

CADANGAN KERJA-KERJA PERKHIDMATAN PENYELENGGARAAN INFRASTRUKTUR SISTEM BEKALAN ELEKTRIK SELAMA SATU (1) TAHUN DI UITM KAMPUS KUALA PILAH, NEGERI SEMBILAN DARUL KHUSUS.

JADUAL OPERASI

**SCHEDULE OPERATION, TESTING AND MAINTENANCE
FOR SUB-STATION BUILDINGS**

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a 18 Month	Satisfactory/ Not satisfactory	Remark
	<u>Check and inspect :-</u>						
1.	Compound maintenance inclusive of area one metre all round from drain & drain cleaning.	X					
2.	Lubricate door hinges & padlocks.	X					
3.	Cleaning and vacuumed the floor, wall, vermin mesh & rectify light fitting defect and replace if necessary.	X					
4.	Clean cable trench.	X					
5.	First aid poster, drawings, substation tool inspected and reported.	X					
6.	All external surface of switchboard, panels, feeder pillars and RMUs to be vacuumed	X					
7.	Thermal demand indicator read and reset	X					
8.	Earth loop impedance measured (not more than 3 ohms)				X		
9.	Sub-station earthing resistance system inspected and rectified	X					
10.	Earthing strip and lighting protection system inspected and rectified	X					
11.	Check and report building condition Pest Control (inclusive of white ants, rat, etc)	X					

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JADUAL OPERASI

SCHEDULE OPERATION, SERVICING & MAINTENANCE FOR 11KV OIL CIRCUIT BREAKER

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a 18 Month	Satisfactory/ Not satisfactory	Remark
	<u>MAINTENANCE FOR 11KV OIL CIRCUIT BREAKER</u>						
1.	Check and inspect OCB, measure insulation at 5KV and report				X		
2.	Recondition contract, adjust stroke, wipe, overshoot stop and latch, and operating mechanism, record closing and opening times of each pole to verify correct adjustment.				X		
3.	Check condition of Tension rod & tabulator pod and flush breaker components and tank with clean oil.				X		
4.	Lubricate auxiliary contacts with copper grease and test conductivity of Contracts, record result.				X		
5.	Check and adjust trip operation, interlock, integral earthing and report.				X		
6.	Test insulating oil for dielectric, strength until it passes test of 30 KV at 4mm gap for one minute or equivalent approved standard. To top up oil, at no extra cost to UiTM, if necessary.				X		
7.	If the oil fails the test in 6 above, then the oil will be changed to new oil and the Contractor will be paid according to the rate as specified in.				X		
8.	General cleaning and vacuuming.	X					

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JADUAL OPERASI

SCHEDULE OPERATION, SERVICING & MAINTENANCE FOR HIGH TENSION SWITCHBOARD (11KV)

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a 18 Month	Satisfactory/ Not satisfactory	Remark
	<u>HIGH TENSION SWITCHBOARD (11KV)</u>						
1.	Test insulation at 5KV and record in mega ohms.				X		
2.	Check all connections, conductors, busbars, switch contacts, fuse contacts, etc tighten & rectify if necessary.				X		
3	Check all cable boxes.	X					
4	General cleaning and vacuuming.	X					

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JADUAL OPERASI

SCHEDULE OPERATION, SERVICING & MAINTENANCE FOR POWER TRANSFORMER

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a 18 Month	Satisfactory/ Not satisfactory	Remark
	<u>Check and inspect :-</u>						
1.	General cleaning – External surface to be cleaned and to touch up with paint if necessary, oil leakage to be arrested, if necessary.	X					
2.	Oil level, max/temperature, silica gel condition to be recorded, If necessary top up oil, replace silica and determine cause of high temperature.	X					
3	Check all connections and cable boxes and report.	X					
4	Test insulating oil for dielectric strength until it passed test of 300KV at 4mm gap for one minute or equivalent approved standard. To top up oil, at no extra cost to UiTM, if necessary.				X		
5.	If the oil fails the test in 4 above, then the oil will be changed to new oil and the contractor will be paid as the rate as specified.				X		

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JADUAL OPERASI

**SCHEDULE OPERATION, SERVICING & MAINTENANCE FOR
LOW VOLTAGE MAIN SWITCHBOARD**

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a 18 Month	Satisfactory/ Not satisfactory	Remark
	<u>Check and inspect MSB :-</u>						
1.	Test insulation at 500V and record in megaohms				X		
2.	Check all connections, conductors, busbars, switch contacts, fuse contacts, etc. tighten & rectify if necessary.				X		
3.	Check all cable boxes and report.	X					
4.	General cleaning and vacuuming of Mains Switchboard	X					
5.	Test and measure earth loop impedance in ohms at each board.				X		
6.	Grease all the moving parts or gears in ACB/changeover Contractor / Switch fuses.				X		
7.	Services and maintain A.C.Bs switching mechanism to ensure operation is in order.				X		
8.	General cleaning and cleaning of capacitor bank panel inspect for any sign of over heating / flash over. Test capacitor and functional test ON PF Regulation Replace, if necessary.	X					

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JADUAL OPERASI

SCHEDULE OPERATION, TESTING, SERVICING & MAINTENANCE FOR PROTECTION RELAY

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a 18 Month	Satisfactory/ Not satisfactory	Remark
1.	Inspect all protection relays and report on flag indications, cause for the indication and action taken (HV and LV relay)	X					
2.	Check trip supply to relay and measure secondary current/voltage to relay corresponding with ammeter/voltage reading. Record results (HV & LV relays)	X					
3	Service H.V & L.V relays and test and record relay operation, characteristics in formats to be submitted for approval prior to tests. Adjustment are to be able to maintain operating values corresponding to settings to within limits specified by B.S.S (H.V relay include both E/F & C/C relay)				X		
4	Test integrity of all HV & LV protection secondary circuits, measure relay currents at normal primary load currents. Record result (HV relays include E/F & C/C relays)				X		
5.	Test stability of earth fault protection and any other current balanced protection scheme and record results and action taken.				X		
6.	Service, adjust and test overload protection devices e.g oil dashpots, thermal overload relays, time lag fuse, and records results and test integrity of secondary circuit as per (4) above. (HV & LV relays)				X		
7.	Except where not permissible test insulation of secondary circuit of protection and record results.				X		
8.	Carry out functional test of all HV & LV and record all corresponding result. (HV relays include E/F & O/C relays)				X		

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JADUAL OPERASI

SCHEDULE OPERATION, TESTING, SERVICING & MAINTENANCE FOR BATTERY CHARGER AND BATTERY BANK

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a year	Satisfactory/ Not satisfactory	Remark
1.	Inspect, clean, lubricate poles with Vaseline of battery cells, top-up with distilled water and record battery voltage at full load, as well as trickle and boost charging currents.	X					
2.	Test and measure cell resistance of each battery cell record and report.	X					
3.	Clean and vacuum exterior and interior of battery charger and check all terminal connections.	X					
4.	Check all fuses and where provided overload device, voltage surge suppression devices, record on action taken.	X					
5.	Carry out functional test and check tripping indication alarm operations.	X					
6.	Test, adjust and record threshold voltage levels for automatic trickle and boost charging to maintain correct operating voltage.	X					

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JADUAL OPERASI

**SCHEDULE OPERATION, TESTING, SERVICING & MAINTENANCE FOR
EMERGENCY GENERATOR SUPPLY SYSTEM**

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a year	Satisfactory/ Not satisfactory	Remark
1.	Check and inspect bedplate, engine block, piping, radiator, crankcase for damage, leaks, dirt, clean and rectify and record.	X					
2.	Note manual start up to steady thermal conditions. Note sequence and record temperature, pressure, speed indications, adjust rectify and report.	X					
3.	Service fuel system, ignition system, cooling water system, lubrication oil system, air cooling system.			X			
4.	Check fuel battery water, radiator water and engine oil level.	X					
5.	Service, check and adjust engine governor to maintain frequency limits during operation.			X			
6.	Check and maintain all control panel instrumentation to maintain effective information of generator conditions.			X			
7.	Service, check and adjust AVR to maintain voltage limits during operation.			X			
8.	General cleaning and vacuuming.	X					
9.	Normal service, replace engine oil, oil filter and air filter.			X			

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JADUAL OPERASI

**SCHEDULE OPERATION, TESTING, SERVICING & MAINTENANCE FOR
FIRE FIGHTING SYSTEM**

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a year	Satisfactory/ Not satisfactory	Remark
	<u>FIRE FIGHTING SYSTEM</u>						
1.	Check for any defect in the fire indicator board including battery, charger control, AC/DC supply.	X					
2.	Check for any defect in the manual breakglass, call points, alarm bells, heat and smoker detector.	X					
3.	Portable Fire Extinguishers – Check and service all part fire extinguishers so that they are in serviceable condition renewal of service label after servicing for Bomba Inspection.						
4.	Functional test on Fire Alarm System						
5.	Clean and vacuum interior of fire alarm / CO2 panel	X					
6.	Service, troubleshoot and test the fire alarm system						
7.	Check and service Window Curtain, solenoid and mounting inclusive of control.						
8.	Check and test for alarm bells, heat and smoke detector.						

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JADUAL OPERASI

**SCHEDULE OPERATION, TESTING, SERVICING & MAINTENANCE FOR
11KV VACUUM CIRCUIT BREAKER**

Item	Description of operation, testing, Servicing and maintenance	Frequency of Visit				Result	
		(i) Monthly	(ii) Four times a year	(iii) Twice a Year	(iv) Once a 18 Month	Satisfactory/ Not satisfactory	Remark
	<u>MAINTENANCE FOR 11KV VACUUM CIRCUIT BREAKER</u>						
1.	Inspection of Busbars compartment, busbar and feeder sports.				X		
2.	Check VCB and measure insulation at 5KV and report				X		
3.	Recondition contacts, adjust stroke, wipe, overshoot stop and latch, and operating mechanism, record closing and opening times of each pole to verify adjustments.				X		
4.	Lubricate auxiliary contacts and test conductivity				X		
5.	General cleaning, vacuuming and load reading – Internal and External	X					
6.	Check and adjust trip operation, interlock, integral, earthing and report	X					
7.	Functional and test on VCB				X		