

Syllabus for Energy Assistants (JLM Grade-II)

1. Fundamentals of Electrical Engineering

Electric current-conductors- Semiconductors-Insulators, Electric potential-resistance- laws of resistance, Effects of temperature on resistance, Ohms law, Resistances in series, parallel and Series-parallel, Kirchhoff's laws.

2. Electro Magnetism

Introduction to magnets, Magnetic pole, magnetic axis, pole strength, Properties of magnets, Classification of magnets, Fleming left hand rule, Field pattern of long straight conductor, solenoid.

3. Electro Magnetic Induction

Concept of electro-magnetic induction Lenz's law -Fleming's right-hand rule, Faraday laws of electromagnetic induction-types of emf's-dynamically and statically induced emf, Self and mutual induction.

4. Cells and Batteries

Chemical effects of electric current-faraday laws of electrolysis, Cells and their components- Definition of battery-Primary cells -defects and remedies, dry cell-Secondary cell-comparison between primary cells and secondary cells, Lead acid cell-principle and working of lead acid cell detailed study-Wh & Ah efficiencies of cell, charging methods of secondary cells, Maintenance of Lead acid cell and testing of lead acid battery.

5. Electrostatics

Definition of Electric charge& its Units, Capacitance- Definition and formula, Types of Capacitors, Capacitors in series and parallel.

6. Electrical Wiring accessories, wiring tools and wire joint

Types of switches with modern approach, Other accessories like lamp holders, ceiling roses, sockets, fuses etc. (detailed study), Fuses and fuse materials, MCB & CBs, wiring tools, Wire joints, Soldering, taping and termination of wires/Cables and cable joints.

7. Wiring Systems & wiring circuits

Types of house wiring-Cleat wiring, CTS/TRS wiring, Conduit wiring, Casing capping wiring-detailed study, Comparison between different wiring methods, Stair case wiring, series and parallel circuits, Master switch circuits, Corridor wiring circuits, Fluorescent tube light circuit, flashers, moving lights.

8. Earthing

Necessity of earthing- definitions of fundamental terms in earthing like earth, earth lead, earth electrode, earth wire etc, Types of earthing-detailed study of pipe earthing and plate earthing, Specifications of materials used for earthing, Measurement of Earth resistance, IE rules for earthing.

9. IE rules for Electrical wiring

Precautions to be observed while installing different electric appliances in houses, I E Rules regarding house wiring, Causes of Fire accidents due to Electricity failures.

10. Indicating Instruments

Classification of Indicating type measuring instruments, Effects of currents used in indicating instruments, torques/forces in electrical instruments, Basic requirements of indicating instruments, Moving Iron Instruments, MC instruments – difference between MI and MC insts., Extension of MI & MC Instruments, Measurement of Power-Dynamometer type, different types of errors in indicating instruments.

11. Integrating Instruments

Definition and classification of integrating instruments, 1-ph, 3-ph phase induction type energy meters, errors in energy meters.

12. Special instruments

Power factor meter, Frequency meter, Synchronoscope, Instrument transformers CT-PT, Multi meter, Megger, Tongue tester.

13. Semiconductor Devices and Their Applications

Atomic structure and semiconductor theory, P-type and N-type materials, P-N junction, biasing and characteristics of diodes. Rectifier circuit - half wave, full wave, bridge rectifiers, Transistors-types of transistors- configurations, applications, working of inverter and UPS.

14. D.C. Generators

Generator Principle, simple loop generator, Production of induced EMF and its nature, Construction details of DC Generator, Yoke-poles-pole shoes -Armature- Commutator - brush assembly bearing Field coils, Armature winding-lap and wave winding, E.M.F. equation, Types of Generators-separately- Self excited-series-shunt-compound wound, Applications of different types of Generators.

15. D.C. Motors

Principle of working-Significance of back EMF(E_b), Types of dc motors, Series-shunt and compound motors, speed and torque equation, Speed Control of Motors-Field control method for series & shunt motors- Armature control methods (for shunt motors only), DC motor starters-Necessity of starter working of 3-point starter-4-point starter, Applications of different types of motors.

16. A C fundamentals & Circuits

Definitions of Alternating currents and voltage, different wave forms, Definition of cycle, time period, Frequency, Amplitude, Instantaneous value, maximum, Average and RMS values of A.C voltage & current, Form factor, Peak factor of sinusoidal wave, Phasor representation of A.C, Phase & Phase difference of ac, Power & Power Factor. Single phase A.C. Through Pure Resistive/Inductive/capacitive circuit- current-voltage-phasor diagrams- power-power factor, A.C. through R-L/R-C/R-L-C Circuit Current -voltage-phasor diagram Power-Power factor, Poly phase circuits-advantages of poly phase over single-phase Star and delta connection- voltage & current Relation in star connection - Delta or mesh connections, 3-phase power equation.

17. Transformers

Transformer – Its construction, working, performance, EMF equation, Cooling of transformer, losses and efficiency, transformation ratio. Construction of core, winding shielding, auxiliary parts breather, conservator. Buchholz's relay, other protective devices, Transformer oil testing, Auto transformer- working, Applications.

18. Alternators

Principle and operation of Alternators, Relation between speed, no. of poles and frequency, Constructional details of alternator – Salient pole type and smooth cylindrical type, EMF equation.

19. Three-Phase Induction Motors

Classification of 3-Ph motors, working principle of 3-Ph Induction motors, Relations between N_s , no. of poles and supply frequency-Definition of Slip & slip speed, Constructional details of Induction Motors-squirrel cage and slip ring motors, Starters for Induction Motors-Necessity of starter-D.O.L starter-Star/delta starter-Rotor resistance starter for slip ring Induction Motor, Applications.

20. Single phase Induction Motors

Principle of operation of Single-phase Induction Motors, Types of 1-Ph Induction motor like Split phase, capacitor start -capacitor start capacitor run-shaded pole motors- their applications.

21. Generation of Power

Sources of Electrical Energy- conventional-non conventional energy sources, Generation of Electrical power using conventional energy sources -working of Hydel and Thermal power stations.

22. Transmission and Distribution of Power

Transmission of power from generating station to receiving stations, use of step-up and step-down transformers and associated equipment, Use of Circuit breaker-isolators-earth switches, C.T.'s etc., Distribution of power, Transformer substations, Distribution T/F Substation- Double Pole Structure-Pole mounted and Plinth mounted T/F, Substation associated equipment such as A.B. switch, L.A.-H.G. Fuse-Circuit Breaker.

23. Planning, Estimation & Costing of Wiring

Control Panel elements, types and specifications, Concept and Principle of plan, estimation and cost. Preparation of complete house wiring layout, industrial wiring.

24. Illumination

Introduction of Illumination, Terms & definitions, laws of illumination, requirements of good lighting, intensity of light –importance of light, colour available. Construction, working & applications of – Incandescent lamp, Fluorescent tube, CFL, Neon sign, Halogen, Mercury vapour and types, sodium vapour etc. Decoration lighting.

Model Paper (మోడల్ పేపర్)

1. The magnetizing force (H) and magnetic flux density (B) are connected by the relation []

అయస్కాంతీకరణ బలం (H) మరియు అయస్కాంత అభివాహ సాంద్రత (B) అనుసంధానించబడే సంబంధం

(1) $B = \mu H$

(2) $B = H / \mu_0 \mu_r$

(3) $B = \mu_0 H / \mu_r$

(4) $B = \mu_r H / \mu_0$

2. If the peak value of a certain sine wave voltage is 5 V, what is the peak-to-peakvalue? []

ఒక నిర్దిష్ట సైన్ తరంగ వోల్టేజ్ యొక్క శిఖర విలువ 5V అయితే శిఖరానికి, శిఖరానికి మధ్య విలువ

(1) 20 V

(2) 10 V

(3) 5 V

(4) 7.07 V

3. The standard supply frequency in India is []

భారతదేశంలో ప్రామాణిక సరఫరా పౌనఃపున్యం

(1) 25Hz

(2) 50Hz

(3) 60Hz

(4) 100Hz

4. In a three-phase system, the phase sequence is used to indicate the[]

మూడు దశల వ్యవస్థలో, దశల క్రమాన్ని ఉపయోగించి సూచించునది

- (1) Frequency of the voltages

వోల్టేజీల పౌనఃపున్యం

- (2) Magnitude of the voltages

వోల్టేజీల పరిమాణం

- (3) Angle between the voltages

వోల్టేజీల మధ్యకోణం

- (4) Order in which the phase voltages attain their peak values

దశల వోల్టేజీలు పొందే శిఖర విలువల క్రమం

5. _____ is most suitable for temporary wiring. []

_____తాత్కాలిక వైరింగ్‌కు చాలా అనుకూలంగా ఉంటుంది.

(1) Cleat Wiring

క్లీట్ వైరింగ్

(2) CTS Wiring

సిటిఎస్ వైరింగ్

(3) PVC Wiring

పివిసి వైరింగ్

(4) PVC Casing & Capping

పివిసి కేసింగ్ & క్యాపింగ్

6. I.E. rule pertaining to earthing is []

ఎర్టింగ్‌కు సంబంధించిన I.E. రూల్

(1) 89

(2) 90

(3) 88

(4) 87

7. The specific gravity of an electrolyte is measured with a _____ []

ఎలక్ట్రోలైట్ యొక్క నిర్దిష్ట గురుత్వాకర్షణను _____తో కొలుస్తారు.

(1) Watt meter

వాట్ మీటర్

(2) Ammeter

అమ్మీటర్

(3) Multi meter

మల్టీ మీటర్

(4) Hydro meter

హైడ్రో మీటర్

8. The two element 3-phase energy meter is only suitable for a system of _____ []

రెండు మూలకాల 3-ఫేస్ శక్తి మీటర్ _____ వ్యవస్థకు మాత్రమే సరిపోతుంది.

(1) 1-phase 2-wire

1-ఫేస్ 2-వైర్

(2) 1-phase 3-wire

1-ఫేస్ 3-వైర్

(3) 3-phase 3-wire

3-ఫేస్ 3-వైర్

(4) 3-phase 4-wire

3-ఫేస్ 4-వైర్

9. The advantage of moving iron instrument is []

మూవింగ్ ఐరన్ పరికరం యొక్క ఉపయోగం

(1) Used for both AC and DC

ఏసి మరియు డిసిలో ఉపయోగిస్తారు

(2) Used in DC only

డిసిలో మాత్రమే ఉపయోగిస్తారు

(3) Used in AC only

ఏసిలో మాత్రమే ఉపయోగిస్తారు

(4) Have non uniform scale

ఏకరీతి కాని స్కేలు ఉంటుంది

10. The most suitable material for transformer core is []

పరివర్తక కోర్ కు అతి సరియైన పదార్థం

(1) Hot rolled grain-oriented steel

వేడిగా చుట్టబడిన కణ ఆధారిత ఉక్కు

(2) Cold rolled grain-oriented steel

శీతలంగా చుట్టబడిన కణ ఆధారిత ఉక్కు

(3) Cast steel

పోత ఉక్కు

(4) Aluminum

అల్యూమినియం

Form-2

(For representing a State in India in a National Competition in one of the recognized Games/Sports)

STATE ASSOCIATION OF

Certificate to a meritorious sportsperson for Employment to Group-III posts/Service under the State Government/Similar posts in Government Institutions.

Certified that Shri _____ Son of
Shri _____ resident of (complete address)
_____ repr
esented the State of _____ in the game/event of
_____ in the National
Competition/Tournament held at _____ from
_____ to _____.

The position obtained by the individual/team in the above said Competition/Tournament was _____.

The Certificate is being given on the basis of records available in the Office of the State Association of _____.

Place _____

Signature _____

Date _____

Name _____

Designation _____

Name of the State

Association _____

Address _____

Seal _____

Note: This Certificate will be valid only when signed personally by the Secretary of the State Association.

Form-3

(For representing a University from A.P. State in the Inter-University Competition at National level/Zonal level/Regional level in one of the recognized Games/Sports)

UNIVERSITY OF _____

Certificate to a meritorious sportsperson for Employment to Group-IV posts/Service under the State Government/Similar posts in Government Institutions.

Certified that Shri _____ Son of
Shri _____ resident of (complete address)
_____ repr
esented the University of _____ in the game/event of
_____ in Inter University
Competition/Tournament held at _____ from
_____ to _____.

The position obtained by the individual/team in the above said Competition/Tournament was _____.

The Certificates is being given on the basis of records available in the Office of Dean of Sports or Officer in overall charge of Sports in the University of _____.

Place _____

Signature _____

Date _____

Name _____

Designation _____

Name of the University _____

Address _____

Seal _____

Note: This Certificate will be valid only when signed personally by Dean/Director or other Officer in overall charge of Sports in the concerned University.

ANNEXURE –I

CERTIFICATE

This is to certify that on verification of the Log Book, daily Log Sheet, Attendance Register maintained at _____ Sub-Station/Office and the Aquitance rolls maintained by the Contractor, Sri _____ (Full Name with Surname) S/o. Sri _____ (Full Name with Surname) has worked as _____ (designation of post) at _____ Sub-Station/office/Section for the period from _____ to _____

The particulars of Sri _____ are noted below

I. Particulars of Agreement

S. No	Name of the Incumbent	Name of the Contractor	Particulars of Agreement		Particulars of Work Order		Particulars of Check Measurement		No. of days present during the period from	Working in Sub-station/ Section Office/ any other office	Whether continuing as on date of Notification
			Agreement No.	Date	Work order No.	Date	Date	Amount			

II. Particulars of EPF :

S.No.	Name of the Incumbent	Name of the Contractor	Particulars of Remittance of EPF			Period	No. of Days
			Challan No.	Date	Amount		

III. Particulars of Group Insurance

S.No.	Name of the Incumbent	Name of the Contractor	Insurance Policy No.	Period No. of days	
				From	To

IV. Spells of absence for more than 180 days

S.No.	Name of the Incumbent	Name of the Contractor	Spells of Absence		
			From	To	No.of Days

Total No.of Man days (excluding absence period)_____

This certificate is issued only for the purpose of enabling Sri_____ to apply for the post of Energy Assistant (Junior Lineman Grade-II) in APCPDCL.

**EXECUTIVE ENGINEER
APCPDCL**

NOTE: The above particulars of agreement, check measurement, attendance are to be based on records only and Xerox copy of the records duly attested by the concerned Executive Engineer are to be enclosed to this certificate. The above particulars are to be verified by the Executive Engineer personally and he is responsible for the correctness of the particulars. Certificates of the lower officers and counter signed by Executive Engineer are not permitted. Executive Engineer himself should certify.

ANNEXURE-II

SCHOOL STUDY CERTIFICATE

NOTE: Should be obtained from the Head of Educational Institution(s).

Class	Name and Place of School	District	Duration of Study giving month and year
IV			
V			
VI			
VII			
VIII			
IX			
X or SSC			

STATION:
DATE:

Signature of the Head of the
Educational Institute(s)

FORM FOR COMMUNITY, NATIVITY AND DATE OF BIRTH CERTIFICATE

Serial No.

S.C.

S.T.

B.C.

Certificate No:

Seal of the
Issuing Office

District Code:

Mandal Code:

Village Code:

COMMUNITY, NATIVITY AND DATE OF BIRTH CERTIFICATE

(1) This is to certify that Sri _____ Son of
Sri _____ of Village/Town _____ the State of Andhra Pradesh
belongs to _____ Community which is recognized as (*) S.C/S.T/B.C Sub-
group _____

The Constitution (Scheduled Castes) Order, 1950

The Constitution (Scheduled Tribes) Order, 1950

G.O.Ms.No.1793, Education, dated 25.9.1970 as amended from time to time
(BCs)/SCs, STs list (modification) Order, 1956 S.Cs and S.Ts (Amendment) Act, 1976.

(2) It is certified that Sri _____ is native of
_____ Village/Town _____ Mandal _____ District of
Andhra Pradesh.

(3) It is certified that the place of birth of Sri _____ is
_____ Village/Town _____ Mandal _____ District of
Andhra Pradesh.

(4) It is certified that the date of birth of Sri _____ is
_____ Day _____ Month _____ Year _____ (in words)
_____ as per the declaration given by
his/her/father/mother/guardian and as entered in the School records where he/she studied.

Signature _____

Date _____

Name in Capital Letters

Designation:

(Seal)

Explanatory Note: While mentioning the community, the Competent Authority must mention the Sub-caste (in case of Scheduled Castes) and Sub-tribe or Sub-group (in case of Scheduled Tribes) as listed out in the S.Cs and S.Ts (Amendment) Act, 1976.

CERTIFICATE OF RESIDENCE

(To be produced by such candidates who have not studied in any educational institution during the whole or any part* of the relevant 4/7 years period but claim to be local candidates by virtue of residence for Post Codes for which there is reservation for Local Candidates)

It is here by certified

(a) That Sri _____
S/o. _____ appeared for the first time
for the Matriculation (S.S.C) Examination in _____ (Month) _____
(Year)

(b) That he/she has not studied in any educational institution during the whole/or part of the 4/7 consecutive academic years ending with the academic years ending with the in which he/she first appeared for the aforesaid examination.

(c) That in the 4/7 years immediately preceding the commencement of the aforesaid examination he/she resided in the following place / places namely;

Sl.No	Village	Mandal	District	Period
1				
2				
3				
4				
5				

OFFICE SEAL:

STATION:

DATED:

Officer of Revenue Department not
below the rank of Mandal Revenue
Officer holding independent Charge
of a Mandal.

* STRIKE OFF “WHOLE”/PART AS THE CASE MAY BE.