2	$60 \times 72 \times 5 / 18 = \text{Length of train} + 500\text{m}$ Answer = 700m	
1.3	$1/10 - 1/12 = 1/60$ i.e. 60 minutes	
2.1	H1N1 is A virus	
2.2	Smt. Pratibha Patil is the first Woman President of India	
2.3	First Railway train in India ran between Bori-Bunder to Thane	
2.4	Head Quarter of West Central Railway is located at Jabalpur	
2.5	Slumdog Millionaire gets the Best Picture award in 81 st Academy Oscar award	
2.6	Abhinav Bindra wins India's first ever individual Olympic gold	
2.7	Length of Gandhi Setu is around 5.6 Km	
2.8	Total earning of Dhanbad Division is the highest in East central Railway	
2.9	Sun Temple is located in Orissa State of India	
2.10	Next Commonwealth game in the year 2010 will be held in New Delhi city	
3	Answer any Four	12
3.1	Violet, Indigo, Blue, Green, orange, Yellow, Red	
3.2	Atmospheric pressure at mountain reduces as compared to plains, thus boiling temperature also reduces in the same proportion.	
3.3	Brass is an alloy of Copper and Zinc	
3.4	Due to acceleration of lift, you feel loss of weight equal to mass multiplied by the acceleration of lift	
3.5	Specific gravity of iron is more than that of wood or buoyancy of water in the case of wood is more as compared to iron.	
3.6	After switching on, the temperature of filament increases thus increasing the resistance and reducing the current	
OR	Rajbhasha (Answer any three) राजभाषा(किन्ही तीन का उत्तर लिखें)	
3.1	राजभाषा विभाग से प्राप्त पुस्तिका संलग्न है	
3.2		
3.3		
3.4		

PART II

Attempt any 6 Questions.

1	Attempt any 4 Numericals	
1.1	$P = F \times V$, $3 \times 10^7 \times 40 = 1.2 \times 10^3$ Killowatt	
1.2	It is a wheatsone bridge circuit. $4 \times 1.5 = R \times 1$; $R = 6\Omega$. Total circuit resistance = $2 + 2 = 4\Omega$ and circuit current $10/4 = 2.5$ A. Current through R is 0.5A.	
1.3	$N = 120f/P$; $120 \times 50/4 = 1500$ rpm, $N_s = N_s(1-s) = 1500(-.04) = 1440$ rpm.	
1.4	Rated output at full load: 10kW. Rated input at full load = $1.732 \times 0.415 \times 18.2 \times 0.9 = 11.8$ kW; Measured input power = $1.732 \times 0.415 \times 12 \times 0.7 = 6.0$ kW, Motor loading% = $6 \times 100 / 11.8 = 51.2\%$.	

	In case any one calculate with input power of 10kW, 4 marks may be given.	
1.5	$0.8 \times 10 \times 10 = 3.7 \text{ kWh}$	
1.6	$S = ut - \frac{1}{2}gt^2$; $40 \times 2 - \frac{1}{2} \times 10 \times 4 = 60 \text{ m}$	
2	Attempt any two	
2.1	Energy conservation is measures to use minimum energy for defined output. Minimum energy by use of energy efficient appliance and output is defined for the user and than use of timer, sensor etc. to switch on/off the appliance. Five measures may vary from candidate to candidate and may be examined as per directives issued from time to time.	
2.2	+ve and -ve wire runs separately and meets only at light and fan point. Nothing will happen if one wire is shorted. This is detected during negative bonding test. If for reason both the wires are shorted, MCB or HRC fuse will blow. Five measures may vary from candidate to candidate and may be examined as per directives issued from time to time.	
2.3	Electrical safety is the measures and norms followed to prevent passage of electrical current through human or live beings. This is prevented by use of proper insulating material, earthing, protection circuit, leakage detectors etc. Five measures may vary from candidate to candidate and may be examined as per directives issued from time to time.	
3	Answer any two	
3.1	Rolling stock move on the track, various fixed structures are build alongside the track and the minimum clearances are required to be kept while building structures alongside or over the track. Since OHE is installed over the track, the design must take into consideration the minimum clearances prescribed for such structures. When a consignment whose length, width and height are such that any one or more of the dimensions infringe with the standard moving dimensions at any point during the run from starting location to the destination, then the consignment is called an over dimensional consignment. ODC are classified in three classes Class A: Loads having a gross clearances of 230mm and above from fixed structure Class B: more than 150mm but less than 230mm Class C: more than 80mm but less than 150mm (It may be difficult to remember the values therefore nearby values may be accepted)	
3.2	1 Power line crossings upto and including 11kV required to be cabled and crossed underground 2. Power line crossing upto and including 33kV is recommended to be crossed through underground cables 3. For overhead crossings of power lines, the minimum height above rail level to the lowest conductor including the guard wire shall be as given below: Upto 132kV 14.6m 132 to 220kV 15.4m 220 to 400kV 17.9m	

	<p>LED – Light Emitting Diode CLW – Chittranjan Locomotive works IGBT: Insulated Gate Biopolar Transistor XLPE:: Cross Linked Polyethene Cables</p>	
7.2	<p>Answer any five short questions:</p> <ol style="list-style-type: none"> a) So that the appliance is first connected to earth and thick so that it can carry high current b) Coach gets charged due to electro static induction from OH current and person touching may get a shock. Also during OH failure, tripping may not take place. c) Voltage at Secondary end may go very high d) Speed will be very high e) RMS value of sinusoidal wave ac current is $I/\sqrt{2}$ f) GTO is called Gate turn-off thyristor which requires comparatively less current to turn it off. The main applications are in variable speed motor drives, high power inverters and traction. g) Wheel slipping and skidding is caused due loss of adhesion. Slipping takes place when tractive effort is more than adhesive weight and skidding when braking effort is more than adhesive weight 	